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# Greater Sage-Grouse

Volume 3: Appendixes 2—19

## Draft Resource Management Plan Amendment and Environmental Impact Statement









The Bureau of Land Management's multiple-use mission is to sustain the health and productivity of the public lands for the use and enjoyment of present and future generations. The Bureau accomplishes this by managing such activities as outdoor recreation, livestock grazing, mineral development, and energy production, and by conserving natural, historical, cultural, and other resources on public lands.

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# Appendix 2

## Existing Greater Sage-Grouse RMP Management Direction

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# Appendix 2. Existing Greater Sage-Grouse RMP Management Direction

## INTRODUCTION

This appendix includes the greater sage-grouse management goals, objectives and management decisions/actions added to the BLM's resource management plans (RMPs) during the 2014 and 2015 amendments/revisions and the 2019 amendments (as applicable). Each state has a separate section in this appendix with state-specific page numbering. In addition, the goals, objectives, and decisions/actions are numbered from their state-specific planning efforts. These actions apply to the following land use plans, which includes both RMPs, management framework plans, and other BLM planning-level documents, referred to collectively as RMPs. It is important to note that the language in these appendices may not be the exact language from the applicable 2015 or 2019 amendments. During the implementation process, some states have made subsequent amendments or maintenance actions to the language from the 2015 or 2019 ARMPAs. The language in this appendix presents the current management, inclusive of all such changes that have occurred subsequent to the original records of decision.

**California:**

- Altura RMP (2008)
- Eagle Lake RMP (2008)
- Surprise RMP (2008)

**Colorado:**

- Colorado River Valley RMP (2015), including Roan Plateau RMPA (2016)
- Grand Junction RMP (2015)
- Kremmling RMP (2015)
- Little Snake RMP (2011)
- White River RMP (1997) and associated amendments, including the White River Oil and Gas Amendment (2015)

**Idaho:**

- Bennett Hills/Timmerman Hills Management Framework Plan (MFP) (1980)
- Big Desert MFP (1981)
- Big Lost MFP (1983)
- Bruneau MFP (1983)
- Cassia RMP (1985)
- Challis RMP (1999)
- Craters of the Moon National Monument RMP (2006)
- Four Rivers RMP (2023)
- Jarbidge RMP (2015)
- Lemhi RMP (1987)
- Little Lost-Birch Creek MFP (1981)
- Magic MFP (1975)
- Medicine Lodge MFP (1981)

- Monument RMP (1985)
- Owyhee RMP (1999)
- Pocatello RMP (2012)
- Snake River Birds of Prey National Conservation Area RMP (2008)
- Sun Valley MFP (1981)
- Twin Falls MFP (1982)

**Montana/Dakotas:**

- Billings and Pompeys Pillar Nation Monument RMP (2015)
- Butte RMP (2009)
- Dillon RMP (2006)
- HiLine RMP (2015)
- Lewistown RMP (2021)
- Miles City RMP (2015)
- North Dakota RMP (1988)
- South Dakota RMP (2015)
- Upper Missouri River Breaks National Monument RMP (2008)

**Nevada:**

- Black Rock Desert-High Rock Canyon Emigrant Trails National Conservation Area RMP (2004)
- Carson City Field Office Consolidated RMP (2001)
- Elko RMP (1987)
- Ely RMP (2008)
- Shoshone-Eureka RMP (1986)
- Tonopah RMP (1997)
- Wells RMP (1985)
- Winnemucca District RMP (2015)

**Oregon:**

- Andrews RMP (2005)
- Baker RMP (1989)
- Brothers/La Pine RMP (1989)
- Lakeview RMP (2003)
- Southeastern Oregon RMP (2002)
- Steens Mountain Cooperative Management and Protection Area RMP (2005)
- Three Rivers RMP (1992)
- Upper Deschutes RMP (2005)

**Utah:**

- Vernal RMP (2008)
- Price RMP (2008)
- Richfield RMP (2008)
- Kanab RMP (2008)
- Kanab/Escalante Planning Area RMP (2020)
- Grand Staircase-Escalante National Monument – Grand Staircase Unit RMP (2020)

- Cedar/Beaver/Garfield/Antimony RMP (1986)
- Pinyon MFP (1978)
- Warm Springs RMP (1987)
- House Range RMP (1987)
- Pony Express RMP (1990)
- Box Elder RMP (1986)
- Randolph MFP (1980)
- Park City MFP (1975)
- Salt Lake District Isolated Tracts Planning Analysis (1985)

**Wyoming:**

- Buffalo RMP (2015)
- Casper RMP (2007
- Cody RMP (2015)
- Kemmerer RMP (2010)
- Lander RMP (2014)
- Newcastle RMP (2000)
- Pinedale RMP (2008)
- Rawlins RMP (2008)
- Green River RMP (1997)
- Worland RMP (2015)

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# Appendix 2.1
# Colorado RMPs

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# Appendix 2. Existing Greater Sage-Grouse RMP Management Direction

## 2.1 COLORADO RMPS

This appendix presents the GRSG approved RMP amendment language from the 2015 and 2019 records of decision for Colorado. Changes between 2015 and 2019 are noted. The table below notes which goals, objectives, appendices, and management decisions/actions have a potential to change as a result of the current planning effort and if so, under which alternatives changes are being considered. Note that any references to tables and appendices are to those applicable 2015 and 2019 appendices that are listed in **Section 2.1.2** of this appendix.

### 2.1.1 Existing GRSG RMP Management – Colorado RMPs

**Table 1: Changes in Management from the 2015 Approved RMPA to the 2019 Approved RMPA**

| 2015 BLM GRSG Approved RMP Amendment | 2019 BLM GRSG Approved RMP Amendment | Potential Changes in 2023 Plan |
|---|---|---|
| ***SPECIAL STATUS SPECIES (SSS)*** | ***SPECIAL STATUS SPECIES (SSS)*** | — |
| **Objectives:** | **Objectives:** | — |
| **Objective SSS-1:** Maintain and enhance populations and distribution of GRSG by protecting and improving sagebrush habitats and ecosystems that sustain GRSG populations. | No changes made. | Potential change under Alternatives 3, 4, 5 and 6. |
| **Management Decisions (MD):** | **Management Decisions (MD):** | — |
| **MD SSS-1:** Adaptive Management: Implement Adaptive Management Plan including soft and hard triggers as described in Appendix H (Guidelines for Implementation and Adaptive Management). The hard and soft trigger data will be analyzed as soon as it becomes available after the signing of the ROD and then at a minimum, analyzed annually thereafter. | No changes made. | Potential change under Alternatives 3, 4, 5 and 6. |
| **MD SSS-2:** In undertaking BLM management actions, and consistent with valid and existing rights and applicable law in authorizing third-party actions, the BLM will apply the lek buffer distances identified in the U.S. Geological Survey Conservation Buffer Distance Estimates for Greater Sage-Grouse—A Review (Open File Report 2014-1239) in accordance with Appendix B. | **MD SSS-2:** In undertaking BLM management actions, and consistent with valid and existing rights and applicable law in authorizing third-party actions, the BLM will evaluate the lek buffer distances during project-specific NEPA analyses, in accordance with Appendix H (Guidelines for Implementation and Adaptive Management). Appendix B of the 2015 ROD/ARMPA will not be carried forward. | No changes proposed. |

| 2015 BLM GRSG Approved RMP Amendment | 2019 BLM GRSG Approved RMP Amendment | Potential Changes in 2023 Plan |
|---|---|---|
| **MD SSS-3:** In all sage-grouse habitat, in undertaking BLM management actions, and, consistent with valid existing rights and applicable law, in authorizing third-party actions that result in habitat loss and degradation, the BLM will require and ensure mitigation that provides a net conservation gain to the species including accounting for any uncertainty associated with the effectiveness of such mitigation. This will be achieved by avoiding, minimizing, and compensating for impacts by applying beneficial mitigation actions. | **MD SSS-3:** In all Greater Sage-Grouse habitat, before authorizing third-party actions that result in habitat loss and degradation, the BLM will complete the following steps, in alignment with the Governor of Colorado's Executive Orders 2015-004 (May 15, 2015) and 2018-036 (December 2018), including avoiding, minimizing, and compensating for impacts by applying beneficial mitigation actions.<br>1. If the proponent has not already done so pursuant to Colorado Executive Order 2015-004 and 2018-036, and 2 CCR 404-1:1200 et seq. or other applicable law, policy or regulation, BLM will notify Colorado Parks and Wildlife to determine if the State requires or recommends any additional mitigation – including compensatory mitigation – under State regulations, policies, or programs related to the conservation of Greater Sage-Grouse.<br>2. Incorporate state required or recommended mitigation into the BLM's NEPA and decisionmaking process, if the CPW determines that there are unacceptable residual impacts on Greater Sage-Grouse or its habitat and compensatory mitigation is required as a part of a State policy or authorization, or if a proponent voluntarily offers mitigation.<br>3. Analyze whether the compensatory mitigation:<br>• achieves measurable outcomes for Greater Sage-Grouse habitat function that are at least equal to the lost or degraded values<br>• provides benefits that are in place for at least the duration of the impacts<br>• accounts for a level of risk that the mitigation action may fail or not persist for the full duration of the impact<br>4. Verify that the project proponent has coordinated with the State of Colorado to ensure it complies with Executive Orders 2015-004 and 2018-036 and, when necessary, complies with 2 CCR 404-1:1200 et seq. or other applicable state law, policy or regulation relating to its proposal.<br>5. Through coordination with CPW, ensure mitigation outcomes are consistent with the State of Colorado's mitigation strategy and principles outlined in **Appendix H** (Guidelines for Implementation and Adaptive Management). | Potential change under Alternatives 3, 4, 5 and 6. |

| 2015 BLM GRSG Approved RMP Amendment | 2019 BLM GRSG Approved RMP Amendment | Potential Changes in 2023 Plan |
|---|---|---|
| ***VEGETATION (VEG)*** | ***VEGETATION (VEG)*** | — |
| **Objectives:** | **Objectives:** | — |
| **Objective VEG-1:** (1) Use habitat restoration as a tool to create and/or maintain landscapes that benefit GRSG; (2) Use Integrated Vegetation Management to control, suppress, and eradicate, where possible, noxious and invasive species per BLM Handbook H-1740-2; and (3) In PHMA, the desired condition is to maintain all lands ecologically capable of producing sagebrush (but no less than 70 percent) with a minimum of 15 percent sagebrush cover or as consistent with specific ecological site conditions. The attributes necessary to sustain these habitats are described in Interpreting Indicators of Rangeland Health (BLM Technical Reference 1734-6). | No changes made. | No changes proposed. |

| 2015 BLM GRSG Approved RMP Amendment | 2019 BLM GRSG Approved RMP Amendment | Potential Changes in 2023 Plan |
|---|---|---|
| **Management Decisions (MD):** | **Management Decisions (MD):** | — |
| ***Sagebrush Steppe (Habitat Restoration)*** | ***Sagebrush Steppe (Habitat Restoration)*** | — |
| **MD VEG-1:** (ADH) When planning restoration treatments in GRSG habitat, identify seasonal habitat availability, and prioritize treatments in areas that are thought to be limiting GRSG distribution and/or abundance.<br>The habitat objectives for GRSG (**Table 2**) are a list of indicators and values that describe GRSG seasonal habitat conditions. The values for the indicators were derived using a synthesis of current local and regional GRSG habitat research and data and reflect variability of ecological sites. The habitat cover indicators are consistent with existing indicators used by the BLM.<br>When determining if a site is meeting habitat objectives, the measurements from that particular site would be assessed based on the range of values for the indicators in **Table 2**. **Table 2** is one component of GRSG multi-scale habitat assessment (see **Appendix D**, Greater Sage-Grouse Monitoring Framework).<br>The results of the habitat assessment would be used during the land health evaluation to ascertain if the land health standard applicable to GRSG habitat (e.g., special status species habitat standard) is being met.<br>When authorizing activities in GRSG habitat, the BLM would consider if habitat objectives are being achieved. If the habitat objectives are not being achieved, and the site has the potential for achieving these objectives, the BLM would determine the causal factor(s) and make the necessary management adjustments to address the causal factor(s), following current BLM regulations and policy. | No changes made. | Potential change under Alternatives 3, 4, 5 and 6. |
| **MD VEG-2:** (PHMA) Include GRSG habitat parameters as defined by Connelly et al. (2000), Hagen et al. (2007), or, if available, state GRSG conservation plans and appropriate local information in habitat restoration objectives. Make meeting these objectives within GRSG PHMA areas a high restoration priority. | No changes made. | No changes proposed. |

| 2015 BLM GRSG Approved RMP Amendment | 2019 BLM GRSG Approved RMP Amendment | Potential Changes in 2023 Plan |
|---|---|---|
| **MD VEG-3:** (ADH) Require use of native plant seeds that are beneficial for GRSG for vegetation treatments based on availability, adaptation (site potential), probability for success (Richards et al. 1998), and the vegetation management objectives for the area covered by the treatment. Where probability of success or native seed availability is low, use species that meet soil stability and hydrologic function objectives as well as vegetation and GRSG habitat objectives (Pyke 2011). | No changes made. | No changes proposed. |
| **MD VEG-4:** (PHMA) Design post restoration management to ensure long-term persistence of seeded or pre-burn native plants. This may require temporary or long-term changes in livestock grazing, wild horse management, travel management, and other uses, to achieve and maintain the desired condition of emergency stabilization and rehabilitation (ESR) projects to benefit GRSG (Eiswerth and Shonkwiler 2006). | No changes made. | No changes proposed. |
| **MD VEG-5:** (ADH) Manage for a habitat objective that is primarily sagebrush with a mosaic of seral stages and sagebrush in all age classes. On a site-by-site basis, do not allow treatments that would adversely affect GRSG populations. | No changes made. | No changes proposed. |
| **MD VEG-6:** (ADH) Make reestablishment of sagebrush and desirable understory plant cover (relative to ecological site potential) the highest priority for restoration efforts. Consider GRSG habitat requirements in conjunction with all resource values managed by the BLM, and give preference to GRSG habitat unless site-specific circumstances warrant an exemption. | No changes made. | No changes proposed. |
| **MD VEG-7:** (ADH) Authorize local sagebrush seed collection to support local restoration efforts. | No changes made. | No changes proposed. |
| **MD VEG-8:** (ADH) Treat areas that contain *Bromus tectorum* and other invasive or noxious species to minimize competition and favor establishment of desired species. | No changes made. | No changes proposed. |

| 2015 BLM GRSG Approved RMP Amendment | 2019 BLM GRSG Approved RMP Amendment | Potential Changes in 2023 Plan |
|---|---|---|
| ***Conifer Encroachment*** | ***Conifer Encroachment*** | — |
| **MD VEG-8:** Remove conifers encroaching into sagebrush habitats, in a manner that considers tribal cultural values. Prioritize treatments closest to occupied GRSG habitats and near occupied leks, and where juniper encroachment is phase 1 or phase 2. Use of site-specific analysis and principles like those September 2015 *Northwest Colorado Greater Sage-Grouse Approved RMP Amendment* 2-7 included in the Fire and Invasives Assessment Team report (Chambers et. al., 2014) and other ongoing modeling efforts to address conifer encroachment will help refine the location for specific priority areas to be treated. See **Appendix H**, Guidelines for Implementation and Adaptive Management. | No changes made. | No changes proposed. |
| ***FIRE AND FUELS MANAGEMENT (FIRE)*** | ***FIRE AND FUELS MANAGEMENT (FIRE)*** | — |
| **Objectives:** | **Objectives:** | — |
| **Objective FIRE-1:** Manage fire to maintain and enhance large blocks of contiguous sagebrush. | No changes made. | No changes proposed. |
| **Management Decisions (MD):** | **Management Decisions (MD):** | — |
| ***Suppression (Fire Operations)*** | ***Suppression (Fire Operations)*** | — |
| **MD FIRE-1:** (PHMA) The protection of human life is the single, overriding priority. Setting priorities among protecting human communities and community infrastructure, other property and improvements, and natural and cultural resources will be done based on the values to be protected, human health and safety, and the costs of protection. Consider GRSG habitat requirements commensurate with all resource values at risk managed by the BLM. | No changes made. | No changes proposed. |
| **MD FIRE-2:** (GHMA) The protection of human life is the single, overriding priority. Setting priorities among protecting human communities and community infrastructure, other property and improvements, and natural and cultural resources will be done based on the values to be protected, human health and safety, and the costs of protection. Consider GRSG habitat requirements commensurate with all resource values at risk managed by the BLM. | No changes made. | No changes proposed. |

| 2015 BLM GRSG Approved RMP Amendment | 2019 BLM GRSG Approved RMP Amendment | Potential Changes in 2023 Plan |
|---|---|---|
| **MD FIRE-3:** (PHMA/GHMA) Temporary closures would be considered in accordance with 43 CFR subparts 8364, 8351, 6302 and 8341. Temporary closure or restriction orders under these authorities are enacted at the discretion of the authorized officer to resolve management conflicts and protect persons, property, and public lands and resources. Where an authorized officer determines that off-highway vehicles are causing or will cause considerable adverse effects upon soil, vegetation, wildlife, wildlife habitat, cultural resources, historical resources, threatened or endangered species, wilderness suitability, other authorized uses, or other resources, the affected areas shall be immediately closed to the type(s) of vehicle causing the adverse effect until the adverse effects are eliminated and measures implemented to prevent recurrence (43 CFR, Part 8341.2). A closure or restriction order should be considered only after other management strategies and alternatives have been explored. The duration of temporary closure or restriction orders should be limited to 24 months or less; however, certain situations may require longer closures and/or iterative temporary closures. This may include closure of routes or areas. | No changes made. | No changes proposed. |
| **Objectives:** | **Objectives:** | — |
| **Objective FIRE-2:** Manage the fuels program to avoid GRSG habitat loss and restore damaged habitat. | No changes made. | No changes proposed. |
| **Management Decisions (MD):** | **Management Decisions (MD):** | — |
| ***Fuels Management*** | ***Fuels Management*** | — |
| **MD FIRE-4:** (PHMA) Do not reduce sagebrush canopy cover to less than 15 percent (Connelly et al. 2000; Hagen et al. 2007) in a project area unless a vegetation management objective requires additional reduction in sagebrush cover to meet strategic protection of GRSG PHMA and conserve habitat quality for the species, in consultation with the State of Colorado. | No changes made. | No changes proposed. |

| 2015 BLM GRSG Approved RMP Amendment | 2019 BLM GRSG Approved RMP Amendment | Potential Changes in 2023 Plan |
|---|---|---|
| **MD FIRE-5:** (PHMA) Apply appropriate seasonal restrictions for implementing vegetation management treatments according to the type of seasonal habitats present in a Colorado management zone (MZ). | No changes made. | No changes proposed. |
| **MD FIRE-6:** (PHMA) Allow no treatments in known winter range unless the treatments are designed to strategically reduce wildfire risk around or in the winter range and will maintain winter range habitat quality, unless in consultation with the State of Colorado it is deemed necessary to reduce risk to life and property. | No changes made. | No changes proposed. |
| **MD FIRE-7:** (ADH) Do not use fire to treat sagebrush in less than 12-inch precipitation zones (e.g., Wyoming big sagebrush or other xeric sagebrush species) (Connelly et al. 2000; Hagen et al. 2007; Beck et al. 2009). However, if as a last resort and after all other treatment opportunities have been explored, and site-specific variables allow, the use of prescribed fire or natural ignition fire for fuels breaks that would disrupt fuel continuity or enhance land health could be considered where cheatgrass is deemed a minor threat.<br><br>If prescribed fire is used in GRSG habitat, the NEPA analysis for the burn plan will address:<br>• why alternative techniques were not selected as viable options<br>• how GRSG goals and objectives would be met by its use<br>• how the COT report objectives would be addressed and met<br>• a risk assessment to address how potential threats to GRSG habitat would be minimized<br><br>Prescribed fire as a vegetation or fuels treatment shall only be considered after the NEPA analysis for the burn plan has addressed the four bullets outlined above. Prescribed fire could be used to meet specific fuels objectives that would protect GRSG habitat in PHMA (e.g., creating fuel designed to strategically reduce wildfire risk around and/or in the winter range and designed to protect winter range habitat quality breaks that | No changes made. | No changes proposed. |

| 2015 BLM GRSG Approved RMP Amendment | 2019 BLM GRSG Approved RMP Amendment | Potential Changes in 2023 Plan |
|---|---|---|
| would disrupt the fuel continuity across the landscape in stands where annual invasive grasses are a minor component in the understory, burning slash piles from conifer-reduction treatments, or being used as a component with other treatment methods to combat annual grasses and restore native plant communities).<br><br>Prescribed fire in known winter range shall only be considered after the NEPA analysis for the burn plan has addressed the four bullets outlined above. Any prescribed fire in winter habitat would need to be designed to strategically reduce wildfire risk around and/or in the winter range and designed to protect winter range habitat quality. | *(See above.)* | *(See above.)* |
| **MD FIRE-8:** (ADH) Monitor and control invasive vegetation post treatment. | No changes made. | No changes proposed. |
| **MD FIRE-9:** (ADH) Require use of native plant seeds for vegetation treatments based on availability, adaptation (site potential), probability for success (Richards et al. 1998), and the vegetation management objectives for the area covered by the treatment. Where probability of success or native seed availability is low, use species that meet soil stability and hydrologic function objectives as well as vegetation and GRSG habitat objectives (Pyke 2011). | No changes made. | No changes proposed. |
| **MD FIRE-10:** (PHMA) Design post fuels management to ensure long-term persistence of seeded or pre-burn native plants. This may require temporary or long-term changes in livestock grazing, wild horse management, travel management, and other uses, to achieve and maintain the desired condition of ESR projects to benefit GRSG (Eiswerth and Shonkwiler 2006). | No changes made. | No changes proposed. |

| 2015 BLM GRSG Approved RMP Amendment | 2019 BLM GRSG Approved RMP Amendment | Potential Changes in 2023 Plan |
|---|---|---|
| **MD FIRE-11:** (ADH) Design vegetation treatments in GRSG habitats to strategically facilitate firefighter safety, reduce wildfire threats, and extreme fire behavior. This may involve spatially arranging new vegetation treatments with past treatments, vegetation with fire-resistant serial stages, natural barriers, and roads in order to constrain fire spread and growth. This may require vegetation treatments to be implemented in a more linear versus block design (Launchbaugh et al. 2007). | No changes made. | No changes proposed. |
| **MD FIRE-12:** (PHMA) During fuels management project design, consider the utility of using livestock to strategically reduce fine fuels (Diamond at al. 2009), and implement grazing management that will accomplish this objective (Davies et al. 2011; Launchbaugh et al. 2007). Consult with ecologists to minimize impacts to native perennial grasses consistent with the objectives and conservation measures of the grazing section. | No changes made. | No changes proposed. |
| **Objectives:** | **Objectives:** | — |
| **Objective FIRE-3:** Use ESR to address post-wildfire threats to GRSG habitat. | No changes made. | No changes proposed. |
| **Management Decisions (MD):** | **Management Decisions (MD):** | — |
| ***Post-Fire Management (Emergency Stabilization and Rehabilitation)*** | ***Post-Fire Management (Emergency Stabilization and Rehabilitation)*** | — |
| **MD FIRE-13:** (ADH) Require use of native plant seeds that are beneficial for GRSG for vegetation treatments based on availability, adaptation (site potential), probability for success (Richards et al. 1998), and the vegetation management objectives for the area covered by the treatment. Where attempts to use native seeds have failed, or native seed availability is low, use species that meet soil stability and hydrologic function objectives, as well as vegetation and GRSG habitat objectives (Pyke 2011). | No changes made. | No changes proposed. |

| 2015 BLM GRSG Approved RMP Amendment | 2019 BLM GRSG Approved RMP Amendment | Potential Changes in 2023 Plan |
|---|---|---|
| **MD FIRE-14:** (ADH) Design post-fire ESR and Burn Area Emergency Rehabilitation management to ensure long-term persistence of seeded or pre-burn native plants. This may require temporary or long-term changes in livestock grazing, wild horse management, travel management, and other uses to achieve and maintain the desired condition of ESR and Burn Area Emergency Rehabilitation projects to benefit GRSG (Eiswerth and Shonkwiler 2006). | No changes made. | No changes proposed. |
| **MD FIRE-15:** (ADH) Rest burned areas from grazing for two full growing seasons unless vegetation recovery dictates otherwise (Wyoming Game and Fish Department 2011). | — | No changes proposed. |
| ***RANGE MANAGEMENT (RM)*** | ***RANGE MANAGEMENT (RM)*** | — |
| **Objectives:** | **Objectives:** | — |
| **Objective RM-1:** GRSG objectives and well-managed livestock operations are compatible because forage availability for livestock and hiding cover for GRSG are both dependent on healthy plant communities. Agreements with partners that promote sustainable GRSG populations concurrent with sustainable ranch operations offer long-term stability. In the context of sustainable range operations, manage the range program to: 1) maintain or enhance vigorous and productive plant communities; 2) maintain residual herbaceous cover to reduce predation during GRSG nesting and early brood-rearing; 3) avoid direct adverse impacts to GRSG-associated range project infrastructure; and 4) employ grazing management strategies that avoid concentrating animals on key GRSG habitats during key seasons. | No changes made. | Potential change under Alternatives 3, 4, 5 and 6. |
| **Management Decisions (MD):** | **Management Decisions (MD):** | — |
| **MD RM-1:** (ADH) Within ADH, incorporate GRSG habitat objectives and management considerations into all BLM grazing allotments through Allotment Management Plans. | No changes made. | Potential change under Alternatives 3, 4, 5 and 6. |
| **MD RM-2:** (ADH) Work cooperatively on integrated ranch planning within GRSG habitat. Develop management strategies that are seamless with respect to actions on public and private lands within BLM grazing allotments. | No changes made. | Potential change under Alternatives 3, 4, 5 and 6. |

| 2015 BLM GRSG Approved RMP Amendment | 2019 BLM GRSG Approved RMP Amendment | Potential Changes in 2023 Plan |
|---|---|---|
| **MD RM-3:** (PHMA) The BLM will prioritize:<br>1. the review of grazing permits/leases, in particular to determine if modification is necessary prior to renewal, and<br>2. the processing of grazing permits/leases in PHMA.<br><br>In setting workload priorities, precedence will be given to existing permits/leases in these areas not meeting Land Health Standards, with focus on those containing riparian areas, including wet meadows. The BLM may use other criteria for prioritization to respond to urgent natural resource concerns (e.g., fire) and legal obligations. | No changes made. | Potential change under Alternatives 3, 4, 5 and 6. |
| **MD RM-4:** (ADH) Conduct land health assessments that include (at a minimum) indicators and measurements of vegetation structure/condition/composition specific to achieving GRSG habitat objectives (Doherty et al. 2011). If local/state seasonal habitat objectives are not available, use GRSG habitat recommendations from Connelly et al. 2000 and Hagen et al. 2007. | No changes made. | Potential change under Alternatives 3, 4, 5 and 6. |
| ***Implementing Management Actions after Land Health and Habitat Evaluations*** | ***Implementing Management Actions after Land Health and Habitat Evaluations*** | — |
| **MD RM-5:** (ADH) Develop specific objectives—through NEPA analysis conducted in accordance with the permit/lease renewal process—to conserve, enhance, or restore GRSG habitat. Base benchmarks on Ecological Site/Range Site Descriptions. When existing on Ecological Site/Range Site Descriptions have not been developed, or are too general to serve adequately as benchmarks, identify and document local reference sites for areas of similar potential that exemplify achievement of GRSG habitat objectives and use these sites as the benchmark reference. Establish measurable objectives related to GRSG habitat from baseline monitoring data, ecological site descriptions, or land health assessments/evaluations, or other habitat and successional stage objectives. | No changes made. | Potential change under Alternatives 3, 4, 5 and 6. |

| 2015 BLM GRSG Approved RMP Amendment | 2019 BLM GRSG Approved RMP Amendment | Potential Changes in 2023 Plan |
|---|---|---|
| **MD RM-6:** (ADH) Manage for vegetation composition and structure consistent with ecological site potential and within the reference state subject to habitat objectives, including successional stages. | No changes made. | Potential change under Alternatives 3, 4, 5 and 6. |
| **MD RM-7:** (ADH) Include terms and conditions on grazing permits and leases that address disruptive activities that affect GRSG and assure plant growth requirements are met and residual forage remains available for GRSG hiding cover.<br><br>Specify as necessary:<br>1. Season or timing of use<br>2. Numbers of livestock (include temporary non-use or livestock removal)<br>3. Distributions of livestock use<br>4. Intensity of use (utilization or stubble height objectives)<br>5. Kind of livestock (e.g., cattle, sheep, horse, llama, alpaca, and goat)<br>6. Class of livestock (e.g., yearlings versus cow/calf pairs)<br>7. Locations of bed grounds, sheep camps, trail routes, and the like | No changes made. | Potential change under Alternatives 3, 4, 5 and 6. |
| **MD RM-8:** (ADH) Develop drought contingency plans at the appropriate landscape unit that provide for a consistent/appropriate BLM response. Plans shall establish policy for addressing ongoing drought and post-drought recovery for GRSG habitat objectives. | No changes made. | Potential change under Alternatives 3, 4, 5 and 6. |
| **MD RM-9:** The NEPA analysis for renewals and modifications of livestock grazing permits/leases that include lands within PHMA would include specific management thresholds based on Table 2.3 in the Proposed Plan, Land Health Standards (43 CFR, Part 4180.2), ecological site potential, and one or more defined responses that would allow the authorizing officer to make adjustments to livestock grazing that have already been subject to NEPA analysis. | No changes made. | Potential change under Alternatives 3, 4, 5 and 6. |
| **MD RM-10:** Allotments within PHMA, focusing on those containing riparian areas, including wet meadows, would be prioritized for field checks to help ensure compliance with the terms and conditions of the grazing permits. Field checks could include monitoring for actual use, utilization, and use supervision. | No changes made. | Potential change under Alternatives 3, 4, 5 and 6. |

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| ***Riparian Areas and Wet Meadows*** | ***Riparian Areas and Wet Meadows*** | |
| **MD RM-11:** (ADH) Manage riparian areas and wet meadows for proper functioning condition within ADH. | No changes made. | Potential change under Alternatives 3, 4, 5 and 6. |
| **MD RM-12:** (ADH) Within ADH, manage wet meadows to maintain diverse species richness, including a component of perennial forbs, relative to site potential (i.e., reference state). | No changes made. | Potential change under Alternatives 3, 4, 5 and 6. |
| **MD RM-13:** (ADH) Establish permit/lease terms and conditions in conjunction with grazing strategies to ensure that the timing and level of utilization results in wet meadows with diverse species richness, including a component of perennial forbs, relative to site potential (i.e., reference state). | No changes made. | Potential change under Alternatives 3, 4, 5 and 6. |
| **MD RM-14:** (ADH) Authorize new water development only after determining that the project will not adversely impact GRSG from habitat loss. Ensure that adequate long-term grazing management is in effect before authorizing water developments that may increase levels of use or change season of use. Give specific consideration to adjacent or downstream wetland habitat when a project entails a diversion from a spring or seep. | No changes made. | Potential change under Alternatives 3, 4, 5 and 6. |
| **MD RM-15:** (ADH) Analyze springs, seeps and associated pipelines to determine if modifications are necessary to maintain the continuity of the predevelopment riparian area. If necessary to maintain GRSG populations or reverse a downward population trend caused by habitat loss, modify the project as necessary to restore the applicable wetland habitat. | No changes made. | Potential change under Alternatives 3, 4, 5 and 6. |
| ***Treatments to Increase Forage for Livestock/Wild Ungulates*** | ***Treatments to Increase Forage for Livestock/Wild Ungulates*** | — |
| **MD RM-16:** (ADH) Manage for a habitat objective that is primarily sagebrush with a mosaic of seral stages and sagebrush in all age classes. On a site-by-site basis, do not allow treatments that would adversely affect GRSG populations. See Appendix H, Guidelines for Implementation and Adaptive Management. | No changes made. | Potential change under Alternatives 3, 4, 5 and 6. |

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| **MD RM-17:** (PHMA) Evaluate the role of existing seedings that are currently composed of primarily introduced perennial grasses in and adjacent to GRSG PHMA to determine if they should be restored to sagebrush or habitat of higher quality for GRSG. If these seedings are part of an Allotment Management Plan/Conservation Plan or if they provide value in conserving or enhancing the rest of PHMA, then no restoration would be necessary. Assess the compatibility of these seedings for GRSG habitat or as a component of a grazing system during the land health assessments (Davies et al. 2011).<br><br>For example: Some introduced grass seedings are an integral part of a livestock management plan and reduce grazing pressure in important sagebrush habitats or serve as a strategic fuels management area. | No changes made. | Potential change under Alternatives 3, 4, 5 and 6. |
| ***Structural Range Improvements and Livestock Management Tools*** | ***Structural Range Improvements and Livestock Management Tools*** | — |
| **MD RM-18:** (ADH) Design new range improvement projects to enhance livestock distribution and to control the timing and intensity of utilization. Examples of structural range improvement projects are cattle guards, fences, corrals, pipelines, troughs, storage tanks, windmills, ponds/reservoirs, solar panels, and spring developments.<br><br>Include a plan to monitor and control invasive plant species following any related ground disturbance. Place mineral or salt supplements away from water sources and leks in locations that enhance livestock distribution. | No changes made. | Potential change under Alternatives 3, 4, 5 and 6. |
| **MD RM-19:** (PHMA) Where conditions create the potential for impacts from West Nile virus from developments or modification of water developments, use preferred design features (PDFs)/RDFs to mitigate the potential impacts. See **Appendix C** (Required Design Features, Preferred Design Features, and Suggested Design Features). | No changes made. | Potential change under Alternatives 3, 4, 5 and 6. |

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| **MD RM-20:** (PHMA) Evaluate existing structural range improvements to determine if modifications are necessary to maintain GRSG populations or reverse a downward population trend caused by habitat loss. Modify, relocate, or remove projects as necessary.<br><br>Place mineral and salt supplements away from water sources and leks in locations that enhance livestock distribution. | No changes made. | Potential change under Alternatives 3, 4, 5 and 6. |
| **MD RM-21:** (ADH) Mark fences in high risk areas (Christiansen 2009; Stevens 2011).<br><br>(PHMA) Where marking fences does not reduce fence-related GRSG mortality, modify fences. Where modification does not reduce GRSG mortality and the fence-related mortality is sufficient to adversely affect GRSG populations, remove fences. | No changes made. | Potential change under Alternatives 3, 4, 5 and 6. |
| **MD RM-22:** (ADH) Monitor for and treat invasive species associated with existing range improvements (Gelbard and Belnap 2003; Bergquist et al. 2007). | — | Potential change under Alternatives 3, 4, 5 and 6. |
| ***Retirement of Grazing Privileges*** | ***Retirement of Grazing Privileges*** | — |
| **MD RM-23:** (ADH) At the time a permittee or lessee voluntarily relinquishes a permit or lease, the BLM will consider whether the public lands where that permitted use was authorized shall remain available for livestock grazing or be used for other resource management objectives, such as reserve common allotments or fire breaks. This does not apply to or impact grazing preference transfers, which are addressed in 43 CFR, Part 4110.2-3.<br><br>When a permittee or lessee voluntarily relinquishes grazing preference, consider conversion of the allotment to a reserve common allotment that will remain available for use on a temporary, nonrenewable basis for the benefit of GRSG habitat. Authorize temporary nonrenewal permits in Reserve Common Allotments to meet resource objectives elsewhere such as rest or deferment due to fire or vegetation treatments. Temporary use of reserve common allotments would not be allowed due to drought or overuse of customary allotments. | No changes made. | Potential change under Alternatives 3, 4, 5 and 6. |

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| ***WILD HORSES AND BURROS (WHB)*** | ***WILD HORSES AND BURROS (WHB)*** | — |
| **Objectives:** | **Objectives:** | — |
| **Objective WHB-1:** Manage wild horses in a manner designed to 1) avoid reductions in grass, forb, and shrub cover, and 2) avoid increasing unpalatable forbs and invasive plants such as Bromus tectorum. | No changes made. | Potential change under Alternative 3. |
| **Management Decisions (MD):** | **Management Decisions (MD):** | — |
| **MD WHB-1:** (ADH) Manage wild horse population levels within established appropriate management levels. | No changes made. | Potential change under Alternatives 3, 4, 5 and 6. |
| **MD WHB-2:** (ADH) Prioritize gathers in GRSG PHMA, unless removals are necessary in other areas to prevent catastrophic environmental issues, including herd health impacts. Consider GRSG habitat requirements in conjunction with all resource values managed by the BLM, and give preference to GRSG habitat unless site-specific circumstances warrant an exemption. | No changes made. | Potential change under Alternative 3. |
| **MD WHB-3:** (PHMA) Within PHMA, develop or amend BLM HMA plans to incorporate GRSG habitat objectives and management considerations for all BLM HMAs. When developing HMA plans, apply all appropriate conservation measures from the range program, including, but not limited to, utilization of forage and structural range improvements. | No changes made. | Potential change under Alternatives 3, 4, 5 and 6. |
| **MD WHB-4:** (PHMA) For all BLM HMAs within PHMA, prioritize the evaluation of all appropriate management levels based on indicators that address vegetation structure/condition/composition and measurements specific to achieving GRSG habitat objectives. Consider GRSG habitat requirements in conjunction with all resource values managed by the BLM, and give preference to GRSG habitat unless site-specific circumstances warrant an exemption. | No changes made. | Potential change under Alternative 3. |
| **MD WHB-5:** (ADH) Coordinate with other resources (range, wildlife, and riparian) to conduct land health assessments to determine existing vegetation structure/condition/composition within all BLM HMAs. | No changes made. | Potential change under Alternative 3. |

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| **MD WHB-6:** (PHMA) When conducting NEPA analysis for wild horse management activities, water developments, or other rangeland improvements for wild horses in PHMA, address the direct and indirect effects to GRSG populations and habitat. Implement any water developments or rangeland improvements using the criteria identified for domestic livestock identified above in PHMA. | No changes made. | Potential change under Alternative 3. |
| ***MINERALS (MR)*** | ***MINERALS (MR)*** | — |
| **Objectives:** | **Objectives:** | — |
| **Objective MR-1:** Manage fluid minerals to avoid, minimize, and compensate for: 1) direct disturbance, displacement, or mortality of GRSG; 2) direct loss of habitat or loss of effective habitat through fragmentation; and 3) cumulative landscape-level impacts. Priority will be given to leasing and development of fluid mineral resources, including geothermal, outside PHMA and GHMA. When analyzing leasing and authorizing development of fluid mineral resources, including geothermal, in PHMA and GHMA, and subject to applicable stipulations for the conservation of GRSG, priority will be given to development in non-habitat areas first and then in the least suitable habitat for GRSG. The implementation of these priorities will be subject to valid existing rights and any applicable law or regulation, including, but not limited to, 30 US Code 226(p) and 43 CFR, Part 3162.3-1(h). | No changes made. | Potential change under Alternatives 3, 4, 5 and 6. |

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| **Management Decisions (MD):** | **Management Decisions (MD):** | — |
| ***Unleased Fluid Minerals*** | ***Unleased Fluid Minerals*** | — |
| **MD MR-1:** No new leasing 1 mile from active leks in ADH. | **MD MR-1:** One mile from active leks: Open to leasing subject to **NSO-1**.<br><br>**NSO-1: **Exceptions or modifications** may be considered if, in consultation with the State of Colorado, it can be demonstrated that there is no impact on Greater Sage-Grouse based on one of the following:<br>• Topography/areas of non-habitat create an effective barrier to impacts<br>• No additional impacts would be realized above those created by existing major<br>• infrastructure (for example, State Highway 13)<br>• The exception or modification precludes or offsets greater potential impacts if the action were proposed on adjacent parcels (for example, due to landownership patterns)<br><br>**In order to approve exceptions or modifications to this lease stipulation, the Authorized Officer must obtain: agreement, including written justification, between the BLM District Managers and CPW that the proposed action satisfies at least one of the criteria listed above.<br>Waiver:<br>No waivers are authorized unless the area or resource mapped as possessing the attributes protected by the stipulation is determined during collaboration with the State of Colorado to lack those attributes or potential attributes. A 30-day public notice and comment period is required before waiver of a stipulation. Waivers would require BLM State Director approval. | Potential change under Alternatives 3, 4, 5 and 6. |
| **MD MR-2: No Surface Occupancy (NSO)** without waiver or modification in PHMA. See **Appendix G** (Stipulations Applicable to Fluid Mineral Leasing and Land Use Authorizations) for exceptions. The following stipulation would apply:<br><br>**GRSG NSO-46e:** See **Appendix G**, Stipulations Applicable to Fluid Mineral Leasing and Land Use Authorizations, for waiver, modification, and exception criteria. | **MD MR-2** (one mile from active leks to the remainder of PHMA): Open to leasing subject to No Surface Occupancy (**NSO-2**) with waivers, exceptions, or modifications in PHMA. Surface occupancy can occur in PHMA with approved waivers, exceptions, or modifications. The following stipulation would apply:<br><br>**NSO-2:** See Appendix G, Stipulations Applicable to Fluid Mineral Leasing and Land Use Authorizations for waiver, modification and exception criteria. | Potential change under Alternatives 3, 4, 5 and 6. |

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| **MD MR-3:** In GHMA, any new leases would include **TL** stipulations to protect GRSG and its habitat. The following stipulation would apply:<br><br>**GRSG TL-46e:** No activity associated with construction, drilling, or completions within 4 miles from active leks during lekking, nesting, and early brood-rearing (March 1 to July 15). Authorized Officer could grant an exception, modification, or waiver in consultation with the State of Colorado (**Appendix G**, Stipulations Applicable to Fluid Mineral Leasing and Land Use Authorizations). | No changes made. | Potential change under Alternatives 3, 4, 5 and 6. |
| **MD MR-4: No Surface Occupancy (NSO)** within 2 miles of active leks in GHMA. Waivers, exceptions, and modification could be obtained under conditions described in **Appendix G**, Stipulations Applicable to Fluid Mineral Leasing and Land Use Authorizations. | No changes made. | Potential change under Alternatives 3, 4, 5 and 6. |
| **MD MR-5:** Disturbance on new leases would be limited to 3 percent in PHMA (biologically significant unit) (see **Appendix E**, Methodology for Calculating Disturbance Caps) and would limited to 1 disturbance per 640 acres calculated by Colorado MZ. The following Lease Notice (LN) would apply:<br><br>**GRSG LN-46e**: Any lands leased in PHMA are subject to the restrictions of 1 disturbance per 640 acres calculated by biologically significant unit (Colorado populations) and proposed project analysis area (Colorado MZ) to allow clustered development (**Appendix G**, Stipulations Applicable to Fluid Mineral Leasing and Land Use Authorizations). | No changes made. | Potential change under Alternatives 3, 4, 5 and 6. |
| **MD MR-6:** No new leasing in PHMA if disturbance cap exceeds 3 percent calculated by biologically significant unit (Colorado populations) and proposed project analysis area (Colorado MZ) or 1 disturbance per 640 acres density is exceeded (see **Appendix E**, Methodology for Calculating Disturbance Caps). | No changes made. | Potential change under Alternatives 3, 4, 5 and 6. |

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| **MD MR-7:** (PHMA) Allow geophysical exploration within PHMA to obtain information for existing federal fluid mineral leases or areas adjacent to state or fee lands within PHMA. Allow geophysical operations only using helicopter-portable drilling, wheeled or tracked vehicles on existing roads, or other approved methods conducted in accordance with seasonal TLs and other restrictions that may apply. Geophysical exploration shall be subject to seasonal restrictions that preclude activities in breeding, nesting, brood-rearing, and winter habitats during their season of use by GRSG. | No changes made. | Potential change under Alternatives 4 and 5. |
| **Objectives:** | **Objectives:** | — |
| **Objective MR-2:** Where a proposed fluid mineral development project on an existing lease could adversely affect GRSG populations or habitat, the BLM will work with the lessees, operators, or other project proponents to avoid, reduce, and mitigate adverse impacts to the extent compatible with lessees' rights to drill and produce fluid mineral resources. The BLM will work with the lessee, operator or project proponent in developing an Application for Permit to Drill for the lease to avoid, minimize, and compensate for impacts to GRSG or its habitat and will ensure that the best information about GRSG and its habitat informs and helps guide development of such federal leases. | No changes made. | Proposed change under Alternative 3. |

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| **Management Decisions (MD):** | **Management Decisions (MD):** | — |
| ***Leased Fluid Minerals*** | ***Leased Fluid Minerals*** | — |
| **MD MR-8:** Within 1 mile of active leks, disturbance, disruptive activities, and occupancy are precluded.<br><br>If it is determined that this restriction would render the recovery of fluid minerals infeasible or uneconomic, considering the lease as a whole, or where development of existing leases requires that disturbance density exceeds 1 disturbance per 640 acres and/or the 3 percent disturbance cap (see **Appendix E**, Methodology for Calculating Disturbance Caps), use the **criteria*** below to site proposed lease activities to meet GRSG habitat objectives and require mitigation as described in **Appendix F** (Greater Sage-Grouse Mitigation Strategy).<br><br>**Criteria*:**<br>• Location of proposed lease activities in relation to critical GRSG habitat areas as identified by factors, including, but not limited to, average male lek attendance and/or important seasonal habitat<br>• An evaluation of the potential threats from proposed lease activities that may affect the local population as compared to benefits that could be accomplished through compensatory or off-site mitigation<br>• An evaluation of the proposed lease activities, including design features, in relation to the site-specific terrain and habitat features. For example, within 4 miles from a lek, local terrain features such as ridges and ravines may reduce the habitat importance and shield nearby habitat from disruptive factors. This is particularly likely in Colorado MZ 17, which has an atypical GRSG habitat featuring benches with GRSG habitat interspersed with steep ravines<br><br>To authorize an activity based on the criteria above, the environmental record of review must show no significant direct disturbance, displacement, or mortality of GRSG. | No changes made. | Potential change under Alternatives 3, 4, 5 and 6. |

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| **MD MR-9:** In PHMA and within 4 miles of an active lek, the **criteria*** below would be applied to guide development of the lease or unit that would result in the fewest impacts possible to GRSG.<br><br>**Criteria*:**<br>• Location of proposed lease activities in relation to critical GRSG habitat areas as identified by factors, including, but not limited to, average male lek attendance and/or important seasonal habitat<br>• An evaluation of the potential threats from proposed lease activities that may affect the local population as compared to benefits that could be accomplished through compensatory or off-site mitigation<br>• An evaluation of the proposed lease activities, including design features, in relation to the site-specific terrain and habitat features. For example, within 4 miles from a lek, local terrain features such as ridges and ravines may reduce the habitat importance and shield nearby habitat from disruptive factors. This is particularly likely in Colorado MZ 17, which has an atypical GRSG habitat featuring benches with GRSG habitat interspersed with steep ravines<br><br>To authorize an activity based on the criteria above, the environmental record of review must show no significant direct disturbance, displacement, or mortality of GRSG. | No changes made. | Potential change under Alternatives 3, 4, 5 and 6. |

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| **MD MR-10:** Based on site-specific conditions, prohibit construction, drilling, and completion within PHMA within 4 miles of a lek during lekking, nesting, and early brood-rearing (March 1 to July 15). In consultation with the State of Colorado, this TL may be adjusted based on application of the criteria below.<br><br>**Criteria*:**<br>• Location of proposed lease activities in relation to critical GRSG habitat areas as identified by factors, including, but not limited to, average male lek attendance and/or important seasonal habitat<br>• An evaluation of the potential threats from proposed lease activities that may affect the local population as compared to benefits that could be accomplished through compensatory or off-site mitigation<br>• An evaluation of the proposed lease activities, including design features, in relation to the site-specific terrain and habitat features. For example, within 4 miles from a lek, local terrain features such as ridges and ravines may reduce the habitat importance and shield nearby habitat from disruptive factors. This is particularly likely in Colorado MZ 17, which has an atypical GRSG habitat featuring benches with GRSG habitat interspersed with steep ravines<br><br>To authorize an activity based on the criteria above, the environmental record of review must show no significant direct disturbance, displacement, or mortality of GRSG. | No changes made. | Potential change under Alternatives 3, 4, 5 and 6. |
| **MD MR-11:** Within PHMA, operators would be encouraged to complete Master Development Plans in consultation with the State of Colorado, instead of single-well Applications for Permit to Drill for all but exploratory wells. (Notice to Lessees-54e: see **Appendix G**, Stipulations Applicable to Fluid Mineral Leasing and Land Use Authorizations.) | No changes made. | No changes proposed. |

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| **MD MR-12:** When necessary, conduct effective mitigation in 1) GRSG PHMA or—less preferably—2) GHMA (dependent upon the area-specific ability to increase GRSG populations and in consultation with the State of Colorado). | No changes made. | Potential change under Alternatives 3, 4, 5 and 6. |
| **MD MR-13:** Conduct effective compensatory mitigation first within PHMA in the same Colorado MZ where the impact is realized; if not possible, then conduct mitigation within the same population as the impact, or in other Colorado GRSG populations, in consultation with the State of Colorado. | No changes made. | Potential change under Alternatives 3, 4, 5 and 6. |
| **MD MR-14:** For future actions in ADH, require a full reclamation bond specific to the site in accordance with 43 CFR, Parts 3104.2, 3104.3, and 3104.5. Ensure bonds are sufficient for costs relative to reclamation (Connelly et al. 2000; Hagen et al. 2007) that would result in full restoration of the lands to the condition it was found prior to disturbance. Base the reclamation costs on the assumption that contractors for the BLM will perform the work. | No changes made. | Potential change under Alternatives 3, 4, 5 and 6.. |
| **Objectives:** | **Objectives:** | — |
| **Objective MR-3:** Manage solid mineral programs to avoid, minimize, and compensate for adverse impacts to GRSG habitat to the extent practical under the law and BLM jurisdiction. | No changes made. | Potential change under Alternative 3. |
| **Management Decisions (MD):** | **Management Decisions (MD):** | — |
| ***Locatable Minerals*** | ***Locatable Minerals*** | — |
| **MD MR-15:** (PHMA) In plans of operations required prior to any proposed surface-disturbing activities include as appropriate effective mitigation for conservation in accordance with existing policy (BLM Washington Office Instruction Memorandum 2013-142). | No changes made. | Potential change under Alternative 3. |
| **MD MR-16:** (PHMA) Where applicable to prevent unnecessary or undue degradation, apply seasonal restrictions if deemed necessary. | No changes made. | Potential change under Alternative 3. |
| **Objectives:** | **Objectives:** | — |
| **Objective MR-4:** Manage solid mineral programs to avoid, minimize, and compensate for adverse impacts to GRSG habitat to the extent practical under the law and BLM jurisdiction. | No changes made. | Potential change under Alternative 3. |

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| **Management Decisions (MD):** | **Management Decisions (MD):** | — |
| ***Saleable Minerals*** | ***Saleable Minerals*** | — |
| **MD MR-17:** (PHMA) Close PHMA to new mineral material sales. However, these areas would remain open to free use permits and the expansion of existing active pits, only if the following criteria are met:<br>• The activity is within the biologically significant unit and the project area disturbance cap<br>• The activity is subject to the provisions set forth in the mitigation strategy (Appendix F)<br>• All applicable required/preferred design features are applied; and [if applicable] the activity is permissible under the regional screening criteria (Appendix H, Guidelines for Implementation and Adaptive Management). | No changes made. | Potential change under Alternatives 3 and 6. |
| **MD MR-18:** (ADH) Restore salable mineral pits no longer in use to meet GRSG habitat conservation objectives. Require reclamation/restoration of GRSG habitat as a viable long-term goal to improve the GRSG habitat (Appendix H, Guidelines for Implementation and Adaptive Management). | No changes made. | Potential change under Alternatives 3 and 6. |
| **Objectives:** | **Objectives:** | — |
| **Objective MR-5:** Manage solid mineral programs to avoid, minimize, and compensate for adverse impacts to GRSG habitat to the extent practical under the law and BLM jurisdiction. | No changes made. | Potential change under Alternative 3. |
| **Management Decisions (MD):** | **Management Decisions (MD):** | — |
| ***Nonenergy Leasable Minerals*** | ***Nonenergy Leasable Minerals*** | — |
| **MD MR-19:** No new nonenergy mineral leasing in PHMA. | No changes made. | No changes proposed. |

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| **MD MR-20:** Existing nonenergy mineral leases: Apply the following conservation measures as conditions of approval (COAs) where applicable and feasible:<br>• Preclude new surface occupancy on existing leases within 1 mile of active leks (Blickley et al. 2012; Harju et al. 2012).<br>• If the lease is entirely within 1 mile of an active lek, require any development to be placed in the area of the lease least harmful to GRSG based on vegetation, topography, or other habitat features (Appendix G, Stipulations Applicable to Fluid Mineral Leasing and Land Use Authorizations).<br>• Preclude new surface disturbance on existing leases within 2 miles of active leks within PHMA. If the lease is entirely within 2 miles of an active lek, require any development to be placed in the area of the lease least harmful to GRSG based on vegetation, topography, or other habitat features (Appendix G, Stipulations Applicable to Fluid Mineral Leasing and Land Use Authorizations).<br>• Limit permitted disturbances to 1 disturbance per 640 acres average across the landscape in PHMA. Disturbances may not exceed 3 percent in PHMA (see Appendix E, Methodology for Calculating Disturbance Caps) in any biologically significant unit (Colorado populations) and proposed project analysis area (Colorado MZ).<br>GRSG TL-47-51 – Based on site-specific conditions, prohibit surface occupancy or disturbance within PHMA within 4 miles of a lek during lekking, nesting, and early brood-rearing (March 1 to July 15). | No changes made. | Potential change under Alternatives 3, 4, 5 and 6. |
| **Objectives:** | **Objectives:** | — |
| **Objective MR-6:** Utilize federal authority to protect GRSG habitat on split-estate lands to the extent provided by law. | No changes made. | Potential change under Alternative 3. |

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| **Management Decisions (MD):** | **Management Decisions (MD):** | — |
| ***Mineral Split-Estate*** | ***Mineral Split-Estate*** | — |
| **MD MR-21:** (PHMA/GHMA) Where the federal government owns the mineral estate in PHMA and GHMA, and the surface is in nonfederal ownership, apply the same stipulations, COAs, and/or conservation measures and RDFs/PDFs applied if the mineral estate is developed on BLM-administered lands in that management area, to the maximum extent permissible under existing authorities, and in coordination with the landowner. | No changes made. | Potential change under Alternative 3. |
| **MD MR-22:** (PHMA/GHMA) Where the federal government owns the surface and the mineral estate is in nonfederal ownership in PHMA and GHMA, apply appropriate surface use COAs, stipulations, and mineral RDFs/PDFs through ROW grants or other surface management instruments, to the maximum extent permissible under existing authorities, in coordination with the mineral estate owner/lessee. | No changes made. | Potential change under Alternative 3. |
| **Objectives:** | **Objectives:** | — |
| **Objective MR-7:** Manage solid mineral programs to avoid, minimize, and compensate for adverse impacts to GRSG habitat to the extent practical under the law and BLM jurisdiction. | No changes made. | No changes proposed. |

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| **Management Decisions (MD):** | **Management Decisions (MD):** | — |
| ***Solid Minerals – Coal*** | ***Solid Minerals – Coal*** | — |
| **MD MR-23:** (ADH) *Existing Coal Leases:* During the term of the lease, encourage the lessee to voluntarily follow PDFs (**Appendix C**, Required Design Features, Preferred Design Features, and Suggested Design Features) to reduce and mitigate any adverse impacts to GRSG. At the time an application for a new coal lease or lease modification is submitted to the BLM, the BLM will determine whether the lease application area is "unsuitable" for all or certain coal mining methods pursuant to 43 CFR, Part 3461.5. PHMA is essential habitat for maintaining GRSG for purposes of the suitability criteria set forth at 43 CFR, Part 3461.5(o)(1).<br><br>To authorize expansion of existing leases, the environmental record of review must show no significant direct disturbance, displacement, or mortality of GRSG based on these criteria:<br>• Important GRSG habitat areas as identified by factors, including, but not limited to, average male lek attendance and/or important seasonal habitat<br>• An evaluation of the threats affecting the local population as compared to benefits that could be accomplished through compensatory or off-site mitigation<br>• An evaluation of terrain and habitat features. For example, within 4 miles from a lek, local terrain features such as ridges and ravines may reduce the habitat importance and shield nearby habitat from disruptive factors. | No changes made. | No changes proposed. |
| **MD MR-24:** No new surface coal mine leases would be allowed in PHMA. At the time an application for a new coal lease or lease modification is submitted to the BLM, the BLM would determine whether the lease application area is "unsuitable" for all or certain coal mining methods pursuant to 43 CFR, Part 3461.5. PHMA is essential habitat for maintaining GRSG for purposes of the suitability criteria set forth at 43 CFR, Part 3461.5(o)(1). | No changes made. | No changes proposed. |

| 2015 BLM GRSG Approved RMP Amendment | 2019 BLM GRSG Approved RMP Amendment | Potential Changes in 2023 Plan |
|---|---|---|
| **MD MR-25:** *New Underground Coal Mine Leases would be subject to:* Special Stipulations:<br>• All surfaces disturbances will be placed more than 2 miles from active leks.<br>• No surface disturbance on remainder of PHMA subject to the following conditions:<br><br>If, after consultation with the State of Colorado, and in consideration of the following criteria, there is no significant direct disturbance, displacement, or mortality of GRSG or impact to GRSG habitat;<br>• 3 percent disturbance cap in PHMA with disturbances limited to 1 disturbance per 640 acres density calculated by Colorado MZ and proposed project analysis area would apply to new lease activities<br>• No new leasing in PHMA if disturbance cap exceeds 3 percent (see **Appendix E**, Methodology for Calculating Disturbance Caps) for the biologically significant unit (Colorado populations) and proposed project analysis area (Colorado MZ) or 1 disturbance per 640 acres is exceeded | No changes made. | No changes proposed. |

| 2015 BLM GRSG Approved RMP Amendment | 2019 BLM GRSG Approved RMP Amendment | Potential Changes in 2023 Plan |
|---|---|---|
| **MD MR-26:** (ADH) Underground mining exemption criteria for new leases:<br><br>1. Federal lands with coal deposits that would be mined by underground mining methods shall not be assessed as unsuitable where there would be no surface coal mining operations, as defined in 43 CFR, Part 3400.0-5(mm) of this title, on any lease, if issued.<br><br>Where underground mining will include surface operations and surface impacts on federal lands to which a criterion applies, the lands shall be assessed as unsuitable unless the surface management agency find that a relevant exception or exemption applies. See 43 CFR, Part 3461.1(b). Where practicable, limit permitted disturbances as defined in Appendix H, Guidelines for Implementation and Adaptive Management, to 3 percent in any biologically significant unit (Colorado populations) and proposed project analysis area (Colorado MZ). Where disturbance exceeds 3 percent in any biologically significant unit (Colorado populations) and proposed project analysis area (Colorado MZ), make additional, effective mitigation necessary to offset the resulting loss of GRSG habitat. | No changes made. | No changes proposed. |

| 2015 BLM GRSG Approved RMP Amendment | 2019 BLM GRSG Approved RMP Amendment | Potential Changes in 2023 Plan |
|---|---|---|
| **MD MR-27:** (PHMA) See 43 CFR, Part 3461.4 (a) and (b), Exploration. Authorized exploration activities may be conducted only if the Authorized Officer reviews any application for an exploration license on such lands to ensure that any exploration does not harm any value for which the area has been assessed as unsuitable and determines that the exploration will not adversely affect GRSG populations due to habitat loss or disruptive activities or that the impact can be fully mitigated. Where practicable, limit permitted disturbances as defined in **Appendix H**, Guidelines for Implementation and Adaptive Management, to 3 percent in PHMA any biologically significant unit (Colorado populations) and proposed project analysis area (Colorado MZ). Where disturbance exceeds 3 percent in any biologically significant unit (Colorado populations) and proposed project analysis area (Colorado MZ), make additional, effective mitigation necessary to offset the resulting loss of GRSG habitat. | No changes made. | No changes proposed. |
| **MD MR-28:** (PHMA) *Underground mining – lease renewals:*<br>• Require that all surface mining appurtenant facilities for underground mining be located outside of PHMA (unless the lessee establishes that that such location is not technically feasible).<br>• If surface mining facilities must be located in PHMA, require the facilities be located in areas of existing disturbance and to have the smallest footprint possible utilizing design strategies to minimize disturbance, such as those identified in the PDF section of this table.<br>• Apply as conditions of lease renewal all appropriate conservation measures, PDFs, and mitigation designed to avoid or minimize impacts to GRSG.<br><br>(ADH) *Surface mining – lease renewals/readjustments:* Apply as conditions of lease renewal all appropriate conservation measures, PDFs, and mitigation designed to avoid or minimize impacts to GRSG. | No changes made. | No changes proposed. |

| 2015 BLM GRSG Approved RMP Amendment | 2019 BLM GRSG Approved RMP Amendment | Potential Changes in 2023 Plan |
|---|---|---|
| **MD MR-29:** (ADH) Recommend or require as appropriate during all relevant points of the coal leasing and authorization process, minimization of surface-disturbing or disrupting activities (including operations and maintenance) where needed to reduce the impacts of human activities on important seasonal GRSG habitats. Apply these measures during activity-level planning (jurisdiction is managed by the State). The Office of Surface Mining or a delegated State Regulatory authority under the Surface Mining Control and Reclamation Act of 1977 authorizes surface-disturbing activities of active coal mining operations on federal mineral estate. The BLM coordinates with the Surface Mining Control and Reclamation Act of 1977 in overseeing coal leasing and permitting on federal lands. The resource recovery and protection plan for which BLM recommends approval to the Secretary integrates the reclamation plan recommended by the Surface Mining Control and Reclamation Act of 1977 for active coal mines on federal mineral estate. Approval of coal mining plans on lands containing leased federal coal is reserved to the Secretary of the Interior (30 CFR, Part 740.4). BLM issues coal leases and exploration licenses for right of entry to promote development of minerals on federal lands. See the following in regards to BLM exploration: 43 CFR, Part 3461.4, Exploration. States with delegated authority on federal lands from the Office of Surface Mining may have their own GRSG guidance in association with state wildlife agencies and such guidance may differ from state to state. | No changes made. | No changes proposed. |
| **MD MR-30:** (ADH) (a) Assessment of any area as unsuitable for all or certain stipulated methods of coal mining operations pursuant to Section 522 of the Surface Mining Control and Reclamation Act of 1977 (30 US Code 1272) and the regulations of this subpart does not prohibit exploration of such area under 43 CFR, Parts 3410 and 3480, and 43 CFR, Part 3461.4(a) | No changes made. | No changes proposed. |

| 2015 BLM GRSG Approved RMP Amendment | 2019 BLM GRSG Approved RMP Amendment | Potential Changes in 2023 Plan |
|---|---|---|
| **MD MR-31:** (ADH) (b) An application for an exploration license on any lands assessed as unsuitable for all or certain stipulated methods of coal mining shall be reviewed by the BLM to ensure that exploration does not harm any value for which the area has been assessed as unsuitable (43 CFR, Part 3461.4(b)) | No changes made. | No changes proposed. |
| ***RENEWABLE ENERGY (WIND AND SOLAR) (RE)*** | ***RENEWABLE ENERGY (WIND AND SOLAR) (RE)*** | — |
| **Objectives:** | **Objectives:** | — |
| **Objective RE-1:** Manage the Lands and Realty program to avoid, minimize, and compensate for the loss of habitat and habitat connectivity through the authorizations of ROWs, land tenure adjustments, proposed land withdrawals, agreements with partners, and incentive programs. | No changes made. | Potential change under Alternative 3. |
| **Management Decisions (MD):** | **Management Decisions (MD):** | — |
| ***Wind Energy Development*** | ***Wind Energy Development*** | — |
| **MD RE-1:** (PHMA) Manage PHMA as exclusion areas for wind energy development. | No changes made. | Potential change under Alternatives 3, 4, 5 and 6. |
| **MD RE-2:** (GHMA) Manage GHMA as avoidance areas for wind energy development. | No changes made. | Potential change under Alternatives 3, 4, 5 and 6. |
| ***Industrial Solar Development*** | ***Industrial Solar Development*** | |
| **MD RE-3:** (PHMA) Manage PHMA as exclusion areas for industrial solar projects. | No changes made. | Potential change under Alternatives 3, 4, 5 and 6. |
| **MD RE-4:** (GHMA) Manage GHMA as avoidance areas for industrial solar projects. | No changes made. | Potential change under Alternatives 3, 4, 5 and 6. |
| ***LANDS AND REALTY (LR)*** | ***LANDS AND REALTY (LR)*** | — |
| **Objectives:** | **Objectives:** | — |
| **Objective LR-1:** Manage the Lands and Realty program to avoid, minimize, and compensate for the loss of habitat and habitat connectivity through the authorizations of ROWs, land tenure adjustments, proposed land withdrawals, agreements with partners, and incentive programs. | No changes made. | Potential change under Alternative 3. |
| **Objective LR-2:** Effects of infrastructure projects, including siting, will be minimized using the best available science, updated as monitoring information on current infrastructure projects becomes available. | No changes made. | Potential change under Alternative 3. |

| 2015 BLM GRSG Approved RMP Amendment | 2019 BLM GRSG Approved RMP Amendment | Potential Changes in 2023 Plan |
|---|---|---|
| **Management Decisions (MD):** | **Management Decisions (MD):** | — |
| ***Land Use Authorizations*** | ***Land Use Authorizations*** | — |
| **MD LR-1:** Manage areas within PHMA as avoidance areas* for BLM ROW permits. (See **Appendix G**, Stipulations Applicable to Fluid Mineral Leasing and Land Use Authorizations.)<br><br>***GRSG PHMA ROW Avoidance.** ROWs may be issued after documenting that the ROWs would not adversely affect GRSG populations based on the following criteria:<br>• Location of proposed activities in relation to critical GRSG habitat areas as identified by factors, including, but not limited to, average male lek attendance and/or important seasonal habitat.<br>• An evaluation of the potential threats from proposed activities that may affect the local population as compared to benefits that could be accomplished through compensatory or off-site mitigation<br>• An evaluation of the proposed activities in relation to the site-specific terrain and habitat features. For example, within 4 miles from a lek, local terrain features such as ridges and ravines may reduce the habitat importance and shield nearby habitat from disruptive factors. | No changes made. | Potential change under Alternatives 3, 4, 5 and 6. |

| 2015 BLM GRSG Approved RMP Amendment | 2019 BLM GRSG Approved RMP Amendment | Potential Changes in 2023 Plan |
|---|---|---|
| **MD LR-2:** Manage areas within GHMA as avoidance areas* for major (transmission lines greater than 100 kilovolts and pipelines greater than 24 inches) and minor BLM ROW permits. (See **Appendix G**, Stipulations Applicable to Fluid Mineral Leasing and Land Use Authorizations.)<br><br>***GRSG PHMA ROW Avoidance.** ROWs may be issued after documenting that the ROWs would not adversely affect GRSG populations based on the following criteria:<br>• Location of proposed activities in relation to critical GRSG habitat areas as identified by factors, including, but not limited to, average male lek attendance and/or important seasonal habitat.<br>• An evaluation of the potential threats from proposed activities that may affect the local population as compared to benefits that could be accomplished through compensatory or off-site mitigation<br><br>An evaluation of the proposed activities in relation to the site-specific terrain and habitat features. For example, within 4 miles from a lek, local terrain features such as ridges and ravines may reduce the habitat importance and shield nearby habitat from disruptive factors. | No changes made. | Potential change under Alternatives 3, 4, 5 and 6. |

| 2015 BLM GRSG Approved RMP Amendment | 2019 BLM GRSG Approved RMP Amendment | Potential Changes in 2023 Plan |
|---|---|---|
| **MD LR-3:** No new roads or above-ground structures would be authorized within 1 mile of an active lek.<br><br>Above-ground structures are defined as structures that are located on or above the surface of the ground, including but not limited to: roads, fences, communication towers, and/or any structure that would provide perches.<br><br>Above-ground structures would only be authorized if:<br>1. It is consistent with the overall objective of the RMP Amendment;<br>2. The effect on GRSG populations or habitat is nominal or incidental;<br>3. Allowing the exception prevents implementation of an alternative more detrimental to GRSG or similar environmental concern, and;<br>4. Rigid adherence to the restriction would be the only reason for denying the action. | No changes made. | Potential change under Alternatives 3, 4, 5 and 6. |

| 2015 BLM GRSG Approved RMP Amendment | 2019 BLM GRSG Approved RMP Amendment | Potential Changes in 2023 Plan |
|---|---|---|
| **MD LR-4:** PHMA and GHMA are designated as avoidance areas for high-voltage transmission line ROWs, except for the transmission projects specifically identified below. All authorizations in these areas, other than the following identified projects, must comply with the conservation measures outlined in this ARMPA, including the RDFs and avoidance criteria presented in this document. The BLM is currently processing applications for the TransWest and Energy Gateway South Transmission Line projects, and the NEPA review for these projects is well underway. Conservation measures for GRSG are being analyzed through the projects' NEPA review process, which should achieve a net conservation benefit for the GRSG.<br><br>***GRSG PHMA ROW Avoidance.** ROWs may be issued after documenting that the ROWs would not adversely affect GRSG populations based on the following criteria:<br>• Location of proposed activities in relation to critical GRSG habitat areas as identified by factors, including, but not limited to, average male lek attendance and/or important seasonal habitat.<br>• An evaluation of the potential threats from proposed activities that may affect the local population as compared to benefits that could be accomplished through compensatory or off-site mitigation<br><br>An evaluation of the proposed activities in relation to the site-specific terrain and habitat features. For example, within 4 miles from a lek, local terrain features such as ridges and ravines may reduce the habitat importance and shield nearby habitat from disruptive factors. | No changes made. | Potential change under Alternatives 3, 4, 5 and 6. |

| 2015 BLM GRSG Approved RMP Amendment | 2019 BLM GRSG Approved RMP Amendment | Potential Changes in 2023 Plan |
|---|---|---|
| **MD LR-5:** Any new projects within PHMA would be subject to the 3 percent disturbance cap as described in **Appendix E**, Methodology for Calculating Disturbance Caps. If the 3 percent disturbance cap is exceeded in PHMA in any Colorado MZ, no new ROW would be authorized in PHMA within that biologically significant unit (Colorado populations) and proposed project analysis area (Colorado MZ), unless site-specific analysis documents no impact to GRSG. Within existing designated utility corridors, the 3 percent disturbance cap may be exceeded at the project scale if the site specific NEPA analysis indicates that a net conservation gain to the species will be achieved. This exception is limited to projects which fulfill the use for which the corridors were designated (ex., transmission lines, pipelines) and the designated width of a corridor will not be exceeded as a result of any project co-location. | No changes made. | Potential change under Alternatives 3, 4, 5 and 6. |
| **MD LR-6:** Prohibit surface occupancy and surface-disturbing activities associated with BLM ROW within 4 miles from active leks during lekking, nesting, and early brood-rearing (March 1 to July 15). (See special stipulations applicable to **GRSG PHMA ROW TL**.) | No changes made. | Potential change under Alternatives 3, 4, 5 and 6. |
| **MD LR-7:** Construct new roads to the appropriate Gold Book standard and add the surface disturbance to the total disturbance in the PHMA. | No changes made. | No changes proposed. |
| **MD LR-8:** (PHMA) In PHMA, or within 4 miles of an active lek, for ROW renewals, where existing facilities cannot be removed, buried, or modified, require perch deterrents. | No changes made. | Potential change under Alternatives 3, 4, 5 and 6. |
| **MD LR-9:** (PHMA) Reclaim and restore ROWs considering GRSG habitat requirements. | No changes made. | Potential change under Alternatives 3, 4, 5 and 6. |
| **MD LR-10:** (PHMA) Designate new ROW corridors in GRSG PHMA only where there is a compelling reason to do so and location of the corridor within PHMA will not adversely affect GRSG populations due to habitat loss or disruptive activities. | No changes made. | Potential change under Alternatives 3, 4, 5 and 6. |

| 2015 BLM GRSG Approved RMP Amendment | 2019 BLM GRSG Approved RMP Amendment | Potential Changes in 2023 Plan |
|---|---|---|
| **MD LR-11:** (PHMA) Consider the likelihood of development of not-yet-constructed surface-disturbing activities – as defined in Table D.2 of the Monitoring Framework (Appendix D)−under valid existing rights prior to authorizing new projects in PHMA. | No changes made. | Potential change under Alternatives 3, 4, 5 and 6. |
| ***Land Tenure Adjustment*** | ***Land Tenure Adjustment*** | — |
| **MD LR-11:** Retain public ownership of GRSG PHMA. Consider exceptions where:<br><br>It can be demonstrated that: 1) disposal of the lands, including land exchanges, will provide a net conservation gain to the GRSG; or 2) the disposal of the lands, including land exchanges, will have no direct or indirect adverse impact on GRSG conservation.<br><br>There is mixed ownership, and land exchanges would allow for additional or more contiguous federal ownership patterns within the GRSG PHMA. | No changes made. | No changes proposed. |
| **MD LR-12:** (PHMA) In isolated federal parcels, only allow tract disposals that are beneficial or neutral to long-term management of GRSG populations. | No changes made. | No changes proposed. |
| **MD LR-13:** (GHMA) For lands in GHMA that are identified for disposal, the BLM would only dispose of such lands consistent with the goals and objectives of this ARMPA, including, but not limited to, the ARMPA objective to maintain or increase GRSG abundance and distribution. | No changes made. | No changes proposed. |
| **MD LR-14:** (ADH) Consider GRSG habitat values in acquisitions. For example: Identify key GRSG habitats on private or state land, adjacent to existing BLM land, where acquisition and protection by BLM could substantially benefit the local GRSG population. This could be accomplished via purchase, exchange, or donation to satisfy mitigation requirements. | No changes made. | No changes proposed. |
| ***RECREATION (REC)*** | ***RECREATION (REC)*** | — |
| **Objectives:** | **Objectives:** | — |
| **Objective REC-1:** Manage recreation to avoid activities that 1) disrupt GRSG, 2) fragment GRSG habitat, or 3) spread noxious weeds. | No changes made. | No changes proposed. |

| 2015 BLM GRSG Approved RMP Amendment | 2019 BLM GRSG Approved RMP Amendment | Potential Changes in 2023 Plan |
|---|---|---|
| **Management Decisions (MD):** | **Management Decisions (MD):** | — |
| **MD REC-1:** (PHMA) Do not allow special recreation permits with the potential to adversely affect GRSG or GRSG habitat. | No changes made. | No changes proposed. |
| ***TRAVEL AND TRANSPORTATION (TTM)*** | ***TRAVEL AND TRANSPORTATION (TTM)*** | — |
| **Objectives:** | **Objectives:** | — |
| **Objective TTM-1:** Manage travel and transportation to 1) reduce mortality from vehicle collisions, 2) limit change in GRSG behavior, 3) avoid, minimize, and compensate for habitat fragmentation, 4) limit the spread of noxious weeds, and 5) limit disruptive activity associated with human access. | No changes made. | No changes proposed. |
| **Management Decisions (MD):** | **Management Decisions (MD):** | — |
| **MD TTM-1:** (PHMA) Limit off-highway vehicle (OHV) travel to existing roads, primitive roads, and trails at a minimum. Special Zone Provision: Colorado MZ 13 – Manage the Wolford Mountain open OHV area. | No changes made. | No changes proposed. |
| **MD TTM-2:** (PHMA) Evaluate and consider permanent or seasonal road or area closures as needed to address a current threat. | No changes made. | No changes proposed. |
| **MD TTM-3:** (PHMA) Complete activity level travel plans as soon as possible, subject to funding. During activity level planning, where appropriate, designate routes with current administrative/agency purpose or need to administrative access only. | No changes made. | No changes proposed. |
| **MD TTM-4:** (PHMA) Complete activity level travel plans as soon as possible, subject to funding. Limit route construction to routes that will not adversely affect GRSG populations due to habitat loss or disruptive activities. | No changes made. | No changes proposed. |

| 2015 BLM GRSG Approved RMP Amendment | 2019 BLM GRSG Approved RMP Amendment | Potential Changes in 2023 Plan |
|---|---|---|
| **MD TTM-5:** (PHMA) Use existing roads or realignments whenever possible. If it is necessary to build a new road, and the use of existing roads would cause adverse impacts to GRSG, construct new roads to the appropriate minimum Gold Book standard and add the surface disturbance to the total disturbance in the PHMA if it meets the criteria in **Appendix H**, Guidelines for Implementation and Adaptive Management.<br><br>Construct no new roads if the biologically significant unit (Colorado populations) and proposed project analysis area (Colorado MZ) is over the 3 percent disturbance cap (see **Appendix E**, Methodology for Calculating Disturbance Caps), unless there is an immediate health and safety need, or to support valid existing rights that cannot be avoided. Evaluate and implement additional, effective mitigation necessary to offset the resulting loss of GRSG habitat. | No changes made. | No changes proposed. |
| **MD TTM-6:** (PHMA) Allow upgrades to existing routes after documenting that the upgrade will not adversely affect GRSG populations due to habitat loss or disruptive activities. | No changes made. | No changes proposed. |
| **MD TTM-7:** (PHMA) Conduct restoration of roads, primitive roads and trails not designated in travel management plans. This also includes primitive route/roads that were not designated in wilderness study areas and within lands with wilderness characteristics that have been selected for protection in previous LUPs. | No changes made. | No changes proposed. |
| **MD TTM-8:** (PHMA) When reseeding roads, primitive roads and trails, use appropriate seed mixes and consider the use of transplanted sagebrush. | No changes made. | No changes proposed. |

## Table 2. Seasonal Habitat Desired Conditions for GRSG

| Attribute | Indicators | Desired Condition |
|---|---|---|
| **BREEDING AND NESTING [1,2,3] (Seasonal Use Period March 1-June 15) Apply 4 miles from active leks.** [15] | | |
| Lek Security | Proximity of trees [4] | Trees or other tall structures are none to uncommon within 1.86 miles of leks [5,6] |
| | Proximity of sagebrush to leks [5] | Adjacent protective sagebrush cover within 328 feet of lek[5] |
| Cover | Seasonal habitat extent [6] | >80% of the breeding and nesting habitat |
| | Sagebrush canopy cover [5,6,7,17]<br>Arid sites<br>Mesic sites | 15 to 30%<br>20 to 30%17 |
| | Sagebrush height [6, 17]<br>Arid sites [5,6,9]<br>Mesic sites [5,6,10] | 11.8 to 31.5 inches (30-80 cm)<br>15.7 to 31.5 inches (40-80 cm) |
| | Predominant sagebrush shape [5] | >50% in spreading [11] |
| | Perennial grass canopy cover (such as native bunchgrasses) [5,6, 17]<br>Arid sites [6,9]<br>Mesic sites [6,10,17] | >10%<br>>20%[17] |
| | Perennial grass and forb height (includes residual grasses) [5,6,7] | >6 inches6, [16, 17] |
| | Perennial forb canopy cover [5,6,7]<br>Arid sites [9]<br>Mesic sites [10] | >5%[5,6,17]<br>>15%[5,6,17] |
| **BROOD-REARING/SUMMER[1] (Seasonal Use Period June 16-October 31)** | | |
| Cover | Seasonal habitat extent [6] | >40% of the brood-rearing/summer habitat |
| | Sagebrush canopy cover [5, 6,7, 17]<br>Arid sites<br>Mesic sites | 10 to 25%<br>10 to 25% |
| | Sagebrush height [6,7, 17]<br>Arid sites<br>Mesic sites | 11.8 to 31.5 inches (30 to 80 cm)<br>13.8 to 31.5 inches (35 to 80 cm) |
| | Perennial grass canopy cover and forbs [6,7,17]<br>Arid sites<br>Mesic sites | >15%[17]<br>>25%[17] |
| | Riparian areas (both lentic and lotic systems) | Proper Functioning Condition [13] |
| | Upland and riparian perennial forb availability [5,6] | Preferred forbs are common with several preferred species present [12] |

| Attribute | Indicators | Desired Condition |
|---|---|---|
| **WINTER[1] (Seasonal Use Period November 1-February 28)** | | |
| Cover and Food | Seasonal habitat extent [5,6,7] | >80% of the winter habitat |
| | Sagebrush canopy cover above snow [5,6,7,17] | >20% Arid, 25% Mesic[17] |
| | Sagebrush height above snow [5,6,7] | >10 inches [14] |

[1] Seasonal dates can be adjusted; that is, start and end dates may be shifted either earlier or later, but the amount of days cannot be shortened or lengthened by the local unit.
[2] Doherty 2008
[3] Holloran and Anderson 2005.
[4] Baruch-Mordo et al. 2013
[5] Stiver et. al. 2014
[6] Connelly et al. 2000
[7] Connelly et al. 2003
[9] 10–12 inch precipitation zone; *Artemisia tridentata wyomingensis* is a common big sagebrush sub-species for this type site (Stiver et. al. 2014).
[10] >12 inch precipitation zone; *Artemisia tridentata vaseyana* is a common big sagebrush sub-species for this type site (Stiver et. al. 2014).
[11] Sagebrush plants with a spreading shape provide more protective cover than sagebrush plants that are more tree or columnar shaped (Stiver et. al. 2014).
[12] Preferred forbs are listed in Habitat Assessment Framework Table III-2 (Stiver et. al. 2014). Overall, total forb cover may be greater than that of preferred forb cover since not all forb species are listed as preferred in Table III-2.
[13] Existing land management plan desired conditions for riparian areas/wet meadows (spring seeps) may be used in place of properly functioning conditions, if appropriate for meeting GRSG habitat requirements.
[14] The height of sagebrush remaining above the snow depends upon snow depth in a particular year. Intent is to manage for tall, healthy, sagebrush stands.
[15] Buffer distance may be changed only if 3 out of 5 years of telemetry studies indicate the 4 miles is not appropriate.
[16] Measured as "droop height"; the highest naturally growing portion of the plant.
[17] Colorado Greater Sage-grouse Steering Committee 2008

### 2.1.2 Relevant Appendices

The following table shows which appendices from the 2015 and 2019 plans have management direction that may change through this RMP amendment. Note that if 2019 is not listed in the year, then no change was made to the appendix between the 2015 and 2019 plans. The appendices can be found on the Colorado GRSG ePlanning website.

| ARMPA Appendix Name | Year | Potential for Change in 2023 Plan |
|---|---|---|
| A: Approved RMP Amendment Maps | 2015 | Yes |
| B: Buffer Distances and Evaluation of Impacts on Leks | 2015 | No |
| C: Required Design Features, Preferred Design Features, and Suggested Design Features | 2015 | Yes |
| D: Greater Sage-Grouse Monitoring Framework | 2015 | No |
| E: Methodology for Calculating Disturbance Caps | 2015 | Yes |
| F: Greater Sage-Grouse Mitigation Strategy | 2015 | Yes |
| G: Stipulations Applicable to Fluid Mineral Leasing and Land Use Authorizations | 2015, 2019 | Yes |
| H: Guidelines for Implementation and Adaptive Management | 2015, 2019 | Yes |

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# Appendix 2.2
# Idaho RMPs

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## 2.2 IDAHO RMPS

This appendix presents the GRSG approved RMP amendment language from the 2015 and 2019 records of decision for Idaho. Changes between 2015 and 2019 are noted. The table below notes which goals, objectives, appendices, and management decisions/actions have a potential to change as a result of the current planning effort and if so, under which alternatives changes are being considered. Note that any references to tables and appendices are to those applicable 2015 and 2019 appendices that are listed in **Section 2.2.2** of this appendix.

### 2.2.1 Existing GRSG RMP Management – Idaho RMPs

**Table 1: Changes in Management from the 2015 Approved RMPA to the 2019 Approved RMPA**

<table>
<tr><th>2015 BLM GRSG Approved RMP Amendment</th><th>2019 BLM GRSG Approved RMP Amendment</th><th>Potential for Change in 2023 Plan</th></tr>
<tr><td>TABLE 2-1 SUMMARY OF ALLOCATION DECISIONS BY GRSG HABITAT MANAGEMENT AREAS</td><td>TABLE 2-1 LAND USE ALLOCATIONS WITHIN DESIGNATED SAGE-GROUSE HABITAT IN THE APPROVED PLAN AMENDMENT</td><td>—</td></tr>
<tr><td>
<table>
<tr><th>Resource</th><th>PHMA</th><th>IHMA</th><th>GHMA</th></tr>
<tr><td>Land Tenure</td><td>Retain</td><td>Retain</td><td>Retain</td></tr>
<tr><td>Solar</td><td>Exclusion</td><td>Avoidance</td><td>Open</td></tr>
<tr><td>Wind</td><td>Exclusion</td><td>Avoidance</td><td>Open</td></tr>
<tr><td>Major ROWs</td><td>Avoidance</td><td>Avoidance</td><td>Open</td></tr>
<tr><td>Minor ROWs</td><td>Avoidance</td><td>Avoid</td><td>Open</td></tr>
<tr><td>Oil and Gas</td><td>Open with Major Stipulations</td><td>Open with Major Stipulations</td><td>Open with Controlled Surface use and Standard Stipulations</td></tr>
<tr><td>Geothermal</td><td>Open with Major Stipulations</td><td>Open with Major Stipulations</td><td>Open with Controlled Surface use and Standard Stipulations</td></tr>
<tr><td>Non-energy Leasables</td><td>Closed</td><td>Open</td><td>Open</td></tr>
<tr><td>Salable Minerals</td><td>Closed</td><td>Open</td><td>Open</td></tr>
<tr><td>Locatable Minerals</td><td>SFA = Rec-commend With-drawal; Other PHMA = Open</td><td>Open</td><td>Open</td></tr>
<tr><td>Travel Manage-ment</td><td>Limited</td><td>Limited</td><td>ID –Limited MT-- Limited to Designated (see Dillon RMP)</td></tr>
<tr><td>Livestock Grazing</td><td>Open</td><td>Open</td><td>Open</td></tr>
</table>
</td><td>
<table>
<tr><th>Resource</th><th>PHMA</th><th>IHMA</th><th>GHMA</th></tr>
<tr><td>Land Tenure</td><td>Retain</td><td>Retain</td><td>Retain</td></tr>
<tr><td>Wind and solar</td><td>Exclusion</td><td>Avoidance</td><td>Open</td></tr>
<tr><td>ROWs</td><td>Avoidance</td><td>Avoidance</td><td>Open</td></tr>
<tr><td>Oil and Gas and Geothermal</td><td>Open with Major Stipulations</td><td>Open with Major Stipulations</td><td>Open with Standard Stipulations</td></tr>
<tr><td>Non-energy Leasables</td><td>Closed</td><td>Open</td><td>Open</td></tr>
<tr><td>Salable Minerals</td><td>Closed with limited exceptions</td><td>Open</td><td>Open</td></tr>
<tr><td>Locatable Minerals*</td><td>Open</td><td>Open</td><td>Open</td></tr>
<tr><td>Travel Management</td><td>Limited</td><td>Limited</td><td>Limited</td></tr>
<tr><td>Livestock Grazing</td><td>Open</td><td>Open</td><td>Open</td></tr>
</table>
*Areas are open for locatable mineral entry unless they have been withdrawn under a separate order.
</td><td>Potential change under Alternatives 3, 4, 5 and 6.</td></tr>
</table>

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| ***SPECIAL STATUS SPECIES (SSS)*** | ***SPECIAL STATUS SPECIES (SSS)*** | — |
| **GOAL:** | **GOAL:** | — |
| **Goal SSS 1:** Maintain and/or increase the abundance, distribution and connectivity of GRSG by conserving, enhancing or restoring GRSG habitat to maintain resilient populations by reducing, eliminating or minimizing threats to GRSG habitats. | No changes made. | Potential change under Alternatives 3, 4, 5 and 6. |
| **Goal SSS 2:** Provide for the needs of GRSG and their habitat while also providing for resource uses in accordance with BLM's direction for multiple use and sustained yield as described in FLPMA. | No changes made. | No change proposed. |
| **Goal SSS 3:** Manage anthropogenic development and human disturbance to minimize the likelihood of adverse population level effects on GRSG. | No changes made. | No change proposed. |
| **Goal SSS 4:** Reduce the risk of West Nile Virus or other disease outbreaks from BLM management actions. | No changes made. | No change proposed. |
| **Goal SSS 5:** Conserve, enhance, and restore the sagebrush ecosystem upon which GRSG populations depend on in an effort to maintain and/or increase their abundance and distribution, in cooperation with other conservation partners. | No changes made. | No change proposed. |
| **Objectives:** | **Objectives:** | — |
| **Objective SSS 1:** Maintain or make progress toward all lands within PHMA and IHMA (at least 70%) capable of producing sagebrush so there is a minimum of 15 percent sagebrush cover and conifers absent to uncommon within 1.86 miles of occupied leks. | No changes made. | No change proposed. |
| **Objective SSS 2:** Incorporate GRSG Seasonal Habitat Objectives (**Table 2**), into the design of projects or activities, as appropriate, based on site conditions and ecological potential, unless achievement of fuels management objectives require additional reduction in sagebrush cover to meet strategic protection of GRSG habitat and conserve habitat quality for the species or at least one of the following conditions can be demonstrated and documented in the NEPA analysis associated with the specific project:<br>• A specific objective is not applicable to the site-specific conditions of the project or activity;<br>• An alternative objective is determined to provide equal or better protection for GRSG or its habitat (based on appropriate scientific findings); or<br>• Analysis concludes that following a specific objective will provide no more protection to | **Objective SSS 2:** Within PHMA and IHMA, maintain large intact sagebrush steppe communities with vegetative characteristics consistent with their ecological potential such that GRSG can select suitable seasonal habitats for breeding, nesting, rearing young, and wintering. GRSG actively select suitable use areas within large intact sagebrush ecosystems. Not every site will provide for every GRSG need, which is why they require large intact sagebrush ecosystems.<br>The desired conditions for GRSG (the Desired Conditions table (Table 2-2) in the 2015 Final EIS) are a list of indicators, characteristics, and values that describe GRSG seasonal habitat use areas. The BLM used indicator values derived from a synthesis of local and regional GRSG habitat research and data to describe the typical vegetation communities that GRSG select. | Potential change under Alternatives 3, 4, 5 and 6. |

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| GRSG or its habitat than not following it, for the project being proposed**.**<br>• These habitat objectives in **Table 2** summarize the characteristics that research has found represent the seasonal habitat needs for GRSG. The specific seasonal components identified in the table were adjusted based on local science and monitoring data to define the range of characteristics used in this subregion. Thus, the habitat objectives provide the broad vegetative conditions we strive to obtain across the landscape that indicate the seasonal habitats used by GRSG. These habitat indicators are consistent with the rangeland health indicators used by the BLM.<br>• The habitat objectives will be part of the GRSG habitat assessment to be used during land health evaluations (see **Appendix D**, Monitoring Framework). These habitat objectives are not obtainable on every acre within the designated GRSG habitat management areas. Therefore, the determination on whether the objectives have been met will be based on the specific site's ecological ability to meet the desired condition identified in the table.<br>• All BLM use authorizations will contain terms and conditions regarding the actions needed to meet or progress toward meeting the habitat objectives. If monitoring data show the habitat objectives have not been met nor progress being made towards meeting them, there will be an evaluation and a determination made as to the cause. If it is determined that the authorized use is a cause, the use will be adjusted by the response specified in the instrument that authorized the use. | While the desired conditions are not attainable on every site or every acre within designated GRSG habitat management areas, the values reflect a range of habitat conditions that generally lead to greater survival of individuals within a population. When permitting land use activities, the BLM **shall** consider the ecological site potential within designated habitat management areas to validate the habitat conditions achievable for a specific site.<br><br>The seasonal habitat descriptions in Table 2-2 [the Desired Conditions table in the 2015 Final EIS] vary across the range of GRSG, within a sub-region, and between sites. They are not land health standards but are quantitative measures that **help** inform the Special Status Species Habitat Land Health Standard for GRSG. These measurable values reflect ecological potential, and may be adjusted based on local factors influencing GRSG habitat selection. Local data or recent science may indicate that GRSG select for vegetation structure and composition in seasonal habitats not characterized by the values in the desired conditions table. In these cases, it may be appropriate to adjust the values. Desired Conditions should be evaluated in the context of annual variability in ecological conditions and should not be used singly to determine habitat suitability for GRSG. As appropriate**,** they may be used to demonstrate trends over time, during plan evaluations for effectiveness of GRSG conservation, or when identifying limiting habitat characteristics for a given area.<br><br>The indicators, characteristics, values, and desired seasonal habitat conditions in the GRSG Plan Desired Conditions Table are meant to inform the wildlife habitat component of the Land Health Standards evaluation process (LHS, 43 CFR 4180.2), but do not replace rangeland health assessments. Results from the LHS evaluation should be used to support the BLM in land use authorization processes and during development of appropriate objectives for management actions such as vegetation treatments.<br><br>The Desired Conditions Tables are to be used as follows:<br>a. To assess habitat suitability, as defined by BLM policy and the Habitat Assessment | *(See above.)* |

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| *(See above.)* | Framework, for GRSG at the appropriate scale<br>b. To describe desired conditions that provide habitat at multiple spatial scales, as defined by the best available science<br>c. To evaluate land use plan effectiveness for GRSG conservation<br>d. To develop measurable project objectives for actions in BLM-designated GRSG habitat management areas, as needed, when considered alongside land health standards, ecological potential and local information. | *(See above.)* |
| **Table 2 Habitat Objectives** (full table on following this table)<br>For nesting/early brood rearing habitat:<br>Indicator: Perennial grass (and forb) height (includes residual grasses)<br>Desired Condition: ≥ 7 inches | **Table 3 Desired Conditions** (full table following this table; same as 2015 except)<br>For nesting/early brood rearing habitat:<br>Indicator: Perennial grass (and forb) height (includes residual grasses)<br>Desired Condition: - Adequate Nesting Cover<br>References (add): Hausleitner 2005; Holloran et al. 2005; Gibson et al. 2016; Smith et al. 2017; Smith et al. 2018 | Potential change under Alternatives 3, 4, 5 and 6. |
| ***Greater Sage-Grouse Management Areas*** | **2.3 GREATER SAGE-GROUSE MANAGEMENT AREAS**<br>The boundaries of the habitat designations have been adjusted to correct administrative mapping errors that occurred when PHMA was designated in 2015. Habitat management area boundary changes also include removing some areas of non-habitat that were added to PHMA by the 2015 ROD/ARMPA as part of the SFA designations. Additionally, in the West Owyhee Conservation Area, the circle of 60,706 acres of PHMA (Brown's Creek area) that is surrounded by IHMA will be re-designated as IHMA (see Map 1); 11,828 acres of non-Greater Sage-Grouse habitat managed as PHMA, in the Mountain Valleys Conservation Area, would be changed to non-habitat (Donkey Hills ACEC and mapping errors). (See Appendix A). | Potential change in Alternatives 3, 4, 5 and 6. |
| **Objective SSS 3:** Maintain a resilient population of GRSG in Idaho. | No changes made. | No change proposed. |
| **Objective SSS 4:** Designate GRSG management areas and associated management to maintain a resilient population and to designate strategically located adjacent areas to provide a buffer from unpredictable habitat loss such as wildfire to the resilient population areas. | No changes made. | No change proposed. |
| **Objective SSS 5:** Identify and strategically protect larger intact sagebrush areas and areas of lower fragmentation to maintain GRSG population persistence. | No changes made. | No change proposed. |

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| **Management Decisions (MD):** | **Management Decisions (MD):** | — |
| **MD SSS-1:** Designate four GRSG Conservation Areas (see Glossary) within the subregion to form the geographic basis for achieving population objectives; evaluating the disturbance density and adaptive regulatory triggers; and tailor adaptive management responses. These conservation areas are depicted in **Figure 2-14**. These areas are referred to as Mountain Valleys, Desert, West Owyhee, and Southern Conservation Areas.<br><br><u>Conservation Area Description</u><br>Mountain Valleys Conservation Area – generally located north of the Snake River Plain, including GRSG habitat in the Salmon and Challis areas, and habitat in west-central population area. It extends west from Rexburg, north and west of Highway 33 to Howe, north and west of Highway 33/22 to Arco, north and west of Highway 26/20/93 to Carey, north and west of Highway 20 west to Hill City, north and west of Highway 20 to the Dylan Karaus Road, west to Canyon Creek. Canyon Creek to the confluence with the Snake River form the western boundary.<br><br>Desert Conservation Area – located north of the Snake River and south of the Mountain Valleys Conservation Area. It extends from the confluence of Canyon Creek and the Snake River, eastward to Idaho Falls. The Snake River and Henry's Fork form the eastern boundary.<br><br>West Owyhee Conservation Area – located south of the Snake River and west of the Bruneau River.<br><br>Southern Conservation Area – located south of the Snake River and east of the Bruneau River, including East Idaho uplands and Bear Lake Plateau, and the Utah portion of the Sawtooth National Forest in Box Elder County.<br><br>In general, GRSG habitats in the Desert and West Owyhee CAs are relatively contiguous, while those in the Mountain Valleys and Southern CAs tend to be more fragmented due to more complex topography, and elevational differences and/or effects from wildfires, agriculture, urbanization or other factors. | No changes made. | Potential change in Alternatives 3, 4, 5, and 6. |

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| **MD SSS 2:** Within each Conservation Area designate GRSG Habitat Management Areas: Priority, Important and General Habitat Management Areas (**Figure 2-1**). **Priority Habitat Management Areas (PHMA**) focus on conserving the two key meta-populations in the subregion. PHMA encompasses areas with the highest conservation value to GRSG, based on the presence of larger leks, habitat extent, important movement and connectivity corridors and winter habitat. PHMA include adequate area to accommodate continuation of existing land uses and landowner activities. **Important Habitat Management Areas (IHMA)** contain additional habitat and populations that provide a management buffer for the PHMA and to connect patches of PHMA. IHMA encompasses areas of generally moderate to high conservation value habitat and/or populations and in some Conservation Areas includes areas beyond those identified by USFWS as necessary to maintain redundant, representative and resilient populations (Priority Areas for Conservation (PACs)). IHMA are typically adjacent to PHMA but generally reflect somewhat lower GRSG population status and/or reduced habitat value due to disturbance, habitat fragmentation or other factors. **General Habitat Management Areas (GHMA)** encompass habitat that is outside of PHMA or IHMA. GHMA contain approximately 10 percent of the occupied leks that are also of relatively low male attendance compared to leks in PHMA or IHMA. GHMA are generally characterized by lower quality disturbed or patchy habitat of low lek connectivity. | No changes made. | Potential change in Alternatives 3, 4, 5 and 6. |
| **MD SSS 3**: Designate PHMA and IHMA to encompass 90 percent of the breeding males in Idaho. | No changes made. | No change proposed. |
| **MD SSS 4**: Annually prioritize Conservation Areas at the state scale considering results of the annual adaptive regulatory trigger evaluations relative to implementation of restoration and mitigation activities. | No changes made. | Potential change in Alternatives 3, 4, 5, and 6. |

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| **MD SSS 5**: Prioritize activities and mitigation to conserve, enhance and restore GRSG habitats (i.e., fire suppression activities, fuels management activities, vegetation treatments, invasive species treatments etc.) first by Conservation Area, if appropriate (Conservation Area under adaptive management or at risk of meeting an adaptive management soft or hard trigger), followed by PHMA, then IHMA then GHMA within the Conservation Areas. Local priority areas within these areas will be further refined as a result of completing the GRSG Wildfire and Invasive Species Habitat Assessments as described in **Appendix H**. This can include projects outside GRSG habitat when those projects will provide a benefit to GRSG habitat. | No changes made. | Potential change in Alternatives 3, 4, 5 and 6. |
| **MD SSS 6:** The management area map and Biologically Significant Unit (BSU) baseline map will be re- evaluated in conjunction with plan evaluation processes (i.e. approximately every 5 years). This re- evaluation can indicate the need to adjust PHMA, IHMA or GHMA or the habitat baseline. These adjustments can occur upon completion of the appropriate analysis and process (e.g., plan amendment) to review the allocation decisions based on the map. Results from the Wildfire and Invasive Species Assessments, such as identified focal or emphasis areas will also be used to help inform mapping adjustments during this evaluation. | **MD SSS 6:** The management area map and Biologically Significant Unit (BSU) baseline map will be re- evaluated in conjunction with plan evaluation processes (i.e. approximately every 5 years). This re- evaluation can indicate the need to adjust Conservation Area Boundaries, PHMA, IHMA or GHMA or the habitat or the population baselines. These adjustments can occur upon completion of the appropriate analysis and process (e.g., plan maintenance in coordination with the teams identified in MD SSS 44) to review the allocation decisions based on the map. Results from the Wildfire and Invasive Species Assessments, such as identified focal or emphasis areas will also be used to help inform mapping adjustments during this evaluation. | No change proposed. |
| **MD SSS 7**: GRSG habitat within the project area will be assessed during project-level NEPA analysis within the management area designations (PHMA, IHMA, GHMA). Project proposals and their effects will be evaluated based on the habitat and values affected. | No changes made. | No change proposed. |

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| **MD SSS 8**: Idaho BLM will annually update the Key Habitat map, in order to reflect habitat changes resulting from wildfire, succession, and vegetation treatments that occurred or were observed since the last update. Key habitat includes areas of generally intact sagebrush that provide sage-grouse habitat during some portion of the year. This map also identifies potential restoration areas (perennial grassland annual grasslands, conifer encroachment and recent burns). This map a broad scale current vegetation map that changes as habitat is lost or restored. The Key Habitat Map is not an allocation decision such as PHMA, IHMA, and GHMA. Updates to the map will also occur if it is determined that mapping errors or omissions have occurred, or that radio-telemetry studies indicate that GRSG are consistently utilizing an area. Updates are also intended to capture recommendations by the field offices, GRSG Local Working Groups, or agency partners in GRSG conservation. Project-level evaluations of GRSG habitat during the NEPA process can also be used to inform the annual update. | No changes made. | No change proposed. |
| **MD SSS 9**: Areas of habitat outside of delineated habitat management areas identified during the Key habitat update process will be evaluated during site specific NEPA for project level activities and GRSG required design features (**Appendix C**) and buffers (**Appendix B**) will be included as part of project design. These areas will be further evaluated during plan evaluation and the 5-year update to the management areas, to determine whether they should be included as PHMA, IHMA, or GHMA. | This decision has been deleted. | No change proposed. |
| **MD SSS 10**: Designate Sagebrush Focal Areas (SFA) as shown on **Figure 1-2**. SFA will be managed as PHMA, with the following additional management<br>• Recommended for withdrawal from the General Mining Act of 1872, as amended, subject to valid existing rights.<br>• Managed as NSO, without waiver, exception, or modification, for fluid mineral leasing.<br>Prioritized for vegetation management and conservation actions in these areas, including, but not limited to land health assessments, wild horse and burro management actions, review of livestock grazing permits/leases, and habitat restoration (see specific management sections). | This decision has been deleted. | Potential change under Alternatives 3, 4, 5 and 6. |

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| ***Adaptive Management*** | ***Adaptive Management*** | — |
| **MD SSS 11:** Use hard and soft population and habitat triggers to determine an appropriate management response as described in MD SSS 16 to MD SSS 26. Hard and soft triggers responses are applied at the Conservation Area (MD SSS-1) scale (**Appendix E**). | No changes made. | Potential change under Alternatives 3, 4, 5 and 6. |
| **MD SSS 12:** Utilize monitoring information collected through the Monitoring Framework (**Appendix D**) to determine when adaptive regulatory triggers have been met. | No changes made. | Potential change under Alternatives 3, 4, 5 and 6. |
| **MD SSS 13:** BLM will maintain GRSG habitat information, through use of the Key Habitat map or latest sagebrush/vegetation map, which will be used to track and identify habitat changes to assess the habitat trigger in the adaptive management approach. Key habitat map updates are made each winter by BLM in coordination with the Forest Service and IDFG, using the process described in Appendix F of the FEIS. | No changes made. | No change proposed. |
| **MD SSS 14:** BLM will coordinate with the IDFG regarding population information collected and maintained by the IDFG to track and identify population changes to assess the population trigger in the adaptive management approach. | No changes made. | No change proposed. |
| **MD SSS 15:** The hard and soft trigger data will be analyzed as soon as it becomes available after the signing of the ROD, and twice each year thereafter the applicable monitoring information will be reviewed to determine if any adaptive management triggers have been met. | **MD SSS 15:** The data from the lek counts and the key habitat map update will be reviewed annually to determine if any hard or soft adaptive management triggers have been met. | Potential change under Alternatives 3, 4, 5 and 6. |
| **MD SSS 16:** Adaptive habitat triggers will be individually calculated across all ownerships within the BSUs (**Appendix E**). The BSU is defined as the IDFG modeled nesting and wintering habitat (IDFG 2013, unpublished data) within PHMA and IHMA within a Conservation Area. The sagebrush component of the BSU is represented by the Key habitat within the BSU present during the 2011 baseline and as mapped during subsequent annual Key habitat map updates. Key habitat is defined as areas of generally intact sagebrush that provide GRSG habitat during some portion of the year (ISAC 2006). | No changes made. | Potential change under Alternatives 3, 4, 5 and 6. |
| **MD SSS 17:** Habitat Hard Triggers are defined as:<br>• A 20 percent loss of Key Habitat within the BSU of the PHMA of a Conservation Area when compared to the 2011 baseline, inclusive of all land ownerships or<br>• A 20 percent loss of Key Habitat within the BSU of the IHMA of a Conservation Area when compared to the 2011 baseline. | No changes made. | Potential change under Alternatives 3, 4, 5 and 6. |

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| **MD SSS 18:** Habitat Soft Triggers are defined as:<br>• A 10 percent loss of Key Habitat within the BSU of the PHMA of a Conservation Area when compared to the 2011 baseline; or<br>• A 10 percent loss of Key Habitat within the BSU of the IHMA of a Conservation Area when compared to the 2011 baseline. | No changes made. | Potential change under Alternatives 3, 4, 5 and 6. |
| **MD SSS 19:** Population Hard Triggers are defined as:<br>• A 20 percent decline in the current 3-year average of total maximum number of males counted compared to the 2011 maximum male baseline and a finite rate of change (λ) significantly below 1.0 within PHMA within a Conservation Area over the same 3-year period; or<br>• A 20 percent decline in the current 3-year average of total maximum number of males counted compared to the 2011 maximum male baseline and a finite rate of change (λ) significantly below 1.0 within IHMA within a Conservation Area over the same 3-year period.<br>• Significance is defined by the 90 percent confidence interval around the current 3-year finite rate of change. If the 90 percent confidence interval is less than, and does not include 1.0, then the finite rate of change is considered significant. The finite rate of change and variance will be calculated following Garton et al. (2011). | No changes made. | Potential change under Alternatives 3, 4, 5 and 6. |

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| **MD SSS 20:** Population Soft Triggers are defined as:<br>• A 10 percent decline in the current 3-year average of total maximum number of males counted compared to the 2011 maximum male baseline and a finite rate of change (λ) below 1.0 within PHMA within a Conservation Area over the same 3-year period; or<br>• A 10 percent decline in the current 3-year average of total maximum number of males counted compared to the 2011 maximum male baseline and a finite rate of change (λ) below 1.0 within IHMA within a Conservation Area over the same 3-year period. | **MD SSS 20:** Population Soft Triggers are defined as:<br>A. A 10 percent decline in the current 3-year average of total maximum number of males counted compared to the 2011 maximum male baseline and a finite rate of change (λ) below 1.0 within PHMA within a Conservation Area over the same 3-year period; or<br>B. A 10 percent decline in the current 3-year average of total maximum number of males counted compared to the 2011 maximum male baseline and a finite rate of change (λ) below 1.0 within IHMA within a Conservation Area over the same 3-year period.<br><br>Significance for soft triggers is defined by the 90 percent confidence interval around the current 3-year finite rate of change. If the 80 percent confidence interval is less than and does not include 1.0, then the finite rate of change is considered significant. The finite rate of change and variance will be calculated following Garton et al. (2011). | Potential change under Alternatives 3, 4, 5 and 6. |
| **MD SSS 21:** When any of the Criteria for Soft Triggers have been met the Implementation Team will evaluate causal factors and recommend additional potential implementation level activities (**Appendix E**). | No changes made. | Potential change under Alternatives 3, 4, 5 and 6. |
| **MD SSS 22:** When any of the Criteria for Hard Triggers have been met then all PHMA management actions will be applied to the IHMA within that Conservation Area and the Implementation Team will evaluate causal factors and recommend additional potential implementation level activities. | No changes made. | Potential change under Alternatives 3, 4, 5 and 6. |
| **MD SSS 23:** If an adaptive regulatory trigger is tripped and livestock grazing is identified as a probable limiting factor then adjustments will follow the Adaptive Grazing Management Response described in **Appendix E**. | No changes made. | Potential change under Alternatives 3, 4, 5 and 6. |
| **MD SSS 24:** Remove any adaptive management response when the habitat or maximum male population count (i.e., 3-year average) returns to or exceeds the 2011 baseline levels within the associated Conservation Area in accordance with the Adaptive Management Strategy (**Appendix E**). In such a case, changes in management allocations resulting from a tripped trigger will revert back to the original allocation (MD SSS 22). | **MD SSS 24:** Remove the automatic hard trigger adaptive management response when the habitat or maximum male population count (i.e., 3-year average) returns to or exceeds the 2011 baseline levels within the associated Conservation Area, in accordance with the Adaptive Management Strategy (**Appendix E**). In such a case, changes in management allocations resulting from a tripped trigger will revert to the original allocation (MD SSS 22). | Potential change under Alternatives 3, 4, 5 and 6. |

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| **MD SSS 26:** When a hard trigger is hit in a BSU within a PAC that has multiple BSUs, including those that cross state lines, the WAFWA Management Zone Greater Sage-Grouse Conservation Team will convene to determine the causal factor, put project-level responses in place, as appropriate and discuss further appropriate actions to be applied. The team will also investigate the status of the hard triggers in other BSUs within the PAC and will invoke the appropriate plan response. | No changes made. | Potential change under Alternatives 3, 4, 5 and 6. |
| ***Anthropogenic Disturbance*** | ***Anthropogenic Disturbance*** | — |
| **MD SSS 27:** If the 3 percent anthropogenic disturbance cap is exceeded on lands (regardless of land ownership) within GRSG PHMA (or IHMA in Idaho) Habitat Management Areas in any given BSU, then no further discrete anthropogenic disturbances (subject to applicable laws and regulations, such as the General Mining Law of 1872, as amended, valid existing rights, etc.) will be permitted by BLM within GRSG PHMA and IHMA in any given BSU until the disturbance has been reduced to less than the cap, as measured according to the Disturbance and Adaptive Management Appendix (**Appendix E**) for the intermediate scale.<br><br>For Idaho, if the 3 percent disturbance cap is exceeded on all lands (regardless of land ownership) within a proposed project analysis area (**Appendix E**) in a PHMA (or IHMA in Idaho), then no further anthropogenic disturbance will be permitted by BLM until disturbance in the proposed project analysis area has been reduced to maintain the area under the cap (subject to applicable laws and regulations, such as the General Mining Law of 1872, as amended, valid existing rights, etc.).<br><br>Within existing designated utility corridors, the 3% disturbance cap may be exceeded at the project scale if the site specific NEPA analysis indicates that a net conservation gain to the species will be achieved. This exception is limited to projects which fulfill the use for which the corridors were designated (ex., transmission lines, pipelines) and the designated width of a corridor will not be exceeded as a result of any project co-location.<br><br>The BSU (**Figure 2-2**) is defined as the currently mapped nesting and wintering habitat within PHMA and IHMA within a Conservation Area, | **MD SSS 27:** If the 3 percent anthropogenic disturbance cap is exceeded on lands (regardless of land ownership) within GRSG PHMA (or IHMA in Idaho) Habitat Management Areas in any given BSU, then no further discrete anthropogenic disturbances (subject to applicable laws and regulations, such as the General Mining Law of 1872, as amended, valid existing rights, etc.) will be permitted by BLM within GRSG PHMA and IHMA in any given BSU until the disturbance has been reduced to less than the cap, as measured according to the Disturbance and Adaptive Management Appendix (**Appendix E**) for the intermediate scale.<br><br>For Idaho, the BSU (**Figure 2-2**) is defined as the currently mapped nesting and wintering habitat within PHMA and IHMA within a Conservation Area, inclusive of all ownerships. Anthropogenic disturbance excludes habitat disturbance from wildfire and fuels management activities and includes the following developments (see **Appendix E** for further details):<br>• Oil and Gas Wells and Development Facilities<br>• Coal Mines<br>• Wind Towers<br>• Solar Fields<br>• Geothermal Development Facilities<br>• Mining (Active Locatable, Non-Energy Leasable and Salable Developments)<br>• Roads<br>• Railroads<br>• Power lines<br>• Communication Towers<br>• Other Vertical Structures<br>• Coal bed Methane Ponds | Potential change under Alternatives 3, 4, 5 and 6. |

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| inclusive of all ownerships. Anthropogenic disturbance excludes habitat disturbance from wildfire and fuels management activities and includes the following developments (see **Appendix E** for further details):<br>• Oil and Gas Wells and Development Facilities<br>• Coal Mines<br>• Wind Towers<br>• Solar Fields<br>• Geothermal Development Facilities<br>• Mining (Active Locatable, Non-Energy Leasable and Saleable Developments)<br>• Roads<br>• Railroads<br>• Power lines<br>• Communication Towers<br>• Other Vertical Structures<br>• Coal bed Methane Ponds<br>• Meteorological Towers (e.g., wind energy testing)<br>• Nuclear Energy Facilities<br>• Airport Facilities and Infrastructure<br>• Military Range Facilities and Infrastructure<br>• Hydroelectric Plants<br>• Recreation Areas Facilities and infrastructure<br>For Idaho this disturbance is measured by direct footprint or by ROW width for linear features (power lines, pipelines and roads). For Montana disturbance is measured similar to the Wyoming Disturbance Density Calculation Tool process described in **Appendix E**.<br>Subject to applicable laws and regulations and valid existing rights, if the average density of one energy and mining facility per 640 acres (the density cap) is exceeded on all lands (regardless of land ownership) in the Priority Habitat Management Area within a proposed project analysis area, then no further disturbance from energy or mining facilities will be permitted by BLM: (1) until disturbance in the proposed project analysis area has been reduced to maintain the limit under the cap; or (2) unless the energy or mining facility is co-located into an existing disturbed area. | • Meteorological Towers (e.g., wind energy testing)<br>• Nuclear Energy Facilities<br>• Airport Facilities and Infrastructure<br>• Military Range Facilities and Infrastructure<br>• Hydroelectric Plants<br>• Recreation Areas Facilities and infrastructure<br>This disturbance is measured by direct footprint or by the distance between the outermost lines on transmission lines (Leu et al. 2008). | *(See above.)* |

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| **MD SSS 28:** New anthropogenic disturbances within PHMA or IHMA within a Conservation Area where the disturbance cap is already exceeded from any source or where the proposed development will result in the cap being exceeded will not be allowed in within that Conservation Area until enough habitat has been restored within that Conservation Area to maintain the area under this cap (subject to valid existing rights). | No changes made. | Potential change under Alternatives 3, 4, 5 and 6. |
| **MD SSS 29:** New anthropogenic disturbances within PHMA (Idaho only): Anthropogenic Disturbance Screening Criteria. In order to avoid surface-disturbing activities in PHMA, priority will be given to development (including ROWs, fluid minerals and other mineral resources subject to applicable stipulations) outside of PHMA. When authorizing development in PHMA, priority will be given to development in non-habitat areas first and then in the least suitable habitat for GRSG. In addition to the PHMA and IHMA Anthropogenic Disturbance Development Criteria (MD SSS 30), the following criteria must all be met in the project screening and assessment process:<br>a. The population trend for the GRSG within the associated Conservation Area is stable or increasing over a three-year period and the population levels are not currently engaging the adaptive management triggers (this applies strictly to new authorizations; renewals and amendments of existing authorizations will not be subject to this criteria when it can be shown that long-term impacts from those renewals or amendments will be substantially the same as the existing development);<br>b. The development with associated mitigation will not result in a net loss of GRSG Key habitat and mitigation will provide a net conservation benefit to the respective PHMA;<br>c. The project and associated impacts will not result in a net loss of GRSG Key habitat or habitat fragmentation or other impacts causing a decline in the population of the species within the relevant Conservation Area (the project will be outside Key habitat in areas not meeting desired habitat conditions or the project will provide a benefit to habitat areas that are functioning in a limited way as habitat);<br>d. The development cannot be reasonably accomplished outside of the PHMA; or can be either: 1) developed pursuant to a valid existing authorization; or 2) is co-located within the | **MD SSS 29**: Subject to valid existing rights, new anthropogenic disturbances in PHMA: Anthropogenic Disturbance Screening Criteria. In order to avoid surface-disturbing activities in PHMA, priority will be given to development of rights-of-way (ROWs), fluid minerals, and other mineral resources subject to applicable stipulations outside of PHMA. When authorizing development in PHMA, priority will be given to development in non-habitat areas first and then in the least suitable habitat for Greater Sage-Grouse. In addition to the PHMA and IHMA anthropogenic disturbance development criteria (MD SSS 30), the BLM will ensure an applicant has worked with the State of Idaho to submit a proposal that meets the following criteria:<br>a. The population trend for the Greater Sage-Grouse in the associated conservation area is stable or increasing over a 3-year period and the population levels are not currently engaging the adaptive management triggers (this applies strictly to new authorizations; renewals and amendments of existing authorizations will not be subject to this criteria when it can be shown that long-term impacts from those renewals or amendments will be substantially the same as the existing development).<br>b. The development with associated design features, avoidance, minimization, or mitigation actions will not result in a net loss of Greater Sage-Grouse key habitat or of the respective PHMA.<br>c. The project, its design features, avoidance and minimization actions, and associated impacts will not result in a net loss of Greater Sage-Grouse key habitat or habitat fragmentation or other impacts causing a decline in the population of the species in the relevant conservation area.<br>d. The development cannot be reasonably accomplished outside of the PHMA or can be | No change proposed. |

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| footprint of existing infrastructure (proposed actions will not increase the 2011 authorized footprint and associated impacts more than 50 percent, depending on industry practice).<br>e. Development will be implemented adhering to the required design features (RDF) described in **Appendix C**;<br>f. The project will not exceed the disturbance cap (MD SSS 27)<br>g. The project has been reviewed by the State Implementation Team and recommended for consideration by the Idaho Governor. | either developed pursuant to a valid existing authorization or collocated within the footprint of existing infrastructure. Proposed actions will not increase the 2011 authorized footprint and associated impacts more than 50 percent, depending on industry practice.<br>e. Development will adhere to the RDFs described in **Appendix C**.<br>f. The project will not exceed the disturbance cap (MD SSS 27).<br>g. Large-scale anthropogenic disturbances in PHMA will be reviewed by the technical and policy teams, as described in MD SSS 44. (See the glossary for definition of large-scale anthropogenic disturbances.) | *(See above.)* |
| **MD SSS 30:** The following Anthropogenic Disturbance Development Criteria must be met in the screening and assessment process for proposals in PHMA and IHMA to discourage additional disturbance in PHMA and IHMA (as described in MD LR 2 and MD RE 1; applies to Idaho only):<br>a. Through coordination with the USFWS and State of Idaho (as described in MD CC 1), it is determined that the project cannot be achieved, technically or economically, outside of this management area; and<br>b. The project siting and/or design should best reduce cumulative impacts and/or impacts on GRSG and other high value natural, cultural, or societal resources; this may include co-location within the footprint for existing infrastructure, to the extent practicable; and<br>c. The project results in a net conservation gain to GRSG Key habitat or with beneficial mitigation actions reduces habitat fragmentation or other threats within the Conservation Area; and<br>d. The project design mitigates unavoidable impacts through appropriate compensatory mitigation; and<br>e. Development will be implemented adhering to the RDFs described in **Appendix C**.<br>f. The project will not exceed the disturbance cap (MD SSS 27). | **MD SSS 30:** The applicant will work with the State of Idaho to submit a proposal that meets all of the following anthropogenic disturbance development criteria in the screening and assessment process for proposals in PHMA and IHMA. This is to discourage additional disturbance in PHMA and IHMA (as described in MD LR 2 and MD RE 1):<br>a. Through coordination with the State of Idaho (as described in MD CC 1), it is determined that the project cannot be achieved, technically or economically, outside of this management area<br>b. The project siting and/or design should best reduce cumulative impacts and/or impacts on Greater Sage-Grouse and other high value natural, cultural, or societal resources; this may include collocation in the footprint for existing infrastructure, to the extent practicable<br>c. The State of Idaho determines in coordination with BLM the project results in no net loss to Greater Sage-Grouse key habitat or, with mitigation actions, reduces habitat fragmentation or other threats in the conservation area;<br>d. Development will adhere to the RDFs described in **Appendix C**<br>e. The project will not exceed the disturbance cap (MD SSS 27)<br>f. Large-scale anthropogenic disturbances in PHMA and IHMA will be reviewed by the technical and policy teams, as described in MD SSS 44. | No change proposed. |

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| **MD SSS 31:** Co-locating new infrastructure within existing ROWs and maintaining and upgrading ROWs is preferred over the creation of new ROWs or the construction of new facilities in all management area. Colocation for various activities is defined as:<br>• Communication Sites – The installation of new equipment/facilities on or within or adjacent to existing authorized equipment/facilities or within a communication site boundary as designated in the Communication Site Plan.<br>• Electrical Lines – Installation of new ROWs adjacent to current ROWs boundaries, not necessarily placed on the same power poles.<br>• Other Rights-of-Way – The installation of new ROWs within the existing footprint of an approved ROW boundary or adjacent to an approved ROW boundary.<br>• Designated Corridors – The installation of new rights-of-way within the existing corridor or adjacent to the existing corridor. | No changes made. | No change proposed. |
| **MD SSS 32:** Incorporate RDFs as described in **Appendix C** in the development of project or proposal implementation, reauthorizations or new authorizations and suppression activities, as conditions of approval (COAs) into any post-lease activities and as best management practices for locatable minerals activities, to the extent allowable by law, unless at least one of the following conditions can be demonstrated and documented in the NEPA analysis associated with the specific project:<br>a. A specific RDF is not applicable to the site-specific conditions of the project or activity;<br>b. A proposed design feature or BMP is determined to provide equal or better protection for GRSG or its habitat; or<br>c. Analysis concludes that following a specific RDF will provide no more protection to GRSG or its habitat than not following it, for the project being proposed. | **MD SSS 32:** In PHMA and IHMA, incorporate RDFs as described in **Appendix C**, in developing the project or proposal implementation, reauthorizations or new authorizations, as conditions of approval (COAs) into any post-lease activities and as BMPs for locatable minerals activities, to the extent allowable by law, unless at least one of the following conditions can be demonstrated and documented in the NEPA analysis associated with the specific project:<br>a. A specific RDF is not applicable to the site-specific conditions of the project or activity;<br>b. A proposed design feature or BMP is determined to provide equal or better protection for GRSG or its habitat; or<br>c. Analysis concludes that following a specific RDF will provide no more protection to GRSG or its habitat than not following it, for the project being proposed.<br><br>In GHMA, the RDFs are considered BMPs that should be considered and applied, unless the proponent can show that applying the BMP is technically or economically impracticable. | No change proposed. |
| **MD SSS 33:** Conduct implementation and project activities, including construction and short-term anthropogenic disturbances consistent with seasonal habitat restrictions described in **Appendix C**. | No changes made. | No change proposed. |

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| **MD SSS 34:** RDFs and seasonal habitat restrictions will not be required for emergency or short-term activities necessary to protect and preserve human life or property. | No changes made. | No change proposed. |
| **MD SSS 35:** In undertaking BLM management actions, and consistent with valid and existing rights and applicable law in authorizing third-party actions, the BLM will apply the lek buffer-distances identified in the USGS Report Conservation Buffer Distance Estimates for Greater Sage-Grouse – A Review (Open File Report 2014-1239) in accordance with **Appendix B**. | **MD SSS 35:** In undertaking BLM management actions in PHMA, IHMA, and GHMA, and consistent with valid and existing rights and applicable law in authorizing third-party actions, the BLM will apply the lek buffer-distances in accordance with **Appendix B**. The buffers do not apply to vegetation treatments specifically designed to improve or protect Greater Sage-Grouse habitat; however, impacts on leks should be analyzed and those impacts should be minimized to the extent practicable. | No change proposed. |
| **MD SSS 36:** Incorporate appropriate conservation measures for slickspot peppergrass (*Lepidium papilliferum*) as described in the 2014 Conservation Agreement (as updated, amended or reauthorized) into implementation and project design within slickspot peppergrass habitat in the Jarbidge and Four Rivers Field Offices to avoid and minimize impacts on slickspot peppergrass. | No changes made. | No change proposed. |
| ***Monitoring*** | ***Monitoring*** | — |
| **MD SSS 37:** Once FIAT Assessments are complete, annually complete a review of FIAT Assessment implementation efforts within GRSG habitat with appropriate USFWS and state agency personnel. | No changes made. | No change proposed. |
| **MD SSS 38:** Monitor the effectiveness of projects (e.g., fuel breaks. fuels treatments) until objectives have been met or until it is determined that objectives cannot be met, according to the monitoring schedule identified for project implementation. | No changes made. | No change proposed. |
| **MD SSS 39:** Monitor invasive vegetation post vegetation management treatment. | No changes made. | No change proposed. |
| **MD SSS 40:** Monitor project construction areas for noxious weed and invasive species for at least 3 years, unless control is achieved earlier. | No changes made. | No change proposed. |
| **MD SSS 41:** Use lek, nesting and winter habitat maps and key habitat map (updates) to annually assess GRSG population and habitat status in the context of the adaptive management triggers. | No changes made. | No change proposed. |
| **MD SSS 42:** Continue to support updates to the Key Habitat map to track vegetation changes in relation to GRSG habitat on a yearly basis, until such a time this process is replaced. The process used to update the Key Habitat Map is described in Appendix F of the FEIS. | No changes made. | No change proposed. |

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| **MD SSS 43:** Monitor GRSG habitat as described in the monitoring framework plan (**Appendix D**) in coordination with IDFG. | No changes made. | No change proposed. |
| — | **MD SSS 44:** In collaboration with the Idaho Governor's Office of Species Conservation, Idaho Department of Fish and Game, US Fish and Wildlife Service, and potentially other state and federal agencies, the BLM will form two teams (a technical team and a policy team) through a memorandum of understanding. These teams will be responsible for reviewing proposed infrastructure developments, exceptions, variances, adaptive management triggers and responses, habitat management area adjustments, and mitigation, as described in detail in **Appendix K**. | No change proposed. |
| ***VEGETATION (VEG)*** | ***VEGETATION (VEG)*** | — |
| **Objectives:** | **Objectives:** | — |
| **Objective VEG 1:** Reconnect and expand areas of higher native plant community integrity/rangeland health to increase the extent of high quality habitat and, where possible, to accommodate the future effects of climate change. | No changes made. | No change proposed. |
| **Objective VEG 2:** Increase the amount and functionality of seasonal habitats by:<br>a. Increasing or enhancing canopy cover and average patch size of sagebrush.<br>b. Increasing the amount, condition and connectivity of seasonal habitats.<br>c. Protecting or improving GRSG migration/movement corridors.<br>d. Reducing conifer encroachment within GRSG seasonal habitats.<br>e. Improving understory (grass, forb) and/or riparian condition within breeding and late brood- rearing habitats.<br>f. Reducing the extent of annual grasslands within and adjacent to PHMA and IHMA.<br><br>Decadal treatment objectives by population area are identified in **Table 2-3**, Estimated Acres of Treatment Needed within a 10-Year Period to Achieve Vegetation Objectives on BLM-Administered Lands1. | No changes made. | No change proposed. |

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| **Objective VEG 3:** In all SFA and PHMA, the desired condition is to maintain all lands ecologically capable of producing sagebrush (but no less than 70%) with a minimum of 15% sagebrush canopy cover or as consistent with specific ecological site conditions. The attributes necessary to sustain these habitats are described in Interpreting Indicators of Rangeland Health (BLM Tech Ref 1734-6). | This decision has been deleted. | No change proposed. |
| **Management Decisions (MD):** | **Management Decisions (MD):** | — |
| Sagebrush Steppe: | Sagebrush Steppe: | — |
| **MD VEG 1:** Implement habitat rehabilitation or restoration projects in areas that have potential to improve GRSG habitat using a full array of treatment activities as appropriate, including chemical, mechanical and seeding treatments. | No changes made. | No change proposed. |
| **MD VEG 2:** Implement vegetation rehabilitation or manipulation projects to enhance sagebrush cover or to promote diverse and healthy grass and forb understory to achieve the greatest improvement in GRSG habitat based on FIAT Assessments, HAF assessments, other vegetative assessment data and local, site specific factors that indicate sagebrush canopy cover or herbaceous conditions do not meet habitat management objectives (i.e. is minimal or exceeds optimal characteristics). This may necessitate the use of prescribed fire as a site preparation technique to remove annual grass residual growth prior to the use of herbicides in the restoration of certain lower elevation sites (e.g., Wyoming big sagebrush) but such efforts will be carefully planned and coordinated to minimize impacts on GRSG seasonal habitats. | No changes made. | No change proposed. |
| **MD VEG 3:** Require use of native seeds for restoration based on availability, adaptation (ecological site potential), and probability of success (Richards et al. 1998). Non-native seeds may be used as long as they support GRSG habitat objectives (Pyke 2011) to increase probability of success, when adapted seed availability is low or to compete with invasive species especially on harsher sites. | No changes made. | No change proposed. |
| **MD VEG 4:** Implement management changes in restoration and rehabilitation areas, as necessary, to maintain suitable GRSG habitat, improve unsuitable GRSG habitat and to ensure long-term persistence of improved GRSG habitat (Eiswerth and Shonkwiler 2006). Management changes can be considered during livestock grazing permit renewals, travel management planning, and renewal or reauthorization of ROWs. | No changes made. | No change proposed. |

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| **MD VEG 5:** Consider establishing seed harvest areas that are managed for seed production (Armstrong 2007) to provide a reliable source of locally adapted seed to use during rehabilitation and restoration activities. | No changes made. | No change proposed. |
| **MD VEG 6:** Allocate use of native seed to GRSG or ESA listed species habitat in years when preferred native seed is in short supply. This may require reallocation of native seed from ESR projects outside of PHMA or IHMA to those inside it. Where probability of success or native seed availability is low, nonnative seeds may be used as long as they meet GRSG habitat conservation objectives (Pyke 2011). Re-establishment of appropriate sagebrush species/subspecies and important understory plants, relative to site potential, shall be the highest priority for rehabilitation efforts. | No changes made. | No change proposed. |
| **MD VEG 7:** During land health assessments, evaluate the relative value of existing nonnative seeding within GRSG habitat as: 1) a component of a grazing system allowing improvement of adjacent native vegetation, 2) development of a forage reserve, 3) incorporation into a fuel break system (Davies et al. 2011) or 4) restoration/diversification for GRSG habitat improvement. Where appropriate and feasible, diversify seedings, or restore to native vegetation when potential benefits to GRSG habitat outweigh the other potential uses of the non-native seeding, with emphasis on PHMA and IHMA. Allow recolonization of seedings by sagebrush and other native vegetation. | No changes made. | No change proposed. |
| Conifer Encroachment: | Conifer Encroachment: | — |
| **MD VEG 8:** Remove conifers encroaching into sagebrush habitats, in a manner that considers tribal cultural values. Prioritize treatments closest to occupied GRSG habitats and near occupied leks, and where juniper encroachment is phase 1 or phase 2. Use of site-specific analysis and tools like the FIAT report (Chambers et. al., 2014) will help refine the location for specific areas to be treated. | No changes made. | No change proposed. |
| Invasive Species: | Invasive Species: | — |
| **MD VEG 9:** Incorporate results of the FIAT Assessments into projects and activities addressing invasive species as appropriate. | No changes made. | No change proposed. |

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| **MD VEG 10:** Implement noxious weed and invasive species control using integrated vegetation management actions per national guidance and local weed management plans for Cooperative Weed Management Areas in cooperation with State and Federal agencies, affected counties, and adjoining private lands owners. | No changes made. | No change proposed. |
| **MD VEG 11:** Conduct integrated weed management actions for noxious and invasive weed populations that are impacting or threatening GRSG habitat quality using a variety of eradication and control techniques including chemical, mechanical and other appropriate means. | No changes made. | No change proposed. |
| **MD VEG 12:** Require project proponent (projects described in MD SSS 27 and which are included in the anthropogenic disturbance cap evaluation) to ensure that noxious weeds and invasive species caused as a result of the project are treated to eliminate establishment on the disturbed project construction areas for at least 3 years and monitored and treated during the life of the project. | No changes made. | No change proposed. |
| **MD VEG 13:** Treat areas that contain cheatgrass and other invasive or noxious species to minimize competition and favor establishment of desired species. | No changes made. | No change proposed. |
| ***FIRE AND FUELS MANAGEMENT* (FIRE)** | ***FIRE AND FUELS MANAGEMENT* (FIRE)** | — |
| **Objectives:** | **Objectives:** | — |
| **Objective FIRE 1:** Design fuel treatments to restore, enhance, or maintain GRSG habitat. | No changes made. | No change proposed. |
| **Objective FIRE 2:** Manage wildfires to minimize loss of sagebrush and protect GRSG habitat. | No changes made. | No change proposed. |
| **Management Decisions:** | **Management Decisions:** | — |
| Pre-Suppression: | Pre-Suppression: | — |
| **MD FIRE 1:** (Wildfire Preparedness): Support development and implementation of Rangeland Fire Protection Associations (RFPAs) in coordination with the State of Idaho. | No changes made. | No change proposed. |
| **MD FIRE 2:** Develop a consistent approach to fire restrictions within GRSG habitat through the existing coordinated inter-agency approach to fire restrictions based upon National Fire Danger Rating System thresholds (fuel conditions, drought conditions, and predicted weather patterns). | No changes made. | No change proposed. |

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| **MD FIRE 3:** Annually incorporate into existing fire management plans results and updates from the Wildfire and Invasive Species Habitat Assessments (FIAT Assessments) described in **Appendix H**, to communicate/explain the resource value of GRSG habitat, including fire prevention messages and actions to reduce human-caused ignitions. | No changes made. | No change proposed. |
| **MD FIRE 4:** Continue to participate with the Wildland Fire Leadership Council, a cooperative, interagency organization dedicated to achieving consistent implementation of the goals, actions, and policies in the National Fire Plan and the Federal Wildland Fire Management Policy. | No changes made. | No change proposed. |
| **MD FIRE 5:** Continue annual coordination meetings held between cooperating agencies that have fire suppression responsibilities. Incorporate Rangeland Fire Protection Associations and other stakeholders into this coordination. Discuss priority suppression areas and distribute maps showing priority suppression areas at both the Conservation Area and the local office levels as based on the adaptive management strategy and FIAT Assessments. | No changes made. | No change proposed. |
| **MD FIRE 6:** Ensure firefighter personnel receive annual orientation regarding GRSG habitat and sagebrush management issues as related to wildfire suppression. | No changes made. | No change proposed. |
| **MD FIRE 7**: As part of the FIAT Assessments, identify roads, trails, and recreational use areas with high frequency of human caused fires within or adjacent to the PHMA or IHMA. Consider these areas during annual fire restriction evaluations, and as appropriate, through site specific management. | No changes made. | No change proposed. |
| **MD FIRE 8:** Coordinate with Federal, State and local jurisdictions on fire and litter prevention programs to reduce human caused ignitions. | No changes made. | No change proposed. |
| **MD FIRE 9**: Implement activities identified within the FIAT Assessments. | No changes made. | No change proposed. |

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| Suppression: | Suppression: | — |
| **MD FIRE 10**: Complete Wildland Fire and Invasive Species Assessments (FIAT Assessments) as described within **Appendix H** and incorporate results into appropriate Fire Management Plans as they are completed. FIAT Assessments are interdisciplinary evaluations of the threats posed by wildfire and invasive species, as well as identification of focal and emphasis habitats/treatment opportunities for fuels management, fire management, and restoration. These FIAT Assessments identify focal and emphasis habitats and describe strategies for fuels management, suppression and restoration activities. Focal and Emphasis Habitats identified through the FIAT Assessment to further refine priority areas for treatments to reduce the threats posed by wildfire, invasive annual grass and conifer expansion. | No changes made. | No change proposed. |
| **MD FIRE 11:** As part of the FIAT Assessments incorporate a wildfire response time analysis focusing on response time to identified priority areas within PHMA and IHMA or on those fires that have the potential to impact PHMA and IHMA. Incorporate findings into Unit Initial Attack program that determines initial attack resources. | No changes made. | No change proposed. |
| **MD FIRE 12**: As part of the FIAT Assessment incorporate a water capacity analysis for suppression purposes, including potential private water sources. Utilized the analysis to ensure water availability for response to fire in or threatening PHMA and IHMA during initial attack. | No changes made. | No change proposed. |
| **MD FIRE 13**: During high fire danger conditions, stage initial attack and secure additional resources closer to priority areas identified in the FIAT Assessments, based on anticipated fires and weather conditions, with particular consideration of the West Owyhee, Southern and Desert Conservation Areas to ensure quicker response times in or near GRSG habitat after considerations and placement of resources to protect human life and property. | No changes made. | No change proposed. |

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| **MD FIRE 14**: Utilize a full range of fire management strategies and tactics through strategic wildfire suppression planning consistent with appropriate management response and within acceptable risk levels, to achieve resource objectives for GRSG habitat consistent with land use plan direction. Utilizing both direct and indirect attack as appropriate to limit the overall amount of GRSG habitat burned. This can include suppressing fires in intact sagebrush habitats; limiting fire growth in GHMA when suppression resources are available or managing wildfire for resource benefit in areas of conifer (juniper) encroachment. | No changes made. | No change proposed. |
| **MD FIRE 15**: Suppression priorities: The protection of human life is the single, overriding priority. Setting priorities among protecting human communities and community infrastructure, other property and improvements, and natural and cultural resources will be done based on the values to be protected, human health and safety, and the costs of protection. Maintaining GRSG habitat will be the highest natural resources priority immediately after human life and property, commensurate with threatened and endangered species habitat or other critical habitats to be protected. | No changes made. | No change proposed. |
| **MD FIRE 16**: Ensure close coordination with federal and state firefighters including the Rangeland Fire Protection Associations during suppression activities. | No changes made. | No change proposed. |
| Fuels Management: | Fuels Management: | — |
| **MD FIRE 17**: Design and implement fuels treatments that will reduce the potential start and spread of unwanted wildfires and provide anchor points or control lines for the containment of wildfires during suppression activities with an emphasis on maintaining, protecting, and expanding sagebrush ecosystems and successfully rehabilitated areas and strategically and effectively reduce wildfire threats in the greatest area. | No changes made. | No change proposed. |
| **MD FIRE 18:** Enhance (or maintain/retain) sagebrush canopy cover and community structure to match expected potential for the ecological site and consistent with GRSG habitat objectives unless fuels management objectives requires additional reduction in sagebrush cover to meet strategic protection of GRSG habitat. Closely evaluate the benefits of the fuel management treatments against the additional loss of sagebrush cover on the local landscape in the NEPA process. | No changes made. | No change proposed. |

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| **MD FIRE 19:** Apply appropriate seasonal restrictions for implementing vegetation and fuels management treatments according to the type of seasonal habitats present. Allow no treatments in known winter range unless the treatments are designed to strategically reduce wildfire risk around and/or in the winter range and will protect, maintain, increase, or enhance winter range habitat quality. Ensure chemical applications are utilized where they will assist in success of fuels treatments. Strategically place treatments on a landscape scale to prevent fire from spreading into PHMA or WUI. | No changes made. | No change proposed. |
| **MD FIRE 20**: Develop a fuels continuity and management strategy to expand, enhance, maintain and protect GRSG habitat informed by the FIAT Assessments completed as described in **Appendix H**. | No changes made. | No change proposed. |
| **MD FIRE 21**: When developing the fuels management strategy as part of the FIAT Assessment described in **Appendix H** consider up-to-date fuels profiles; land use plan direction; current and potential habitat fragmentation; sagebrush and GRSG ecological factors; active vegetation management steps to provide critical breaks in fuel continuity where appropriate; incorporate a comparative risk analysis with regard to the risk of increased habitat fragmentation from a proposed action versus the risk of large scale fragmentation posed by wildfires if the action is not taken. | No changes made. | No change proposed. |
| **MD FIRE 22:** Fuel treatments will be designed through an interdisciplinary process to expand, enhance, maintain, and protect GRSG habitat which considers a full range of cost effective fuel reduction techniques, including: chemical, biological (including grazing and targeted grazing), mechanical and prescribed fire treatments. | No changes made. | No change proposed. |
| **MD FIRE 23:** Existing and proposed linear ROWs can be considered for use and maintenance as vegetated fuel breaks in appropriate areas (this activity may or may not be part of the ROW permit or the responsibility of the permit holder, in cases where this activity is considered part of mitigation for project design then it will be appropriately included as part of the ROW permit and the responsibility of the permit holder for development and maintenance). | No changes made. | No change proposed. |

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| **MD FIRE 24:** Fuel breaks will incorporate existing vegetation treatments (seedings), rocky areas or other appropriate topography or features or be located adjacent to existing linear disturbance areas where appropriate. Fuel breaks should be placed in areas with the greatest likelihood of compartmentalizing a fire and/or to foster suppression options to protect existing intact habitat. | No changes made. | No change proposed. |
| **MD FIRE 25:** Strategically pre-treat areas to reduce fine fuels consistent with areas and results identified within the Wildfire and Invasive Species Assessments. | No changes made. | No change proposed. |
| **MD FIRE 26:** Protect vegetation restoration and rehabilitation efforts/projects from subsequent fire events. | No changes made. | No change proposed. |
| **MD FIRE 27:** Targeted grazing as a fuels treatment to adjust the vegetation conditions to reduce the potential start and spread of wildfires may be implemented within existing grazing authorizations if feasible such as through temporary non-renewable authorizations, or through contracts, agreements or other appropriate means separate from existing grazing authorizations and permits. | No changes made. | No change proposed. |
| **MD FIRE 28:** Targeted grazing to achieve fuels management objectives should conform to the following criteria:<br>a. Targeted grazing should be implemented strategically on the landscape, and directly involve the minimum footprint and grazing intensity required to meet fuels management objectives.<br>b. Conform to the applicable Standards for Rangeland Health and Guidelines for Livestock Grazing Management at the assessment scale (pasture/watershed).<br>c. Where feasible and applicable coordinate with the grazing permittee to strategically reduce fuels through livestock management within the Mandatory Terms and Conditions of the applicable grazing authorizations | No changes made. | No change proposed. |
| **MD FIRE 29:** Prioritize the use of native seeds for fuels management treatment based on availability, adaptation (site potential), and probability of success. Where probability of success or native seed availability is low or non-economical, nonnative seeds may be used to meet GRSG habitat objectives to trend toward restoring the fire regime. When reseeding, use fire resistant native and nonnative species, as appropriate, to provide for fuel breaks. | No changes made. | No change proposed. |

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| **MD FIRE 30:** Maintain effectiveness of fuels projects, including fuel breaks, to ensure long-term success, including persistence of seeded species and/or other treatment components while maintaining the integrity of adjacent vegetation. | No changes made. | No change proposed. |
| **MD FIRE 31:** If prescribed fire is used in GRSG habitat, the NEPA analysis for the Burn Plan will address:<br>• why alternative techniques were not selected as a viable options;<br>• how GRSG goals and objectives will be met by its use;<br>• how the COT Report objectives will be addressed and met;<br>• a risk assessment to address how potential threats to GRSG habitat will be minimized.<br><br>Allow prescribed fire as a vegetation or fuels treatment in Wyoming big sagebrush sites or other xeric sagebrush species sites, or in areas with a potential for post-fire exotic annual dominance only after the NEPA analysis for the Burn Plan has addressed the four bullets outlined above. Prescribed fire can be used to meet specific fuels objectives that will protect Greater Sage-Grouse habitat in PHMA (e.g., creation of fuel breaks that will disrupt the fuel continuity across the landscape in stands where annual invasive grasses are a minor component in the understory, burning slash piles from conifer reduction treatments, used as a component with other treatment methods to combat annual grasses and restore native plant communities).<br><br>Allow prescribed fire in known sage-grouse winter range only after the NEPA analysis for the Burn Plan has addressed the four bullets outlined above. Any prescribed fire in winter habitat will need to be designed to strategically reduce wildfire risk around and/or in the winter range and designed to protect winter range habitat quality. | No changes made. | No change proposed. |
| Post Fire Management: | Post Fire Management: | — |
| **MD FIRE 32:** Utilize the findings and Restoration/Rehabilitation Strategy developed as part of the FIAT Assessment process described in **Appendix H** to determine if GRSG rehabilitation actions are needed, based on ecological potential, and direct emergency stabilization and rehabilitation (ESR) (BLM) actions after fire. | No changes made. | No change proposed. |

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| **MD FIRE 33:** Incorporate GRSG Habitat Management Objectives into ESR/BAER plans based on site potential and in accordance with the Restoration/Rehabilitation Strategy developed as a result of the FIAT Assessments. | No changes made. | No change proposed. |
| **MD FIRE 34:** Provide adequate rest from livestock grazing to allow natural recovery of existing vegetation and successful establishment of seeded species within burned/ESR areas. All new seedings of grasses and forbs should not be grazed until at least the end of the second growing season, and longer as needed to allow plants to mature and develop robust root systems which will stabilize the site, compete effectively against cheatgrass and other invasive annuals, and remain sustainable under long-term grazing management. Adjust other management activities, as appropriate, to meet ESR objectives. | No changes made. | No change proposed. |
| **MD FIRE 35:** Adjust, as appropriate, livestock management on adjacent unburned areas to mitigate the effect of the burn on local GRSG populations. | No changes made. | No change proposed. |
| **MD FIRE 36:** Following seedling establishment, modify grazing management practices if needed to achieve long-term vegetation and habitat objectives. | No changes made. | No change proposed. |
| ***LIVESTOCK GRAZING (LG)*** | ***LIVESTOCK GRAZING (LG)*** | — |
| **Management Decisions:** | **Management Decisions:** | — |
| **MD LG 1**: Maintain existing areas designated as available or unavailable for livestock grazing. Existing active AUMs for livestock grazing within the planning area will not be changed at the broad scale, though the number of AUMs available on an allotment may be adjusted based on site-specific conditions to meet management objectives during term permit renewals, AMP development, or other appropriate implementation planning. Additionally, temporary adjustments can be made annually to livestock numbers, the number of AUMs, and season of use in accordance with applicable regulations. | No changes made. | Potential change under Alternative 3. |
| **MD LG 2**: Prioritize BLM land health assessments and processing of BLM grazing permits consistent with management area prioritization (MD SSS 4), unless other higher priority considerations exist (MD LG 15) or other factors such as threatened, endangered and proposed species habitat that livestock grazing can affect. Where possible, conduct land health assessments at the watershed, or other meaningful landscape-scale. | No changes made. | Potential change under Alternatives 3, 4, 5 and 6. |

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| **MD LG 3**: Where opportunities exist, coordinate with other land managers to encourage livestock operations that utilize mixed federal, private and/or state land to be managed at the landscape scale to benefit GRSG and their habitat across land ownerships. | No changes made. | Potential change under Alternatives 3, 4, 5 and 6. |
| **MD LG 4**: PHMA & IHMA: During the land health assessment process, identify the type(s) of seasonal habitat the assessed areas are capable of supporting. Utilize the habitat assessment framework, (Stiver et al. 2015) or other BLM approved methodology, in accordance with current policy and guidance to determine whether vegetation structure, condition and composition are meeting GRSG habitat objectives including riparian and lentic areas (Objective SSS 2; Table 2-2). Use appropriate Ecological Site Descriptions, reference sheets and state and transition models to inform desired habitat conditions and expected responses to management changes for the land unit being assessed. | No changes made. | Potential change under Alternatives 3, 4, 5 and 6. |
| **MD LG 5**: When modifying grazing management, analyze indirect impacts on habitat, including changes in fuel loading and wildfire behavior. | No changes made. | Potential change under Alternatives 3, 4, 5 and 6. |
| **MD LG 6:** When livestock management practices are determined to not be compatible with meeting or making progress towards achievable habitat objectives following appropriate consultation, cooperation and coordination, implement changes in grazing management through grazing authorization modifications, or allotment management plan implementation. Potential modifications include, but are not limited to, changes in:<br>• Season or timing of use;<br>• Numbers of livestock;<br>• Distribution of livestock use;<br>• Duration and/or level of use;<br>• Kind of livestock (e.g., cattle, sheep, horses, or goats) (Briske et al. 2011); and<br>• Grazing schedules (including rest or deferment).<br>*Not in Priority Order | No changes made. | Potential change under Alternatives 3, 4, 5 and 6. |

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| **MD LG 7**: Where opportunities exist, establish forage reserves to facilitate restoration and rehabilitation efforts in GRSG habitat areas. A forage reserve is an area that is set aside for use as needed by various permittees who might be displaced by wildfire, ESR, restoration efforts, etc. rather than having a term permit issued for grazing like a regular allotment. | No changes made. | Potential change under Alternatives 3, 4, 5 and 6. |
| **MD LG 8:** PHMA & IHMA - Where practical, design pasture rotations to utilize non-native perennial grass seedings and/or annual grasslands, during GRSG nesting season annually or periodically. | No changes made. | Potential change under Alternatives 3, 4, 5 and 6. |
| **MD LG 9:** Evaluate the locations where salt/supplements are placed, coordinate salt/supplements placement to reduce impacts on GRSG habitat (e.g., existing disturbed areas). | No changes made. | Potential change under Alternatives 3, 4, 5 and 6. |
| **MD LG 10**: Incorporate RDFs into Terms and Conditions for crossing permits to limit disturbance of occupied leks when trailing livestock across BLM administered lands in the spring. Work with permittees in locating over-nighting, watering and bedding locations to minimize impacts on seasonal habitats. | No changes made. | Potential change under Alternatives 3, 4, 5 and 6. |
| **MD LG 11:** Design any new structural range improvements, following appropriate cooperation, consultation and coordination, to minimize and/or mitigate impacts on GRSG habitat. Any new structural range improvements should be placed along existing disturbance corridors or in unsuitable habitat, to the extent practical, and are subject to RDFs (**Appendix C**). Structural range improvement in this context, include, but are not limited to: fences, exclosures, corrals or other livestock handling structures; pipelines, troughs, storage tanks (including moveable tanks used in livestock water hauling), windmills, ponds/reservoirs, solar panels and spring developments. | No changes made. | Potential change under Alternatives 3, 4, 5 and 6. |
| **MD LG 12:** During the land health assessment and grazing permit renewal process, evaluate existing livestock management range improvements with respect to their effect on GRSG habitat. Consider removal of projects that are not needed for effective livestock management, are no longer in working condition, and/or negatively affect GRSG habitat, with the exception of functional projects needed for management of habitat for other threatened, endangered or proposed species or other sensitive resources. | No changes made. | Potential change under Alternatives 3, 4, 5 and 6. |

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| **MD LG 13**: Prioritize removal, modification or marking of fences or other structures in areas of high collision risk following appropriate cooperation, consultation and coordination to reduce the incidence of GRSG mortality due to fence strikes (Stevens et al. 2012). | No changes made. | Potential change under Alternatives 3, 4, 5 and 6. |
| **MD LG 14**: In response to weather conditions (i.e. drought) adjust grazing management (i.e., delay turnout, adjust pasture rotations, adjust the amount and/or duration of grazing) as appropriate to provide for adequate food and cover for GRSG. | No changes made. | Potential change under Alternatives 3, 4, 5 and 6. |
| **MD LG 15**: The BLM will prioritize (1) the review of grazing permits/leases, in particular to determine if modification is necessary prior to renewal, and (2) the processing of grazing permits/leases in Sagebrush Focal Areas (SFA) followed by PHMA outside of the SFA. In setting workload priorities, precedence will be given to existing permits/leases in these areas not meeting Land Health Standards, with focus on those containing riparian areas, including wet meadows. Management and conservation action prioritization will occur at the Conservation Area (CA) scale and be based on GRSG population and habitat trends: Focusing management and conservation actions first in SFA followed by areas of PHMA outside SFA. The BLM may use other criteria for prioritization to respond to urgent natural resource concerns (e.g., fire) and legal obligations. | **MD LG 15:** Generally, the BLM will prioritize (1) the review of grazing permits/leases, in particular to determine if modification is necessary prior to renewal, and (2) the processing of grazing permits/leases based on land health conditions or concerns related to rangeland health standards. If similar issues are found in both PHMA and IHMA, then those in PHMA should be addressed first. In setting workload priorities, precedence will be given to existing permits/leases in these areas not meeting land health standards and that have declining Greater Sage-Grouse populations, defined by a soft or hard population adaptive management trigger being engaged. Greater Sage-Grouse populations that are stable or trending upward will be a lower priority for permit renewal and the assessment process. The BLM may use other criteria for prioritization to respond to urgent natural resource concerns, such as fire, and legal obligations. | Potential change under Alternatives 3, 4, 5 and 6. |
| **MD LG 16**: The NEPA analysis for renewals and modifications of livestock grazing permits/leases that include lands within SFA and PHMA will include specific management thresholds, based on GRSG Habitat Objectives Table, Land Health Standards (43 CFR 4180.2) and ecological site potential, and one or more defined responses that will allow the authorizing officer to make adjustments to livestock grazing that have already been subjected to NEPA analysis. | **MD LG 16:** Grazing in the PHMA and IHMA will be managed according to the process outlined in the text below, and the grazing permit renewal process will be managed according to 43 CFR 4100, Subpart 4180, and as outlined in the process below. Incorporate the Greater Sage-Grouse desired conditions in Table 2.2 [of the 2015 Final EIS] and management considerations as desired conditions, and manage livestock grazing, recognizing that these conditions may not be achievable: (1) due to the existing ecological condition, ecological potential, or existing vegetation; or (2) due to causal events unrelated to existing livestock grazing; and 3) that they are not intended to be prescriptive at the allotment level.<br>a. Conduct habitat assessments using | Potential change under Alternatives 3, 4, 5 and 6. |

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| *(See above.)* | appropriate monitoring methods. Where appropriate, make a determination of factors causing any failure to achieve the desired conditions in Table 2.2 [of the 2015 Final EIS]. The assessment will be conducted at a resolution and scale sufficient to document the habitat condition and will include local, spatial, and interannual variability. Any determination relative to the habitat characteristics (Table 2.2 [of the 2015 Final EIS]) will be based on existing ecological condition, ecological potential, and existing vegetation information. This is to ensure the assessment recognizes whether these habitat characteristics are achievable.<br>b. The assessment will rely on published characteristics of Greater Sage-Grouse habitat and the ecological site descriptions, on Table 2.2 [of the 2015 Final EIS as amended], and where available and applicable, rangeland health determinations made in accordance with 43 CFR 4180.2(c).<br>c. After conducting the assessment in (b), above, if the current grazing system achieves applicable Idaho rangeland health standards, absent substantial and compelling information, no further grazing management changes are necessary to achieve desired conditions for Greater Sage-Grouse habitat.<br>d. If the process and conditions outlined in (b), above demonstrate that livestock grazing is limiting achievement of the desired conditions (Table 2.2 [of the 2015 Final EIS]), renewed permits will include measures, including but not limited to the actions outlined in **Appendix C** to achieve desired habitat conditions. These measures must be tailored to address the specific management issues.<br>e. Adaptive management changes related to existing grazing permits should be undertaken only where improper grazing is determined to be the causal factor in not meeting habitat characteristics, specific to site capability, based on monitoring, with appropriate spatial variability. See **Appendix C**.<br>f. Where management changes are needed and necessary pursuant to (f), above, implement management actions that are narrowly tailored to address the specific habitat objective applied at the allotment or activity plan level, including the actions outlined in **Appendix C**, Grazing Section of BMPs. (The | *(See above.)* |

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| *(See above.)* | Governor's plan is attached as **Appendix I** for references to this section.) | *(See above.)* |
| **MD LG 17**: Allotments within SFA, followed by those within PHMA, and focusing on those containing riparian areas, including wet meadows, will be prioritized for field checks to help ensure compliance with the terms and conditions of the grazing permits. Field checks can include monitoring for actual use, utilization, and use supervision. Management and conservation action prioritization will occur at the Conservation Area (CA) scale and be based on GRSG population and habitat trends: Focusing management and conservation actions first in SFA followed by areas of PHMA outside SFA. | **MD LG 17:** Allotments within PHMA with declining Greater Sage-Grouse populations, defined by a soft or hard adaptive management trigger being engaged and/or with land health concerns, will be prioritized for field checks. | Potential change under Alternatives 3, 4, 5 and 6. |
| **MD LG 18**: At the time a permittee or lessee voluntarily relinquishes a permit or lease, the BLM will consider whether the public lands where that permitted use was authorized should remain available for livestock grazing or be used for other resource management objectives, such as reserve common allotments or fire breaks. This does not apply to or impact grazing preference transfers, which are addressed in 43 CFR 4110.2-3. | No changes made. | Potential change under Alternatives 3, 4, 5 and 6. |
| ***WILD HORSES AND BURROS (WHB)*** | ***WILD HORSES AND BURROS (WHB)*** | — |
| **Management Decisions:** | — | — |
| **WHB-1**: Manage herd management areas (HMAs) in GRSG habitat within established AML ranges to achieve and maintain GRSG habitat objectives (Table 2-2). | No changes made. | Potential change under Alternatives 3, 4, 5 and 6. |
| **WHB-2**: Complete rangeland health assessments for HMAs containing GRSG habitat using an interdisciplinary team of specialists (e.g. range, wildlife, and riparian). The priorities for conducting assessments are: 1) HMAs Containing SFA; 2) HMAs containing PHMA; 3) HMAs containing IHMA; 4) HMAs containing GHMA; 5) HMAs containing sagebrush habitat outside of PHMA, IHMA, and GHMA mapped habitat; 6) HMAs without GRSG Habitat. | **WHB-2**: Complete rangeland health assessments for herd management areas containing GRSG habitat using an interdisciplinary team of range, wildlife, and riparian specialists. The priority for conducting assessments is herd management areas with known land health issues and where local populations of GRSG are in decline according to the adaptive management trigger standards. When similar issues are found in multiple herd management areas, then the priority should be: 1) herd management areas containing PHMA; 2) herd management areas containing IHMA; 3) herd management areas containing GHMA; 4) herd management areas containing GRSG habitat outside of PHMA, IHMA, and GHMA mapped habitat; 6) herd management areas without GRSG Habitat. | Potential change under Alternative 3. |

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| **WHB-3**: Prioritize gathers and population growth suppression techniques in HMAs in GRSG habitat, unless removals are necessary in other areas to address higher priority environmental issues, including herd health impacts. Place higher priority on Herd Areas not allocated as HMAs and occupied by wild horses and burros in SFA followed by PHMA. | **WHB-3**: Prioritize gathers and population growth suppression techniques in herd management areas in GRSG habitat, unless removals are necessary in other areas to address higher priority environmental issues, including herd health impacts. Place higher priority on Herd Areas not allocated as herd management areas and occupied by wild horses and burros in PHMA. | Potential change under Alternative 3. |
| **WHB-4**: In SFA and PHMA outside of SFA, assess and adjust AMLs through the NEPA process within HMAs when wild horses or burros are identified as a significant causal factor in not meeting land health standards, even if current AML is not being exceeded. | **WHB-4**: In PHMA, assess and adjust appropriate management levels (AMLs) through the NEPA process within herd management areas when wild horses or burros are identified as a significant causal factor in not meeting land health standards, even if current AML is not being exceeded. | Potential change under Alternatives 3, 4, 5 and 6. |
| **WHB-5:** In SFA and PHMA outside of SFA, monitor the effects of wild horse and burro use in relation to GRSG seasonal habitat objectives on an annual basis to help determine future management actions. | **WHB-5:** In PHMA, monitor the effects of wild horse and burro use in relation to GRSG seasonal habitat objectives to help determine future management actions. | Potential change under Alternative 3. |
| **WHB-6**: Develop or amend herd management area plans (HMAPs) to incorporate GRSG habitat objectives and management considerations for all HMAs within GRSG habitat, with emphasis placed on SFA and other PHMA. | **WHB-6**: Develop or amend herd management area plans to incorporate GRSG habitat objectives and management considerations for all herd management areas in GRSG habitat, with emphasis placed on PHMA. | Potential change under Alternative 3. |
| **WHB-7:** Consider removals or exclusion of wild horse and burros during or immediately following emergency situations (such as fire, floods, and drought) to facilitate meeting GRSG habitat objectives where HMAs overlap with GRSG habitat. | No changes made. | Potential change under Alternative 3. |
| **WHB-8**: When conducting NEPA analysis for wild horse and burro management activities, water developments, or other rangeland improvements for wild horses, address the direct and indirect impacts on GRSG populations and habitat. Implement any water developments or rangeland improvements using the criteria identified for domestic livestock. | No changes made. | Potential change under Alternative 3. |
| **WHB-9:** Coordinate with professionals from other federal and state agencies, researchers at universities, and others to utilize and evaluate new management tools (e.g., population growth suppression, inventory techniques, and telemetry) for implementing the wild horse and burro program. | No changes made. | Potential change under Alternative 3. |

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| ***MINERAL RESOURCES (MR)*** | ***MINERAL RESOURCES (MR)*** | — |
| ***Fluid Minerals*** | ***Fluid Minerals*** | — |
| **Objective MR 1:** Priority will be given to leasing and development of fluid mineral resources, including geothermal, outside of PHMA, IHMA, and GHMA. When analyzing leasing and authorizing development of fluid mineral resources, including geothermal, in PHMA, IHMA, and GHMA, and subject to applicable stipulations for the conservation of GRSG, priority will be given to development in non-habitat areas first and then in the least suitable habitat for GRSG. The implementation of these priorities will be subject to valid existing rights and any applicable law or regulation, including, but not limited to, 30 USC 226(p) and 43 CFR 3162.3-1(h). | No changes made. | Potential change under Alternatives 3, 4, 5 and 6. |
| **Objective MR 2:** Where a proposed fluid mineral development project on an existing lease can adversely affect GRSG populations or habitat, the BLM will work with the lessees, operators, or other project proponents to avoid, minimize and apply compensatory mitigation to the extent compatible with lessees' rights to drill and produce fluid mineral resources. The BLM will work with the lessee, operator, or project proponent in developing an APD or Geothermal Drilling Permit (GDP) for the lease to avoid, minimize, and apply compensatory mitigation to impacts on GRSG or its habitat and will ensure that the best information about the GRSG and its habitat informs and helps to guide development of such Federal leases. | **Objective MR 2:** Where a proposed fluid mineral development project on an existing lease can adversely affect GRSG populations or habitat in PHMA, IHMA, and GHMA, the BLM will work with the lessees, operators, or other project proponents to avoid, minimize impacts to the extent compatible with lessees' rights to drill and produce fluid mineral resources. The BLM will work with the lessee, operator, or project proponent in developing an APD or Geothermal Drilling Permit (GDP) for the lease. This would be apply the mitigation hierarchy to impacts on GRSG or its habitat and will ensure that the best information about the GRSG and its habitat informs and helps to guide development of such Federal leases. | No change proposed. |
| **Management Decisions (MD):** | **Management Decisions (MD):** | — |
| **MD MR 1**: Idaho and Montana: Areas within SFA will be open to fluid mineral leasing and development and geophysical exploration subject to NSO without waiver, exception, or modification. Areas within PHMA (outside SFA) and IHMA will be open to mineral leasing and development and geophysical exploration subject to NSO with a limited exception (MD MR 3). GHMA will be open to mineral leasing and development and geophysical exploration subject to CSU which includes buffers and standard stipulations. | **MD MR 1**: Areas within PHMA and IHMA will be open to mineral leasing and development and geophysical exploration subject to NSO with a limited exception (MD MR 3). GHMA will be open to mineral leasing and development and geophysical exploration subject to CSU which includes buffers and standard stipulations and best management practices as identified in Appendix C (Required Design Features). | Potential change under Alternative 3. |
| **MD MR 2:** In Idaho, parcels nominated for lease in PHMA or IHMA will be evaluated prior to lease offering to determine if development is feasible. In GHMA, parcels will not be offered for lease if buffers and restrictions (including RDFs) preclude development in the leasing area. | **MD MR 2:** Parcels nominated for lease in PHMA, IHMA, or GHMA will be evaluated prior to lease offering to determine if development is feasible. | Potential change under Alternative 3. |

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| **MD MR 3:** PHMA and IHMA: No waivers or modifications to a fluid mineral lease NSO stipulation will be granted. The Authorized Officer may grant an exception to a fluid mineral lease NSO stipulation only where the proposed action:<br>i. Will not have direct, indirect, or cumulative effects on GRSG or its habitat; or,<br>ii. Is proposed to be undertaken as an alternative to a similar action occurring on a nearby parcel, and will provide a clear conservation gain to GRSG.<br><br>Exceptions based on conservation gain (ii) may only be considered in (a) PHMA of mixed ownership where federal minerals underlie less than fifty percent of the total surface, or (b) areas of the public lands where the proposed exception is an alternative to an action occurring on a nearby parcel subject to a valid Federal fluid mineral lease existing as of the date of this RMP amendment. Exceptions based on conservation gain must also include measures, such as enforceable institutional controls and buffers, sufficient to allow the BLM to conclude that such benefits will endure for the duration of the proposed action's impacts.<br><br>Any exceptions to this lease stipulation may be approved by the Authorized Officer only with the concurrence of the State Director. The Authorized Officer may not grant an exception unless the applicable state wildlife agency, the USFWS, and the BLM unanimously find that the proposed action satisfies (i) or (ii). Such finding shall initially be made by a team of one field biologist or other GRSG expert from each respective agency. In the event the initial finding is not unanimous, the finding may be elevated to the appropriate BLM State Director, USFWS State Ecological Services Director, and state wildlife agency head for final resolution. In the event their finding is not unanimous, the exception will not be granted. Approved exceptions will be made publically available at least quarterly. | **MD MR 3:** PHMA and IHMA: No waivers or modifications to a fluid mineral lease NSO stipulation will be granted. The Authorized Officer may grant an exception to a fluid mineral lease NSO stipulation only where the proposed action:<br>i. Will not have direct, indirect, or cumulative effects on GRSG or its habitat; or,<br>ii. Is proposed to be undertaken as an alternative to a similar action occurring on a nearby parcel, and would provide no net loss to GRSG.<br><br>Exceptions based on no net loss (ii) may only be considered in (a) PHMA of mixed ownership where federal minerals underlie less than fifty percent of the total surface, or (b) areas of the public lands where the proposed exception is an alternative to an action occurring on a nearby parcel subject to a valid Federal fluid mineral lease existing as of the date of this RMP amendment. Exceptions based on conservation gain must also include measures, such as enforceable institutional controls and buffers, sufficient to allow the BLM to conclude that such benefits will endure for the duration of the proposed action's impacts.<br><br>Any exceptions to this lease stipulation may be approved by the Authorized Officer only with the concurrence of the State Director and in coordination with the Technical and Policy Team. Approved exceptions will be made publically available at least quarterly. | Potential change under Alternatives 3, 4, 5 and 6. |
| **MD MR 4:** Incorporate required design features and best management practices appropriate to the management area as COAs when post leasing activity is proposed into any post-lease authorizations. | No changes made. | No change proposed. |

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| **MD MR 6:** Complete a Master Development Plan, consistent with plan development guide on leases where a producing field is proposed to be developed. | No changes made. | No change proposed. |
| **MD MR 7:** Encourage unitization when deemed necessary for proper development and operation of an area (with strong oversight and monitoring). The unitization must be designed in a manner to minimize adverse impacts on GRSG according to the Federal Lease Form, 3100-11, Sections 4 and 6. | No changes made. | No change proposed. |
| **MD MR 8:** Issue Written Orders of the Authorized Officer (43 CFR 3161.2) requiring reasonable protective measures consistent with the lease terms where necessary to avoid or minimize impacts on GRSG populations or habitat. | **MD MR 8:** Issue written orders of the authorized officer (43 CFR 3161.2) requiring reasonable protective measures consistent with the lease terms where necessary to avoid or minimize impacts on GRSG populations or habitat. | No change proposed. |
| Locatable Minerals | Locatable Minerals | — |
| **MD MR 9:** Apply reasonable and appropriate RDFs to locatable minerals, to the extent consistent with applicable law to prevent unnecessary or undue degradation of GRSG habitat when a Plan of Operations is submitted for BLM approval, in accordance with 43 CFR 3809.411(d)(2). | No changes made. | Proposed change under Alternative 3. |
| **MD MR 10:** Recommend SFA for withdrawal from the General Mining Act of 1872, as amended, subject to valid existing rights. | This decision has been deleted. | Proposed change under Alternative 3. |

| 2015 BLM GRSG Approved RMP Amendment | 2019 BLM GRSG Approved RMP Amendment | Potential for Change in 2023 Plan |
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| Salable Minerals | Salable Minerals | — |
| **MD MR 11:** Idaho: PHMA are closed to new mineral materials sales. However, these areas remain "open" to free use permits and the expansion of existing active pits only if the following criteria are met:<br>• the project area disturbance cap is not exceeded within a BSU;<br>• the activity is subject to the provisions set forth in the mitigation framework [**Appendix F**];<br>• all applicable required design features are applied; and<br>• the activity is permissible under the Idaho exception and development criteria (MD SSS 29 and MD SSS 30)<br>• IHMA: All IHMA will be open to mineral materials development, consistent with the Idaho Anthropogenic Disturbance Criteria (MD SSS 30), and subject to RDFs, and buffers. Sales from existing community pits within IHMA will be subject to seasonal timing restrictions (**Appendix C**).<br>• GHMA: All GHMA will be open to mineral materials development, subject to RDFs and buffers. Sales from existing community pits within GHMA will be subject to seasonal timing restrictions (**Appendix C**). | **MD MR 11:** PHMA: All PHMA will be closed to new mineral materials development, but continued use of existing pits will be allowed. New free use permits and the expansion of existing free use permits may be considered only if the following criteria are met:<br>• the project area disturbance cap is not exceeded within a BSU;<br>• the activity is subject to the provisions set forth in the mitigation framework [**Appendix F**];<br>• all applicable required design features are applied; and<br>• the activity is permissible under the Idaho exception and development criteria (MD SSS 29 and MD SSS 30)<br>• IHMA: All IHMA will be open to mineral materials development, consistent with the Idaho Anthropogenic Disturbance Criteria (MD SSS 30), and subject to RDFs, and buffers.<br>• GHMA: All GHMA will be open to mineral materials development, subject to best management practices, as described in Appendix C. | Proposed change under Alternatives 3, 4, 5 and 6. |
| **MD MR 12:** Restore salable mineral pits no longer in use to meet GRSG habitat management objectives. | No changes made. | Proposed change under Alternatives 3 and 6. |
| **MD MR 13:** Require reclamation bonding that will require restoration of GRSG habitat on new site authorizations for mineral material pits in IHMA (this will not apply to free use permits issued to a government entity such as a county road district, but will apply to non-profit entities). | No changes made. | Proposed change under Alternatives 3 and 6. |

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| Nonenergy Leasable Minerals | Nonenergy Leasable Minerals | — |
| **MD MR 15:** PHMA are closed to leasing. IHMA and GHMA: Areas within Known Phosphate Leasing Areas (KPLAs) will remain open to leasing subject to standard stipulations. IHMA areas outside of KPLAs are open to prospecting and subsequent leasing provided the Anthropogenic Disturbance Development Criteria (MD SSS 30) and the anthropogenic disturbance cap (MD SSS 27) can be met. RDFs and buffers shall be applied to prospecting permits. GHMA: Lands outside KPLAs are available for prospecting and subsequent leasing and initial mine development subject to RDFs, buffers, and standard stipulations. | **MD MR 15:** PHMA are closed to leasing. IHMA and GHMA: Areas within Known Phosphate Leasing Areas (KPLAs) will remain open to leasing subject to standard stipulations. IHMA areas outside of KPLAs are open to prospecting and subsequent leasing provided the Anthropogenic Disturbance Development Criteria (MD SSS 30) and the anthropogenic disturbance cap (MD SSS 27) can be met. RDFs and buffers shall be applied to prospecting permits.<br><br>GHMA: Lands outside KPLAs are available for prospecting and subsequent leasing and initial mine development subject to standard stipulations and best management practices as described in Appendix C. | Proposed change under Alternatives 3 and 6. |
| **MD MR 16:** Require seasonal and daily timing restrictions (**Appendix C**) in undeveloped nonenergy mineral leases when exploration activities or initial mine development is proposed (e.g. exploration drilling, timber removal, shrub clearing, etc.) as COAs. | No changes made. | Proposed change under Alternatives 3 and 6. |
| **MD MR 17:** Include RDFs as COAs to mine plans in undeveloped non-energy mineral leases for exploration activities or initial mine development. | No changes made. | Proposed change under Alternatives 3 and 6. |
| Mineral Split Estate | Mineral Split Estate | — |
| **MD MR 19:** BLM Owns Mineral Estate – non-federal surface owner: Where the federal government owns the mineral estate in PHMA, IHMA, and GHMA, and the surface is in non-federal ownership, apply the same stipulations, COAs, and/or conservation measures and RDFs applied if the mineral estate is developed on BLM-administered lands in that management area, to the maximum extent permissible under existing authorities, and in coordination with the landowner. | No changes made. | Proposed change under Alternative 3. |
| **MD MR 20:** BLM owns surface – non-federal mineral estate owner: Where the federal government owns the surface and the mineral estate is in non-federal ownership in PHMA, IHMA, and GHMA, apply appropriate surface use COAs, stipulations, and mineral RDFs through ROW grants or other surface management instruments, to the maximum extent permissible under existing authorities, in coordination with the mineral estate owner/lessee. | No changes made. | Proposed change under Alternative 3. |

| 2015 BLM GRSG Approved RMP Amendment | 2019 BLM GRSG Approved RMP Amendment | Potential for Change in 2023 Plan |
|---|---|---|
| ***RENEWABLE ENERGY (WIND AND SOLAR) (RE)*** | ***RENEWABLE ENERGY (WIND AND SOLAR) (RE)*** | — |
| **Management Decisions:** | **Management Decisions:** | — |
| Industrial Solar, Wind, Nuclear, and Hydropower Development | Industrial Solar, Wind, Nuclear, and Hydropower Development | — |
| **MD RE 1:** PHMA: Designate and manage PHMA as exclusion areas for utility scale (20 MW) wind and solar testing and development, nuclear and hydropower energy development. IHMA: Designate and manage IHMA as avoidance areas for wind and solar testing and development, nuclear and hydropower development. GHMA **(Idaho)**: Designate and manage GHMA as open for wind and solar testing and development and nuclear and hydropower development subject to RDFs and buffers. GHMA **(Montana)**: Designate and manage GHMA as avoidance for wind and solar testing and development and nuclear and hydropower development. | **MD RE 1:** PHMA: Designate and manage PHMA as exclusion areas for utility scale (20 MW) wind and solar testing and development, nuclear and hydropower energy development. IHMA: Designate and manage IHMA as avoidance areas for wind and solar testing and development, nuclear and hydropower development. GHMA: Designate and manage GHMA as open for wind and solar testing and development and nuclear and hydropower development. | Potential change under Alternatives 3, 4, 5 and 6. |
| ***LANDS AND REALTY (LR)*** | ***LANDS AND REALTY (LR)*** | — |
| **Objectives:** | **Objectives:** | — |
| **Objectives LR 1:** Effects of infrastructure projects, including siting, will be minimized using the best available science, updated as monitoring information on current infrastructure projects becomes available. | No changes made. | No change proposed. |
| **Management Decisions:** | **Management Decisions:** | — |
| Utility Corridors and Communication Sites | Utility Corridors and Communication Sites | — |
| **MD LR 1:** Existing designated corridors, including Section 368 Corridors, will remain Open in all habitat management areas (subject to the ongoing settlement agreement).<br><br>Also see **MD LR 10** and **MD SSS 31** | No changes made. | No change proposed. |
| Land Use Authorizations | Land Use Authorizations | — |
| **MD LR 2**: PHMA: Designate and manage PHMA as ROW avoidance areas, consistent with MD SSS 29 and subject to RDFs and buffers (Appendices B and C). IHMA: Designate and manage IHMA as ROW avoidance areas, consistent with MD SSS 30 and subject to RDFs and buffers. GHMA **(Idaho and Montana)**: Designate and manage GHMA as open with proposals subject to RDFs and buffers. | **MD LR 2**: PHMA: Designate and manage PHMA as ROW avoidance areas, consistent with MD SSS 29 and subject to RDFs and buffers (Appendices B and C). IHMA: Designate and manage IHMA as ROW avoidance areas, consistent with MD SSS 30 and subject to RDFs and buffers. GHMA: Designate and manage GHMA as open with proposals subject to best management practices as described in Appendix C. | Potential change under Alternatives 3, 4, 5 and 6. |
| **MD LR 3**: PHMA: Development of commercial service airports and facilities (as defined by FAA 2014 – publically owned airports that have at least 2,500 passenger boardings each calendar year and receive scheduled passenger service) will not be allowed within PHMA. IHMA and GHMA are Avoidance and Open respectively for these types of ROW applications as described in MD LR 2. | No changes made. | No change proposed. |

| 2015 BLM GRSG Approved RMP Amendment | 2019 BLM GRSG Approved RMP Amendment | Potential for Change in 2023 Plan |
|---|---|---|
| **MD LR 4**: PHMA: Development of new or expansion of existing landfills will not be allowed within PHMA. IHMA and GHMA are Avoidance and Open respectively for these types of ROW applications as described in MD LR 2. | No changes made. | Potential change under Alternatives 3, 4, 5 and 6. |
| **MD LR 5**: Consistent with MD LR 3, MD LR 4, and MD RE 1, Rights-of-way for development of new or amended ROWs and land use authorizations (including permits and leases) in PHMA will only be considered when consistent with the Anthropogenic Disturbance Screening Criteria (MD SSS 29); Rights-of-way for development of new or amended ROWs and land use authorizations (including permits and leases) in IHMA can be considered consistent with the IHMA Anthropogenic Disturbance Development Criteria (MD SSS 30). GHMA: New ROW and land use authorizations can be considered. | No changes made. | Potential change under Alternatives 3, 4, 5 and 6. |
| **MD LR 6**: In PHMA, if a higher voltage transmission line is required adjacent to an existing line (i.e. the project is an incremental upgrade/capacity increase of existing development (i.e. power line capacity upgrade):<br>• the existing transmission line must be removed and area rehabilitated within a specified amount of time after the new line is installed and energized; and<br>• the new line must be constructed in the same alignment as the existing line unless an alternate route will benefit GRSG or GRSG habitat. | No changes made. | No change proposed. |
| **MD LR 7**: Process unauthorized use. If the unauthorized use is subsequently authorized, it will be authorized consistent with direction from this plan including RDFs and buffers. If the use is not subsequently authorized the site will be reclaimed by removing these unauthorized (trespass) features and rehabilitating the habitat. | No changes made. | No change proposed. |
| **MD LR 8**: Land use authorizations that are temporary (less than 3 years) in nature and are not otherwise excluded or restricted will be subject to seasonal or timing restrictions (**Appendix C**) and mitigation requirements regarding habitat loss as needed. | No changes made. | No change proposed. |

| 2015 BLM GRSG Approved RMP Amendment | 2019 BLM GRSG Approved RMP Amendment | Potential for Change in 2023 Plan |
|---|---|---|
| **MD LR 9**: New ROW applications for water facilities (ditches, canals, pipelines), or amendments to existing water facilities which include additional structures to improve fish passage or benefits to fisheries (new diversions, fish screens) will be allowed on a case-by-case basis subject to RDFs to reduce impacts on GRSG habitat and mitigation requirements regarding GRSG habitat loss as needed. | No changes made. | No change proposed. |
| **MD LR 10**: When a ROW grant expires and is not requested to be renewed, is relinquished, or terminated, the lease holder will be required to reclaim the site by removing overhead lines and other infrastructure and to eliminate avian predator nesting opportunities provided by anthropogenic development on public lands associated with the now void ROW grant (e.g., remove power line and communication facilities no longer in service). | No changes made. | No change proposed. |
| **MD LR 11**: As opportunities and priorities indicate work with existing ROW holders to retrofit existing towers and structures consistent with RDFs described in **Appendix C**. | No changes made. | No change proposed. |
| **MD LR 12**: PHMA and IHMA are designated as avoidance areas for high voltage transmission line and large pipeline ROWs, except for Gateway West and Boardman to Hemingway Transmission Projects. All authorizations in these areas, other than the following identified projects, must comply with the conservation measures outlined in this proposed plan, including the RDFs and avoidance criteria presented in MD SSS 29 and MD SSS 30 of this document. The BLM is currently processing an application for Gateway West and Boardman to Hemingway Transmission Projects and the NEPA review for this project is well underway. Conservation measures for GRSG are being analyzed through the project's NEPA review process, which should achieve a net conservation benefit for the GRSG. | No changes made. | No change proposed. |
| **MD LR 13:** Consider the likelihood of development of not-yet-constructed surface disturbing activities<br>– as defined in Table 2 of the Monitoring Framework (**Appendix D**) – under valid existing rights. | No changes made. | No change proposed. |

| 2015 BLM GRSG Approved RMP Amendment | 2019 BLM GRSG Approved RMP Amendment | Potential for Change in 2023 Plan |
|---|---|---|
| Land Tenure | Land Tenure | — |
| **MD LR 14**: Lands classified as PHMA, IHMA, and GHMA for GRSG will be retained in federal management unless: (1) the agency can demonstrate that disposal of the lands, including land exchanges, will provide a net conservation gain to the GRSG or (2) the agency can demonstrate that the disposal, including land exchanges, of the lands will have no direct or indirect adverse impact on conservation of the GRSG. Land tenure adjustments will be subject to the following disposal, exchange, and acquisition criteria, which include retaining lands with GRSG habitat. Retention of areas with GRSG will reduce the likelihood of habitat conversion to agriculture, urbanization, or other uses that will remove sagebrush habitat and potentially impact sensitive plants. Criteria:<br>a. Acquire habitat within PHMA and IHMA, when possible (i.e. willing landowner), and retain ownership of habitat within all Areas, except if disposal will allow for additional or more contiguous federal ownership patterns.<br>b. Lands within PHMA, IHMA and GHMA will be retained unless disposal of those lands will increase the extent or provide for connectivity of PHMA, IHMA or GHMA.<br>c. Evaluate potential land exchanges containing historically low-quality GRSG habitat that may be too costly to restore in exchange for lands of higher quality habitat, lands that connect seasonal GRSG habitats or lands providing for threatened and endangered species. These potential exchanges should lead to an increase in the extent or continuity of or provide for improved connectivity of PHMA. Higher priority will be given to exchanges for those in-tact areas of sagebrush that will contribute to the expansion of sagebrush areas within PHMA currently in public ownership. Lower priority will be given to other lands that will promote enhancement in the PHMA and IHMA (i.e., areas with fragmented or less in-tact sagebrush).<br>d. Identify lands for acquisition that increase the extent of or provide for connectivity of PHMA. | **MD LR 14**: Lands classified as PHMA, IHMA, and GHMA for GRSG will be retained in federal management unless: (1) the agency can demonstrate that disposal of the lands, including land exchanges, will provide no net loss to the GRSG or (2) the agency can demonstrate that the disposal, including land exchanges, of the lands will have no direct or indirect adverse impact on conservation of the GRSG. Land tenure adjustments will be subject to the following disposal, exchange, and acquisition criteria, which include retaining lands with GRSG habitat. Retention of areas with GRSG will reduce the likelihood of habitat conversion to agriculture, urbanization, or other uses that will remove sagebrush habitat and potentially impact sensitive plants.<br>Criteria:<br>a. Retain lands within PHMA, IHMA and GHMA, unless disposal of those lands will increase the extent or provide for connectivity of PHMA, IHMA or GHMA.<br>b. Evaluate potential land exchanges containing historically low-quality GRSG habitat that may be too costly to restore in exchange for lands of higher quality habitat, lands that connect seasonal GRSG habitats or lands providing for threatened and endangered species. These potential exchanges should lead to an increase in the extent or continuity of or provide for improved connectivity of PHMA. Higher priority will be given to exchanges for those in-tact areas of sagebrush that will contribute to the expansion of sagebrush areas within PHMA currently in public ownership. Lower priority will be given to other lands that will promote enhancement in the IHMA and GHMA (i.e., areas with fragmented or less in-tact sagebrush).<br>c. Lands for acquisition increase the extent of or provide for connectivity of PHMA. | No change proposed. |
| Withdrawals | — | — |
| See **MD SS 10** regarding Sagebrush Focal Areas (SFA). | — | Potential change under Alternative 3. |

| 2015 BLM GRSG Approved RMP Amendment | 2019 BLM GRSG Approved RMP Amendment | Potential for Change in 2023 Plan |
|---|---|---|
| ***RECREATION AND VISITOR SERVICES (REC)*** | ***RECREATION AND VISITOR SERVICES (REC)*** | — |
| **Management Decisions:** | **Management Decisions:** | — |
| **REC-1**: Manage existing recreation uses and sites to minimize adverse effects on GRSG or their habitat through incorporation of RDFs, buffers and seasonal restrictions. | No changes made. | No change proposed. |
| **REC-2**: In PHMA and IHMA, do not construct new recreation facilities (e.g., campgrounds, trails, trailheads, staging areas) unless the development will have a net conservation gain to GRSG habitat (such as concentrating recreation, diverting use away from critical areas, etc.), or unless the development is required for visitor health and safety or resource protection. | **REC-2**: In PHMA and IHMA, do not construct new recreation facilities (campgrounds, parking lots, trailheads, and staging areas) larger than 0.25 acres unless subject to appropriate buffers and RDFs and appropriate mitigation. Locate and design new facilities to avoid or minimize impacts on GRSG habitat. New trails in PHMA and IHMA should be designed to avoid or minimize impacts on GRSG habitat. New non-motorized trails would not be subject to buffers but may be subject to timing restrictions to avoid impacts on GRSG during the lekking/nesting season. Motorized trails would also be subject to buffers and seasonal timing restrictions. | No change proposed. |
| ***TRAVEL AND TRANSPORTATION (TMM)*** | ***TRAVEL AND TRANSPORTATION (TMM)*** | — |
| **Management Decisions:** | **Management Decisions:** | — |
| **MD TTM 1:** Limit off-highway vehicle travel within Idaho BLM Field Offices to existing roads, primitive roads, and trails in areas where travel management planning has not been completed or is in progress. This excludes areas previously designated as open through a land use plan decision or currently under review for designation as open, currently being analyzed in ongoing RMP revision efforts in the Four Rivers, Jarbidge and Upper Snake Field Offices. | No changes made. | No change proposed. |
| **MD TTM 2:** In PHMA, IHMA, and GHMA, temporary closures will be considered in accordance with 43 CFR subpart 8364 (Closures and Restrictions); 43 CFR subpart 8351 (Designated National Area); 43 CFR subpart 6302 (Use of Wilderness Areas, Prohibited Acts, and Penalties); 43 CFR subpart 8341 (Conditions of Use) and other applicable law and policy. | No changes made. | No change proposed. |
| **MD TTM 3:** Develop Travel Management Plans for each Field Office as described in the BLM Travel Management Handbook 8342.1 and according to the travel management planning guidelines (Appendix L of FEIS). | No changes made. | No change proposed. |

| 2015 BLM GRSG Approved RMP Amendment | 2019 BLM GRSG Approved RMP Amendment | Potential for Change in 2023 Plan |
|---|---|---|
| **MD TTM 4:** During subsequent travel management planning design and designate a travel system to minimize adverse effects on GRSG. Locate areas and trails to minimize disturbance of GRSG and/or to have a neural or positive effect on GRSG habitat and populations. Give special attention to protect endangered or threatened species and their habitats. Allow for route upgrade, closure of existing routes, timing restrictions, seasonal closures, and creation of new routes to help protect habitat and meet user group needs, thereby reducing the potential for pioneering unauthorized routes. The emphasis of the comprehensive travel and transportation planning within PHMA will be placed on having a neutral or positive effect on GRSG habitat. Individual route designations will occur during subsequent travel management planning efforts. | No changes made. | No change proposed. |
| **MD TTM 5:** Conduct road construction, upgrades, and maintenance activities to avoid disturbance during the lekking season – see **Appendix C**. | No changes made. | No change proposed. |
| ***MITIGATION (IDAHO AND MONTANA)*** | ***MITIGATION (MIT)*** | — |
| (Also see **Appendix F** and **J**) | **See 2.12 Mitigation section below** | — |
| **Management Decisions:** | **Management Decisions:** | — |
| **MD MIT 1**: BLM will establish an inter-agency State GRSG Conservation Team at the state level to help guide conservation of GRSG through compensatory mitigation, within 90 days of the issuance of the Record of Decision. | No changes made. | No change proposed. |
| **MD MIT 2**: The BLM, in coordination with the GRSG Conservation Team will develop a Mitigation Strategy within one year of the issuance of the Record of Decision. In Idaho this strategy will be consistent with the Idaho Mitigation Framework (**Appendix F**). | No changes made. | No change proposed. |

| 2015 BLM GRSG Approved RMP Amendment | 2019 BLM GRSG Approved RMP Amendment | Potential for Change in 2023 Plan |
|---|---|---|
| **MD MIT 3**: In all GRSG habitat, in undertaking BLM management actions, and, consistent with valid existing rights and applicable law, in authorizing third-party actions that result in habitat loss and degradation (**Appendix E**, Table E-1), the BLM will require and ensure mitigation that provides a net conservation gain to the species including accounting for any uncertainty associated with the effectiveness of such mitigation. | **MD MIT 3**: In PHMA, IHMA, and GHMA, in undertaking BLM management actions, and, consistent with valid existing rights and applicable law, in authorizing third-party actions that result in habitat loss and degradation (**Appendix E**, Table E-1), the BLM will Achieve the planning-level GRSG management goals and objectives through implementation of mitigation and management actions. Under this Proposed Plan Amendment, the BLM's GRSG management would be consistent with the GRSG goals and objectives, and in conformance with BLM Manual 6840 – Special Status Species Management, undertake planning decisions, actions, and authorizations to "minimize or eliminate threats affecting the status of GRSG or to improve the condition of GRSG habitat" across the planning area. Further the BLM will require and ensure mitigation that provides no net loss to the species including accounting for any uncertainty associated with the effectiveness of such mitigation. This will be achieved by ensuring GRSG habitat impacts are addressed by implementing mitigating sections consistent with the State of Idaho and the Proposed Plan Amendment. | Potential change under Alternatives 3, 4, 5 and 6. |
| **MD MIT 4**: Mitigate anthropogenic development (**Appendix E**, Table E-1) impacts on GRSG habitat through application of appropriate mitigation in accordance with the Mitigation Framework (**Appendix F** and **L**). | No changes made. | Potential change under Alternatives 3, 4, 5 and 6. |
| **MD MIT 5**: Consistent with regulations for minerals activities, require a full reclamation bond specific to the site when surface disturbing activities are proposed. Ensure reclamation bonds are sufficient to cover costs to fully rehabilitate lost GRSG habitat. Base the reclamation costs on the assumption that contractors for the BLM will perform the work. Areas are considered fully rehabilitated when they meet the conditions described in Table 2-2. | No changes made. | No change proposed. |

| 2015 BLM GRSG Approved RMP Amendment | 2019 BLM GRSG Approved RMP Amendment | Potential for Change in 2023 Plan |
|---|---|---|
| ***COORDINATION (CC)*** | ***COORDINATION (CC)*** | — |
| **Management Decisions:** | **Management Decisions:** | — |
| **MD CC 1:** Collaborate, coordinate and utilize cooperative planning efforts to implement and monitor activities to achieve desired conditions and to maximize the utilization of available funding opportunities. Coordination efforts can include: adjacent landowners, federal and state agencies, local governments, tribes, communities, other agencies, resource advisory groups, public lands permit holders and non- governmental organizations. | No changes made. | No change proposed. |
| **MD CC 2:** Develop a cooperative MOU between the BLM, Forest Service and State of Idaho to establish the State of Idaho as a cooperating agency during implementation of the final decision. The MOU will identify responsibilities, role and interaction of the BLM, Forest Service and State of Idaho. | No changes made. | No change proposed. |
| **MD CC 3:** The BLM will consider any recommendations from the Governor of Idaho as a result of evaluation completed by the Sage-Grouse Implementation Task Force. | No changes made. | No change proposed. |
| **MD CC 4:** Idaho: The BLM will coordinate with the State of Idaho and the Idaho Sage-Grouse Implementation Task Force regarding proposed management changes, the implementation of conservation measures, mitigation, and site-specific monitoring, related to adaptive management, anthropogenic disturbance and livestock grazing. | No changes made. | No change proposed. |
| **MD CC 6:** Upon completion of the Record of Decision the BLM will develop an initial Implementation Guide for BLM District and Field Offices within a year of issuance of the Record of Decision. This Guide will define and describe consistent application of the allocations, management actions, required design features, and etc. that are contained within the final plan and will be updated and expanded as needed to respond to issues and concerns. | No changes made. | No change proposed. |
| **MD CC 7**: At the state level, BLM will coordinate with IDFG, USFWS, and other conservation partners in collaborative efforts with adjacent states (Oregon, Nevada, Utah, Montana, Wyoming) in GRSG MZs IV and II to evaluate GRSG habitat and population status and trends and make appropriate regional recommendations for GRSG conservation at broader scales. | No changes made. | No change proposed. |

| 2015 BLM GRSG Approved RMP Amendment | 2019 BLM GRSG Approved RMP Amendment | Potential for Change in 2023 Plan |
|---|---|---|
| **MD CC 8:** At the state level, BLM will coordinate with the appropriate WAFWA Sage-grouse Technical Committee to develop consistent population and habitat monitoring approaches that facilitate GRSG conservation at the MZ scale. | No changes made. | No change proposed. |
| **MD CC 9:** All prescribed burning will be coordinated with state and local air quality agencies to ensure that local air quality is not significantly impacted by BLM activities. | No changes made. | No change proposed. |

## Table 2: Habitat Objectives for GRSG, 2015 ARMPA

| Attribute | Indicator | Desired Condition | Reference |
|---|---|---|---|
| **LEK HABITAT (Seasonal Use Period March 1 – May 15)[1]** | | | |
| Lek Security | Proximity of trees | Trees (i.e., mainly juniper, conifers, and does not include old-growth juniper, pinyon pine and mountain mahogany) absent or uncommon on shrub/grassland ecological sites within 1.86 miles (3 km) of occupied leks. | Baruch-Mordo et al. 2013[7]<br><br>Stiver et al. 2015[13] |
| | Proximity of sagebrush to leks | Adjacent protective sagebrush cover within 328 ft. (100 m) of an occupied lek | Stiver et al. 2015[13] |
| **NESTING/EARLY BROOD REARING [1,5,10,12,13,14] (Seasonal Use Period May 1 – June 30) [1]** | | | |
| Cover and Food | Seasonal habitat extent (Percent of Seasonal Habitat Meeting Desired Conditions) | >80% of the nesting habitat meets the recommended vegetation characteristics, where appropriate (relative to ecological site potential, etc.). | Connelly et al. 2000[8] |
| | Sagebrush cover [2] | 15-25% | Connelly et al. 2000[8]<br>Connelly et al. 2003[9]<br>Hagen et al. 2007[11] |
| | Sagebrush height<br><br>Arid sites[3]<br>Mesic sites[4] | <br><br>12-31 inches (30-80cm)<br>16-31 inches (40-80cm) | Connelly et al. 2000[8] |
| | Predominant sagebrush shape | Predominantly spreading shape[5] | Stiver et al. 2015[13] |
| | Perennial grass cover (such as native bunchgrasses) [2]<br><br>Arid sites[3]<br>Mesic sites[4] | <br><br>≥10%<br>≥15% | Connelly et al. 2000[8]<br>Stiver et al. 2015[13] |
| | Perennial grass (and forb) height (includes residual grasses) | ≥ 7 inches | Connelly et al. 2000[8]<br>Connelly et al. 2003[9]<br>Hagen et al. 2007[11]<br>Stiver et al. 2015[13] |
| | Perennial forb cover [2]<br>Arid sites[3]<br>Mesic sites[4] | <br>≥5%<br>≥10% | Connelly et al. 2000[8] |
| | Perennial forb availability | Preferred forbs are common with several species present[6] | Stiver et al. 2015[13] |

| Attribute | Indicator | Desired Condition | Reference |
|---|---|---|---|
| **LATE BROOD-REARING/SUMMER[1, 15] (July-October)[1] Late brood-rearing areas, such as riparian, meadows, springs, higher elevation mesic uplands, etc. may occur within other mapped seasonal habitat areas. Apply late brood rearing/summer habitat desired conditions locally as appropriate.** | | | |
| Cover and Food | Seasonal habitat extent (Percent of Seasonal Habitat Meeting Desired Condition) | >40% of the summer/brood habitat meets recommended brood habitat characteristics where appropriate (relative to ecological site potential, etc.) | Connelly et al. 2000[8] |
| | Sagebrush cover[2] | Uplands 10-25%<br>Riparian/Meadow: Sagebrush cover within 100 m | Connelly et al. 2000[8] |
| | Sagebrush height | 16 to 32 inches (40-80cm) | Connelly et al. 2000[8] |
| | Perennial grass and forb cover [2] | >15% | — |
| | Upland and riparian perennial forb availability 2 | Preferred forbs are common with appropriate numbers of species present[6] | Stiver et al. 2015[13] |
| | Riparian and/or meadow habitat condition | Proper Functioning Condition | Stiver et al. 2015[13] |
| **WINTER[1] November-March[1] (Apply to areas of known or likely winter-use)** | | | |
| Cover and Food | Seasonal habitat extent (Percent of Seasonal Habitat Meeting Desired Condition) | >80% of the wintering habitat meets winter habitat characteristics where appropriate (relative to ecological site, etc.). | Connelly et al. 2000[8] |
| | Sagebrush cover and height above snow | Sagebrush is at least 10 inches (25 cm) above snow and ≥10% cover[16] | Connelly et al. 2000[8]<br>Stiver et al. 2015[13] |

Notes and references:

[1] Seasonal dates can be adjusted by local unit according to geographic region.

[2] Since plant species and/or life forms may overlap, total vegetative cover, inclusive of shrubs, forbs and grasses may exceed 100%.

[3] Arid corresponds to the 10 – 12 inch precipitation zone; *Artemisia tridentata wyomingensis* is a common big sagebrush sub-species for this type site (Stiver et al. 2015).

[4] Mesic corresponds to the ≥12 inch precipitation zone; *Artemisia tridentata vaseyana* is a common big sagebrush sub-species for this type site (Stiver et al. 2015).

[5] Collectively the indicators for sagebrush (cover, height, and shape), perennial grass and perennial forb (cover, height and/or availability) represent the desired condition range for nesting/early brood rearing habitat characteristics, consistent with the breeding habitat suitability matrix identified in Stiver et al. *2015*. Sagebrush plants that are more tree or columnar-shaped provide less protective cover near the ground than sagebrush plants with a spreading shape (Stiver et al. 2015). Some sagebrush plants are naturally columnar (e.g., Great Basin big sagebrush), and a natural part of the plant community. However, a predominance of columnar shape arising from animal impacts may warrant management investigation or adjustments at site specific scales.

[6] Preferred forbs are listed in Stiver et al. 2015. Overall total forb cover may be greater than that of preferred forb cover since not all forb species are listed as preferred.

[7] Baruch-Mordo, S., J. S. Evans, J. P. Severson, D. E. Naugle, J. D. Maestas, J. M. Kiesecker, M. J. Falkowski, C. A. Hagen, and K. P. Reese. 2013. Saving sage-grouse from trees. Biological Conservation 167:233-241.

[8] Connelly, J. W., M. A. Schroeder, A. R. Sands, and C. E. Braun. 2000. Guidelines to manage sage-grouse populations and their habitats. Wildlife Society Bulletin 28:967-985.

[9] Connelly, J. W., K. P. Reese, and M. A. Schroeder. 2003. Monitoring of Greater sage-grouse habitats and populations. University of Idaho College of Natural Resources Experiment Station Bulletin 80. University of Idaho, Moscow, Idaho. [10] Doherty, K. 2008. Sage-grouse and Energy Development: Integrating Science with Conservation Planning to Reduce Impacts. Ph.D. Dissertation. University of Montana, Missoula, Montana.

[11] Hagen, C. A., J. W. Connelly, and M. A. Schroeder. 2007. A meta-analysis of greater sage-grouse *Centrocercus urophasianus* nesting and brood-rearing habitats. Wildlife Biology 13 (Supplement 1):42-50.

[12] Holloran, M. J., and S. H. Anderson. 2005. Spatial Distribution of Greater Sage-grouse nests in relatively contiguous sagebrush habitats. Condor 107:742-752.

[13] Stiver, S. J., E. T. Rinkes, D. E. Naugle, P. D. Makela, D. A. Nance, and J. W. Karl. 2015. Sage-Grouse Habitat Assessment Framework: A Multi-scale Habitat Assessment Tool. Bureau of Land Management and Western Association of Fish and Wildlife Agencies Technical Reference 6710-1. U.S. Bureau of Land Management, Denver, Colorado.
[14] Connelly, J.W., A. Moser, and D. Kemner. 2013. Greater Sage-Grouse breeding habitats: Landscape-based comparisons. Grouse News 45. Research Reports.
[15] Some late brood habitat occurs at higher elevations outside of mapped nesting habitat and some is embedded within nesting landscapes especially areas such as wet meadows, riparian areas, springs and seeps.
[16] Winter habitat metrics are a guideline but snow depths and habitat availability may vary widely depending on winter severity, topography and elevation.

## Table 3: Desired Conditions for GRSG, 2019 ARMPA

| Attribute | Indicator | Desired Condition | Reference |
|---|---|---|---|
| **LEK HABITAT (Seasonal Use Period March 1 – May 15)[1]** | | | |
| Lek Security | Proximity of trees | Trees (i.e., mainly juniper, conifers, and does not include old-growth juniper, pinyon pine and mountain mahogany) absent or uncommon on shrub/grassland ecological sites within 1.86 miles (3 km) of occupied leks. | Baruch-Mordo et al. 2013[7]<br><br>Stiver et al. 2015[13] |
| | Proximity of sagebrush to leks | Adjacent protective sagebrush cover within 328 ft. (100 m) of an occupied lek | Stiver et al. 2015[13] |
| **NESTING/EARLY BROOD REARING [1,5,10,12,13,14] (Seasonal Use Period May 1 – June 30) [1]** | | | |
| Cover and Food | Seasonal habitat extent (Percent of Seasonal Habitat Meeting Desired Conditions) | >80% of the nesting habitat meets the recommended vegetation characteristics, where appropriate (relative to ecological site potential, etc.). | Connelly et al. 2000[8] |
| | Sagebrush cover [2] | 15-25% | Connelly et al. 2000[8]<br>Connelly et al. 2003[9]<br>Hagen et al. 2007[11] |
| | Sagebrush height<br><br>Arid sites[3]<br>Mesic sites[4] | <br><br>12-31 inches (30-80cm)<br>16-31 inches (40-80cm) | Connelly et al. 2000[8] |
| | Predominant sagebrush shape | Predominantly spreading shape[5] | Stiver et al. 2015[13] |
| | Perennial grass cover (such as native bunchgrasses) [2]<br><br>Arid sites[3]<br>Mesic sites[4] | <br><br>≥10%<br>≥15% | Connelly et al. 2000[8]<br>Stiver et al. 2015[13] |
| | Perennial grass (and forb) height (includes residual grasses) | Adequate Nesting Cover | Connelly et al. 2000[8]<br>Connelly et al. 2003[9]<br>Hagen et al. 2007[11]<br>Stiver et al. 2015[13]<br>Hausleitner 2005; Holloran et al. 2005; Gibson et al. 2016; Smith et al. 2017; Smith et al. 2018 |
| | Perennial forb cover [2]<br>Arid sites[3]<br>Mesic sites[4] | <br>≥5%<br>≥10% | Connelly et al. 2000[8] |
| | Perennial forb availability | Preferred forbs are common with several species present[6] | Stiver et al. 2015[13] |

| Attribute | Indicator | Desired Condition | Reference |
|---|---|---|---|
| **LATE BROOD-REARING/SUMMER[1, 15] (July-October)[1] Late brood-rearing areas, such as riparian, meadows, springs, higher elevation mesic uplands, etc. may occur within other mapped seasonal habitat areas. Apply late brood rearing/summer habitat desired conditions locally as appropriate.** | | | |
| Cover and Food | Seasonal habitat extent (Percent of Seasonal Habitat Meeting Desired Condition) | >40% of the summer/brood habitat meets recommended brood habitat characteristics where appropriate (relative to ecological site potential, etc.) | Connelly et al. 2000[8] |
| | Sagebrush cover[2] | Uplands 10-25%<br>Riparian/Meadow: Sagebrush cover within 100 m | Connelly et al. 2000[8] |
| | Sagebrush height | 16 to 32 inches (40-80cm) | Connelly et al. 2000[8] |
| | Perennial grass and forb cover [2] | >15% | |
| | Upland and riparian perennial forb availability [2] | Preferred forbs are common with appropriate numbers of species present[6] | Stiver et al. 2015[13] |
| | Riparian and/or meadow habitat condition | Proper Functioning Condition | Stiver et al. 2015[13] |
| **WINTER[1] November-March[1] (Apply to areas of known or likely winter-use)** | | | |
| Cover and Food | Seasonal habitat extent (Percent of Seasonal Habitat Meeting Desired Condition) | >80% of the wintering habitat meets winter habitat characteristics where appropriate (relative to ecological site, etc.). | Connelly et al. 2000[8] |
| | Sagebrush cover and height above snow | Sagebrush is at least 10 inches (25 cm) above snow and ≥10% cover[16] | Connelly et al. 2000[8]<br>Stiver et al. 2015[13] |

Notes and references:

[1] Seasonal dates can be adjusted by local unit according to geographic region.

[2] Since plant species and/or life forms may overlap, total vegetative cover, inclusive of shrubs, forbs and grasses may exceed 100%.

[3] Arid corresponds to the 10 – 12 inch precipitation zone; *Artemisia tridentata wyomingensis* is a common big sagebrush sub-species for this type site (Stiver et al. 2015).

[4] Mesic corresponds to the ≥12 inch precipitation zone; *Artemisia tridentata vaseyana* is a common big sagebrush sub-species for this type site (Stiver et al. 2015).

[5] Collectively the indicators for sagebrush (cover, height, and shape), perennial grass and perennial forb (cover, height and/or availability) represent the desired condition range for nesting/early brood rearing habitat characteristics, consistent with the breeding habitat suitability matrix identified in Stiver et al. *2015*. Sagebrush plants that are more tree or columnar-shaped provide less protective cover near the ground than sagebrush plants with a spreading shape (Stiver et al. 2015). Some sagebrush plants are naturally columnar (e.g., Great Basin big sagebrush), and a natural part of the plant community. However, a predominance of columnar shape arising from animal impacts may warrant management investigation or adjustments at site specific scales.

[6] Preferred forbs are listed in Stiver et al. 2015. Overall total forb cover may be greater than that of preferred forb cover since not all forb species are listed as preferred.

[7] Baruch-Mordo, S., J. S. Evans, J. P. Severson, D. E. Naugle, J. D. Maestas, J. M. Kiesecker, M. J. Falkowski, C. A. Hagen, and K. P. Reese. 2013. Saving sage-grouse from trees. Biological Conservation 167:233-241.

[8] Connelly, J. W., M. A. Schroeder, A. R. Sands, and C. E. Braun. 2000. Guidelines to manage sage-grouse populations and their habitats. Wildlife Society Bulletin 28:967-985.

[9] Connelly, J. W., K. P. Reese, and M. A. Schroeder. 2003. Monitoring of Greater sage-grouse habitats and populations. University of Idaho College of Natural Resources Experiment Station Bulletin 80. University of Idaho, Moscow, Idaho.

[10] Doherty, K. 2008. Sage-grouse and Energy Development: Integrating Science with Conservation Planning to Reduce Impacts. Ph.D. Dissertation. University of Montana, Missoula, Montana.

[11] Hagen, C. A., J. W. Connelly, and M. A. Schroeder. 2007. A meta-analysis of greater sage-grouse *Centrocercus urophasianus* nesting and brood-rearing habitats. Wildlife Biology 13 (Supplement 1):42-50.

[12] Holloran, M. J., and S. H. Anderson. 2005. Spatial Distribution of Greater Sage-grouse nests in relatively contiguous sagebrush habitats. Condor 107:742-752.

[13] Stiver, S. J., E. T. Rinkes, D. E. Naugle, P. D. Makela, D. A. Nance, and J. W. Karl. 2015. Sage-Grouse Habitat Assessment Framework: A Multi-scale Habitat Assessment Tool. Bureau of Land Management and Western Association of Fish and Wildlife Agencies Technical Reference 6710-1. U.S. Bureau of Land Management, Denver, Colorado.

[14] Connelly, J.W., A. Moser, and D. Kemner. 2013. Greater Sage-Grouse breeding habitats: Landscape-based comparisons. Grouse News 45. Research Reports.
[15] Some late brood habitat occurs at higher elevations outside of mapped nesting habitat and some is embedded within nesting landscapes especially areas such as wet meadows, riparian areas, springs and seeps.
[16] Winter habitat metrics are a guideline but snow depths and habitat availability may vary widely depending on winter severity, topography and elevation.

**Table 4:* Estimated Acres of Treatment Needed within a 10-Year Period to Achieve Vegetation Objectives on BLM-Administered Lands[1]**

| Population Area | Mechanical[2] | Prescribed Fire (MD FIRE 31) [3] | Grass Restoration (MD VEG 2) [4] |
|---|---|---|---|
| Bear Lake Plateau | 1,000 | 0 | 0 |
| East Idaho Uplands | 6,000 | 9,000 | 1,000 |
| S Central Idaho/N Snake River and Mountain Valleys | 18,000 | 11,000 | 162,000 |
| Weiser | 0 | 0 | 13,000 |
| SW Idaho | 52,000 | 10,000 | 444,000 |

Notes:
[1] These are estimates of treatments required to achieve and/or maintain desired habitat conditions over a period of ten years. There are many dynamic and highly variable disturbances that may happen over that period of time that can have a significant effect on the amount, type, and timing of treatment needed. Those disturbances are factored into the ten-year simulation using stochastic, not predictive, techniques. Probabilities of events such as large wildfires are used in the model to make the simulation as realistic as possible, given empirical data about such events in the past, but the results of the simulation cannot be used to predict the future occurrence of such events, including their timing, size, or location, which are essentially random.
[2] Removal of conifers that have invaded sagebrush including phase one juniper that is 10 percent or less and reducing sagebrush cover in areas over 30 percent canopy cover
[3] Acres are those that are greater than 30 percent sagebrush canopy cover and/or invaded by 10 percent or greater conifer.
[4] Acres presently dominated by annual grasses that can be improved by herbicide application and seeding of perennial vegetation.

*Table 2-3 (2015 GRSG Approved RMP Amendment)

Note there was no change to Table 2-3 in the 2019 GRSG Approved RMP Amendment.

### 2.2.2 Relevant Appendices

The following table shows which appendices from the 2015 and 2019 plans have management direction that may change through this RMP amendment. If 2019 is not listed in the year, then no change was made to the appendix between the 2015 and 2019 plans. The appendices can be found on the Idaho GRSG ePlanning website.

| ARMPA Appendix Name | Year | Potential for Change in 2023 Plan |
|---|---|---|
| A: Approved RMP Amendment Maps | 2015, 2019 | Yes |
| B: Buffers | 2015, 2019 | Yes |
| C: Required Design Features | 2015, 2019 | No |
| D: Monitoring Framework | 2015 | Yes |
| E: Anthropogenic Disturbance and Adaptive Management | 2015, 2019 | Yes |
| F: Mitigation | 2015, 2019 | Yes |
| G: Fluid Mineral Lease Stipulations, Waivers, Modifications, and Exceptions | 2015 | Yes |
| H: Fire and Invasives Assessment Tool (FIAT) | 2015 | No |
| I: US Fish and Wildlife Service Concurrence Letter | 2015 | No |
| J: Montana Action Screen and Mitigation Process | 2015 | Yes |
| K: Technical and Policy Teams | 2019 | No |

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# Appendix 2.3
# Billings RMP Revision

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## 2.3 BILLINGS RMP REVISION

This appendix presents the GRSG approved RMP amendment language from the 2015 record of decision for the Billings RMP. The Billings RMP was not amended in 2019. The table below notes which goals, objectives, appendices, and management decisions/actions have a potential to change as a result of the current planning effort and if so, under which alternatives changes are being considered. Note that any references to tables and appendices are to those applicable 2015 appendices that are listed in **Section 2.3.2** of this appendix.

### 2.3.1 Existing GRSG RMP Management – Billings RMP Revision

**Table 1: Summary of Goals, Objectives, and Management Actions in Billings 2015 RMP Revision**

| Billings RMP Revision | Potential for Change in 2023 Plan |
|---|---|
| ***Management Decisions: Vegetation Communities*** | |
| MD Veg/R&S-7: In all PHMA the desired condition is to maintain all lands ecologically capable of producing sagebrush (but no less than 70%) with a minimum of 15% sagebrush cover or as consistent with specific ecological site conditions. The attributes necessary to sustain these habitats are described in Interpreting Indicators of Rangeland Health (BLM Tech Ref 1734-6).<br><br>MD WLH & SSS-80: In all PHMA the desired condition is to maintain all lands ecologically capable of producing sagebrush (but no less than 70%) with a minimum of 15% sagebrush cover or as consistent with specific ecological site conditions. The attributes necessary to sustain these habitats are described in Interpreting Indicators of Rangeland Health (BLM Tech Ref 1734-6). | Potential change under Alternatives 3, 4, 5, and 6. |
| MD Veg/F&W-8: Remove conifers encroaching into sagebrush habitats, in a manner that considers tribal cultural values. Prioritize treatments closest to occupied sage-grouse habitats and near occupied leks, and where juniper encroachment is phase 1 or phase 2. Use of site-specific analysis and principles like those included in the FIAT report (Chambers et. al., 2014) and other ongoing modeling efforts to address conifer encroachment will help refine the location for specific priority areas to be treated. | Potential change under Alternatives 3, 4, 5, and 6. |
| MD Veg/R&S-6: Within Greater Sage-Grouse PHMA, only treatments that conserve, enhance, or restore Greater Sage-Grouse habitat will be allowed. Treatment methods, including prescribed burning and mechanical treatments will be used to eliminate conifer encroachment and stimulate vegetative re-growth in grassland/shrub land habitats; and to reduce fuels, thin under-stories, recycle nutrients, and create small openings in forested vegetation types. | No change proposed. |
| ***Management Decisions: Terrestrial and Aquatic Wildlife Resources*** | |
| Goal WLH & SSS 10: To maintain or improve Greater Sage-Grouse populations by maintaining Greater Sage-Grouse habitat in good condition. | Potential change under Alternatives 3, 4, 5, and 6. |
| Goal WLH & SSS 12: BLM will maintain habitat for viable Greater Sage-Grouse populations to promote movement and genetic diversity. Maintain, restore or enhance Greater Sage-Grouse habitat and connectivity between sagebrush habitats, with emphasis on those habitats occupied by Greater Sage-Grouse. | Potential change under Alternatives 3, 4, 5, and 6. |

| Billings RMP Revision | Potential for Change in 2023 Plan |
|---|---|
| Goal WLH & SSS 8: Provide for the long-term conservation, enhancement, and restoration of the sagebrush steppe/mixed-grass prairie complex in a manner that supports sustainable Greater Sage-Grouse populations and a healthy diversity and abundance of wildlife species. | Potential change under Alternatives 3, 4, 5, and 6. |
| MD WLH & SSS-79: Establish Greater Sage-Grouse PHMA (158,926 acres of BLM-administered lands and 205,254 acres of federal minerals). These PHMA are generally consistent with MTFWP Greater Sage-Grouse core area designations, with the exception of one small area in southern Carbon County near Elk Basin Oil field (Map 2-1). | Potential change under Alternatives 3, 4, 5, and 6. |
| MD WLH & SSS-96: Establish GHMA (176,734 acres of BLM-administered lands and 299,166 acres of federal mineral estate). These areas include a 3 mile buffer around Greater Sage-Grouse leks, outside of the PHMA and RHMA areas (Map 2-1). | Potential change under Alternatives 3, 4, 5, and 6. |
| Goal WLH & SSS 11: In these areas, BLM will manage habitat so that Greater Sage-Grouse populations can be restored over the long-term. BLM will strive to restore historical Greater Sage-Grouse habitat functionality, or at a minimum, have no net loss of Greater Sage-Grouse habitat, to support Greater Sage-Grouse populations. | Potential change under Alternatives 3, 4, 5, and 6. |
| MD WLH & SSS-88: Establish RHMAs (78,927 acres of BLM-administered lands and 88,642 acres of federal mineral estate). These areas will include one small polygon of core habitat in Carbon County near Elk Basin Oil Field, as well as other areas (Map 2-1). | Potential change under Alternatives 3, 4, 5, and 6. |
| Objectives: Sagebrush, native grasslands, seasonal or crucial wildlife ranges, special status species habitat, fisheries, cottonwood galleries, and riparian/wetlands will be priority habitats. All wildlife habitats will be managed to meet Rangeland Health Standards (Standards 1 and 5). BLM is responsible for managing habitats, whereas state and federal wildlife management agencies (e.g., MT FWP, USFWS) oversee management of wildlife species. BLM will coordinate with and support the conservation plans of those agencies on BLM administered lands. Priority wildlife species for management are described in Chapter 3.<br><br>In 2010, the USFWS determined that the Greater Sage-Grouse is a Candidate species and Warranted, but precluded, by other priorities, for listing under the ESA. In 2009, the MT/DAKs BLM delineated three types of Greater Sage-Grouse habitat areas as part of the planning process (Map 2-1):<br>• Greater Sage-Grouse Habitat - PHMA,<br>• Greater Sage-Grouse Habitat - RHMA, and<br>• Greater Sage-Grouse Habitat -– GHMA<br><br>Each area will have varying degrees of management in order to achieve the goals or objectives for each Greater Sage-Grouse habitat area. The Greater Sage-Grouse habitat delineations may be modified as needed as local site conditions change or as new information becomes available. Refer to the Glossary for definitions of the three Greater Sage-Grouse habitat areas, Appendix F for mitigation measures and conservation actions for Greater Sage-Grouse habitat, and Appendix D for monitoring of Greater Sage-Grouse and Sagebrush Habitats. | Potential change under Alternatives 3, 4, 5, and 6. |
| MD SSS 81: In undertaking BLM management actions, and consistent with valid and existing rights and applicable law in authorizing third-party actions, the BLM will apply the lek buffer-distances identified in the USGS Report Conservation Buffer Distance Estimates for Greater Sage-Grouse – A Review (Open File Report 2014-1239) in accordance with Appendix B. | Potential change under Alternatives 3, 4, 5, and 6. |

| Billings RMP Revision | Potential for Change in 2023 Plan |
|---|---|
| **[Original language updated through plan maintenance action in 2018]**<br><br>The habitat objectives for GRSG (Table 2.3-2) is a list of indicators, characteristics, and values that describe GRSG seasonal habitat use areas. The BLM used indicator values derived from a synthesis of local and regional GRSG habitat research and data to describe the typical vegetation communities that sage-grouse select. While the habitat objectives are not attainable on every site or every acre within designated GRSG habitat management areas, the values reflect a range of habitat conditions that generally lead to greater survival of individuals within a population. When permitting land use activities, BLM should consider the ecological site potential within designated habitat management areas to validate the habitat conditions achievable for a specific site.<br><br>The seasonal habitat descriptions in Table 2.3-2 [varies by plan] vary across the range of sage-grouse, within a subregion, and between sites. They are not land health standards but are quantitative measures that inform the Special Status Species Habitat Land Health Standard for sage-grouse. These measurable values reflect ecological potential, and may be adjusted based on local factors influencing sage-grouse habitat selection. Local data or recent science may indicate that sage-grouse select for vegetation structure and composition in seasonal habitats not characterized by the values in the habitat objectives table. In these cases, it may be appropriate to adjust the values. Habitat objectives should be evaluated in the context of annual variability in ecological conditions and should not be used singly to determine habitat suitability for sage-grouse. They may be used to demonstrate trends over time, during plan evaluations for effectiveness of sage-grouse conservation, or when identify limiting habitat characteristics for a given area.<br><br>The indicators, characteristics, values and desired seasonal habitat conditions in the GRSG Plan Habitat Objectives Table are meant to inform the wildlife habitat component of the Land Health Standards evaluation process (LHS, 43 CFR 4180.2), but do not replace rangeland health assessments. Results from the LHS evaluation should be used to support BLM in land use authorization processes and during development of objectives for management actions such as vegetation treatments. BLM land use authorizations will contain terms and conditions regarding the actions needed to achieve or make progress toward achieving habitat objectives and land health standards. The Habitat Objectives Tables are to be used:<br>• To assess habitat suitability for sage-grouse following the BLM policy on sage-grouse habitat assessments<br>• To evaluate land use plan effectiveness for sage-grouse conservation, and<br>• As a basis to develop measurable project objectives for actions in BLM-designated GRSG Habitat Management areas when considered alongside land health standards, ecological potential and local information.<br><br>References: U.S. Department of the Interior, Bureau of Land Management. 2001. Rangeland health standards handbook H-4180-1. https://www.blm.gov/sites/blm.gov/files/uploads/Media_Library_BLM_Policy_h4180-1.pdf | Potential change under Alternatives 3, 4, 5, and 6. |

| Billings RMP Revision | Potential for Change in 2023 Plan |
|---|---|
| MD WLH & SSS-76: Special Status Species: Greater Sage-Grouse – All BLM use authorizations will contain terms and conditions regarding the actions needed to meet or progress toward meeting the habitat objectives. If monitoring data show the habitat objectives have not been met nor progress being made towards meeting them, there will be an evaluation and a determination made as to the cause. If it is determined that the authorized use is a cause, the use will be adjusted by the response specified in the instrument that authorized the use. | Potential change under Alternatives 3, 4, 5, and 6. |
| MD WLH & SSS-75: Special Status Species: Greater Sage-Grouse – In addition to the references identified in the following table, the Conservation Plans developed for each of the Wyoming Local Sage-Grouse Working Groups will be consulted to identify specific habitat objectives appropriate for site-specific conditions. The Conservation Plans, updated in March 2014, are available on the Wyoming Game and Fish Department (WGFD) website at: https://wgfd.wyo.gov/web2011/wildlife-1000817.aspx. | No change proposed. |
| ***Management Decisions: Disturbance*** | |
| MD WLH & SSS-78: Special Status Species – Greater Sage-Grouse – If the 3% anthropogenic disturbance cap is exceeded on lands (regardless of land ownership) or if anthropogenic disturbance and habitat loss associated with conversion to agricultural tillage or fire exceed 5% within a project analysis area in PHMA, then no further discrete anthropogenic disturbances (subject to applicable laws and regulations, such as the 1872 Mining Law, valid existing rights, etc.) will be permitted by BLM within PHMA in a project analysis area until the disturbance has been reduced to less than the cap.<br>• If the BLM determines that the State of Montana has adopted a GRSG Habitat Conservation Program that contains comparable components to those found in the State of Wyoming's Core Area Strategy including an all lands approach for calculating anthropogenic disturbances, a clear methodology for measuring the density of operations, and a fully operational Density Disturbance Calculation Tool, the 3% disturbance cap will be converted to a 5% cap for all sources of habitat alteration within a project analysis area.<br><br>If the 3% anthropogenic disturbance cap is exceeded on lands (regardless of land ownership) within GRSG PHMA in any given BSU, then no further discrete anthropogenic disturbances (subject to applicable laws and regulations, such as the 1872 hard rock mining law, valid existing rights, etc.) will be permitted by BLM within GRSG PHMA in any given BSU until the disturbance has been reduced to less than the cap. Within existing designated utility corridors, the 3% disturbance cap may be exceeded at the project scale if the site specific NEPA analysis indicates that a net conservation gain to the species will be achieved. This exception is limited to projects which fulfill the use for which the corridors were designated (ex., transmission lines, pipelines) and the designated width of a corridor will not be exceeded as a result of any project co-location.<br><br>[Management action clarified in 2018 to reflect State of Montana process, under DOI-BLM-MT-2018-0005-CX. RMP Maintenance Action Language: This maintenance action is to clarify that the BLM has determined that the State's all lands approach to analyzing disturbance is operational and effective. Therefore, the BLM will adopt and implement the State's approach as identified in Attachments D (Stipulations for Uses and Activities) and H (definitions) of Montana Executive Order 12-2015.] | Potential change under Alternatives 3, 4, 5, and 6. |

| Billings RMP Revision | Potential for Change in 2023 Plan |
|---|---|
| Management Direction WLH & SSS-83: Subject to applicable laws and regulations and valid existing rights, if the average density of one energy and mining facility per 640 acres (the density cap) is exceeded on all lands (regardless of land ownership) in the PHMA within a proposed project analysis area, then no further disturbance from energy or mining facilities will be permitted by BLM: (1) until disturbance in the proposed project analysis area has been reduced to maintain the limit under the cap; or (2) unless the energy or mining facility is co-located into an existing disturbed area. | Potential change under Alternatives 3, 4, 5, and 6. |
| MD WLH & SSS-71: In all sage-grouse habitat, in undertaking BLM management actions, and consistent with valid existing rights and applicable law, in authorizing third-party actions that result in habitat loss and degradation, the BLM will require and ensure mitigation that provides a net conservation gain to the species including accounting for any uncertainty associated with the effectiveness of such mitigation. This will be achieved by avoiding, minimizing, and compensating for impacts by applying beneficial mitigation actions. Actions which result in habitat loss and degradation" include those identified as threats which contribute to Greater Sage-Grouse disturbance as identified by the USFWS in its 2010 listing decision (75 FR 13910) and shown in Table 2 in the attached Monitoring Framework (Appendix D). | Potential change under Alternatives 3, 4, 5, and 6. |
| ***Management Decisions: Wildland Fire Ecology and Management*** | |
| Action FIRE-8: If prescribed fire is used in GRSG habitat, the NEPA analysis for the Burn Plans will address:<br>*why alternative techniques were not selected as a viable options;<br>*how GRSG goals and objectives will be met by its use;<br>*how the COT report objectives will be addressed and met; and<br>*a risk assessment to address how potential threats to GRSG habitat will be minimized.<br><br>Prescribed fire as vegetation or fuels treatment shall only be considered after the NEPA analysis for the Burn Plan has addressed the four bullets outlined above. Prescribed fire can be used to meet specific fuels objectives that will protect GRSG habitat in PHMA (e.g., creation of fuel breaks that will disrupt the fuel continuity across the landscape in stands where annual invasive grasses are a minor component in the understory, burning slash piles from conifer reduction treatments, used as a component with other treatment methods to combat annual grasses and restore native plant communities).<br><br>Prescribed fire in known winter range shall only be considered after the NEPA analysis for the Burn Plan has addressed the four bullets outlined above. Any prescribed fire in winter habitat will need to be designed to strategically reduce wildfire risk around and/or in the winter range and designed to protect winter range habitat quality. | Potential change under Alternatives 3, 4, 5, and 6. |

| Billings RMP Revision | Potential for Change in 2023 Plan |
|---|---|
| MD FIRE-14: Prescribed fire will be allowed on up to 5 percent of the percent of BLM administered acres within the planning area to achieve measurable landscape level objectives from (1) other resources, including, but not limited to, forestry, wildlife, range, vegetation, and watershed; (2) the reduction of hazardous fuels; and (3) the introduction of fire into fire-adapted ecosystems.<br><br>Within Greater Sage-Grouse PHMA and RHMAs, only treatments that conserve, enhance, or restore Greater Sage-Grouse habitat will be allowed.<br><br>Treatment methods, including prescribed burning and mechanical treatments will be used to eliminate conifer encroachment and stimulate vegetative re-growth in grassland/shrub land habitats; and to reduce fuels, thin under-stories, recycle nutrients, and create small openings in forested vegetation types.<br><br>A fire risk assessment will be completed for implementation of prescribed fire in relation to GRSG goals and objectives.<br><br>When prescribed fire is used for vegetation treatments, the burn plan will clearly indicate how COT objectives will be addressed and met by use of prescribed fire and why alternative techniques for vegetation treatment were not selected. | No change proposed. |
| ***Management Decisions: Lands and Realty*** | |
| MD R/LT-14: Lands classified as priority habitat and general habitat (or habitat classification appropriate for the sub-region) for Greater Sage-Grouse will be retained in federal management unless:<br><br>1) the agency can demonstrate that disposal of the lands, including land exchanges, will provide a net conservation gain to the Greater Sage-Grouse or<br><br>2) the agency can demonstrate that the disposal of the lands, including land exchanges, will have no direct or indirect adverse impact on conservation of the Greater Sage-Grouse. (Map 2-11) | No change proposed. |
| MD WLH & SSS-87: Avoidance area [PHMA] for major and minor ROWs. However ROWs will only be allowed in GRSG PHMA where habitat functionality will be maintained. [(Cross-listed in the RMP as R/RLP-15 where it states "PHMA" and also references Maps 2-9 & 2-10)]<br><br>MD WLH & SSS-95: Avoidance area [RHMA] for major and minor ROWs. However ROWs will only be allowed in GRSG RHMAs where habitat functionality will be maintained.<br><br>MD WLH & SSS-102: GRSG GHMA will be avoidance areas for major ROWs. GRSG GHMA will be open to minor ROWs. Utilities and similar facilities will be located adjacent to other facilities where practical and only when habitat can be maintained.<br><br>MD R/RLP-18: GHMA open to minor ROWs.<br><br>Utilities and similar facilities will be located adjacent to other facilities where practical and only when habitat can be maintained. | Potential change under Alternatives 3, 4, 5, and 6. |

| Billings RMP Revision | Potential for Change in 2023 Plan |
|---|---|
| MD WLH & SSS-86: Exclusion area [PHMA] for renewable and solar energy exploration and facility development.<br><br>MD WLH & SSS-93: GRSG RHMAs outside of Elk Basin will be avoidance areas for renewable and solar energy exploration, development and facilities with approved mitigation.<br><br>MD WLH & SSS-94: The Elk Basin GRSG RHMA will be an exclusion area for renewable and solar energy exploration, development and facilities with approved mitigation.<br><br>MD WLH & SSS-101: Avoidance area [GHMA] for renewable and solar energy exploration, development and facilities with approved mitigation. | Potential change under Alternatives 3, 4, 5, and 6. |
| MD R/RLP-21: Silver Tip Road in Carbon County will be designated as a ROW corridor (1,750 feet on either side of the center line of Silver Tip Road). This corridor will have a total width of 3,500 feet and 6 miles in length on public land, with the exception of the portion of this corridor occurring in the Elk Basin GRSG RHMA which will be 1,320 feet on either side of the center line of Silver Tip Road (total width of 2,640 feet) (Map 2-8). | No change proposed. |
| MD WLH & SSS-103: Consider the potential for the development of not-yet-constructed valid existing rights of surface disturbing activities as defined in Table 2 of the Monitoring Framework (Appendix D) prior to authorizing new projects in PHMA. | No change proposed. |
| ***Management Decisions: Fluid Mineral Resources*** | |
| Fluids 18: Where the federal government owns the surface and the mineral estate is in non-federal ownership in PHMA and GHMA, apply appropriate surface use COAs, stipulations, and mineral RDFs through ROW grants or other surface management instruments, to the maximum extent permissible under existing authorities, in coordination with the mineral estate owner/lessee. | No change proposed. |
| Fluids 17: Where the federal government owns the mineral estate in PHMA and GHMA, and the surface estate is in non-federal ownership, apply the same stipulations, COAs, and/or conservation measures and RDFs applied if the mineral estate is developed on BLM-administered lands in that management area, to the maximum extent permissible under existing authorities, and in coordination with the landowner. | No change proposed. |
| All HMA:<br><br>MD WLH & SSS-92: Geophysical exploration will be allowed on existing roads and trails with surface use prohibited from March 1 to June 15 within 4 miles of a lek (TL). | Potential change under Alternatives 3, 4, 5, and 6. |

| Billings RMP Revision | Potential for Change in 2023 Plan |
|---|---|
| MD FLUIDS-15: Priority will be given to leasing and development of fluid mineral resources, including geothermal, outside of PHMA and GHMA. When analyzing leasing and authorizing development of fluid mineral resources, including geothermal, in PHMA and GHMA, and subject to applicable stipulations for the conservation of Greater Sage-Grouse, priority will be given to development in non-habitat areas first and then in the least suitable habitat for Greater Sage-Grouse (Map 2-4). The implementation of these priorities will be subject to valid existing rights and any applicable law or regulation, including, but not limited to, 30 U.S.C. 226(p) and 43 C.F.R. 3162.3-1(h).<br><br>MD FLUIDS-16: Where a proposed fluid mineral development project on an existing lease could adversely affect GRSG populations or habitat, the BLM will work with the lessees, operators, or other project proponents to avoid, reduce and mitigate adverse impacts to the extent compatible with lessees' rights to drill and produce fluid mineral resources. The BLM will work with the lessee, operator, or project proponent in developing an APD for the lease to avoid and minimize impacts on sage-grouse or its habitat and will ensure that the best information about the GRSG and its habitat informs and helps to guide development of such Federal leases. | Potential change under Alternatives 3, 4, 5, and 6. |
| MD WLH & SSS-85: Open to fluid mineral leasing and development (including geophysical exploration). To protect Greater Sage-grouse, a priority species for management, surface occupancy and use for oil and gas exploration and development will be prohibited within Greater Sage-Grouse PHMA (NSO). | Potential change under Alternatives 3 and 6. |
| MD WLH & SSS-98: Surface occupancy and use for oil and gas exploration and development will be prohibited within 0.6 miles of the perimeter of Greater Sage-Grouse leks (NSO). [GHMA] | Potential change under Alternative 3. |
| MD WLH & SSS-77: Surface occupancy and use for oil and gas exploration and development will be prohibited within Greater Sage-Grouse crucial winter range (NSO). | Potential change under Alternative 3. |
| MD WLH & SSS-99: To protect nesting Greater Sage-grouse [GHMA], surface occupancy and use within 2 miles of a lek may be restricted or prohibited. Prior to such activities, a plan to mitigate impacts on nesting Greater Sage-grouse and Greater Sage-grouse nesting habitat will be prepared by the proponent and implemented upon approval by the AO (CSU). | Potential change under Alternatives 3, 4, 5, and 6. |

| Billings RMP Revision | Potential for Change in 2023 Plan |
|---|---|
| MD WLH & SSS-82: No waivers or modifications to a fluid mineral lease no-surface-occupancy stipulation will be granted. The AO may grant an exception to a fluid mineral lease no-surface-occupancy stipulation only where the proposed action:<br>i. Will not have direct, indirect, or cumulative effects on GRSG or its habitat; or,<br>ii. Is proposed to be undertaken as an alternative to a similar action occurring on a nearby parcel, and will provide a clear conservation gain to GRSG.<br><br>Exceptions based on conservation gain (ii) may only be considered in (a) PHMA of mixed ownership where federal minerals underlie less than fifty percent of the total surface, or (b) areas of the public lands where the proposed exception is an alternative to an action occurring on a nearby parcel subject to a valid Federal fluid mineral lease existing as of the date of this RMP revision. Exceptions based on conservation gain must also include measures, such as enforceable institutional controls and buffers, sufficient to allow the BLM to conclude that such benefits will endure for the duration of the proposed action's impacts.<br><br>Any exceptions to this lease stipulation may be approved by the AO only with the concurrence of the State Director. The AO may not grant an exception unless the applicable state wildlife agency, the USFWS, and the BLM unanimously find that the proposed action satisfies (i) or (ii). Such finding shall initially be made by a team of one field biologist or other GRSG expert from each respective agency. In the event the initial finding is not unanimous, the finding may be elevated to the appropriate BLM State Director, USFWS State Ecological Services Director, and state wildlife agency head for final resolution. In the event their finding is not unanimous, the exception will not be granted. Approved exceptions will be made publicly available at least quarterly. | Potential change under Alternatives 3, 4, 5, and 6. |
| RHMA:<br><br>MD WLH & SSS-89: Surface occupancy and use for oil and gas exploration and development will be prohibited within 0.6 miles of Greater Sage-Grouse leks (NSO). | Potential change under Alternative 3. |
| RHMA:<br><br>MD WLH & SSS-90: Surface use for oil and gas exploration and development will be prohibited from March 1 to June 15 in Greater Sage-Grouse nesting habitat within 3 miles of a lek (TL). | Potential change under Alternatives 3, 4, 5, and 6. |
| RHMA:<br><br>MD WLH & SSS-91: Surface occupancy and use for oil and gas exploration and development will be subject to the following special operating constraints that will maintain Greater Sage-Grouse habitat: surface disturbance density and mitigation plan (CSU). | Potential change under Alternatives 3, 4, 5, and 6. |
| ***Management Decisions: Solid Leasable Minerals*** | |
| Action MR-1.3: At the time an application for a new coal lease or lease modification is submitted to the BLM, the BLM will determine whether the lease application area is "unsuitable" for all or certain coal mining methods pursuant to 43 CFR, Part 3461.5. PHMA is essential habitat for maintaining GRSG for purposes of the suitability criteria set forth at 43 CFR, Part 3461.5(o)(1). | Potential change under Alternatives 3, 4, 5, and 6. |

| Billings RMP Revision | Potential for Change in 2023 Plan |
|---|---|
| MD SL-COAL-8: Within Greater Sage-Grouse PHMA (Map 3-5) and RHMAs solid mineral leasing (coal) will only be allowed with the following lease stipulations:<br>• Mining may only occur via subsurface methods<br>• All mine related appurtenant facilities will be placed outside of the PHMA | No change proposed. |
| ***Management Decisions: Mineral Materials*** | |
| MD SALE_MIN-4: The following areas are closed to mineral material disposals (281,597 acres)<br><br>Greater Sage-Grouse PHMA - closed to new salable minerals sales; existing permits will be renewed with no increase in the permitted boundary. However, these areas remain "open" to free use permits and the expansion of existing active pits, only if the following criteria are met:<br>• the activity is within the BSU and project area disturbance cap;<br>• the activity is subject to the provisions set forth in the mitigation framework (Appendix F);<br>• all applicable required design features are applied; and [if applicable] the activity is permissible under the specific sub-regional screening criteria | Potential change under Alternatives 3 and 6. |
| ***Management Decisions: Recreation*** | |
| MD REC-27: The BLM will issue special recreation use permits as appropriate for commercial, competitive, and special events subject to guidelines in BLM Handbook 2930, resource capabilities, social conflict concerns, professional qualifications, public safety, and public needs. SRPs will only be allowed in priority habitat if they are consistent with the goals and objectives for that habitat or species. | No change proposed. |
| Management Direction REC-15 In PHMA, do not construct new recreation facilities (e.g., campgrounds, trails, trailheads, and staging areas) unless the development will have a net conservation gain to GRSG habitat (such as concentrating recreation, diverting use away from important areas, etc.), or unless the development is required for visitor health and safety or resource protection. | No change proposed. |
| ***Management Decisions: Comprehensive Trails and Travel Management*** | |
| MD TTM-24: Site specific travel planning within Greater Sage-Grouse PHMA will be completed within a five (5) year period after the ROD is signed where it hasn't already been completed as part of this plan. | No change proposed. |
| MD TTM-25: In PHMA and GHMA, temporary closures will be considered in accordance with 43 CFR subpart 8364 (Closures and Restrictions); 43 CFR subpart 8351 (Designated National Area); 43 CFR subpart 6320 (Use of Wilderness Areas, Prohibited Acts, and Penalties); 43 CFR subpart 8341 (Conditions of Use). | No change proposed. |

| Billings RMP Revision | Potential for Change in 2023 Plan |
|---|---|
| ***Management Decisions: Livestock Grazing*** | |
| MD LG-13: The NEPA analysis for renewals and modifications of livestock grazing permits/leases that include lands within PHMA will include specific management thresholds based on GRSG Habitat Objectives Table (Table 2-6) and Land Health Standards (43 CFR, Part4180.2) and one or more defined responses that will allow the authorizing officer to make adjustments to livestock grazing that have already been subjected to NEPA analysis.<br><br>MD LG-15: The NEPA analysis for renewals and modifications of livestock grazing permits/leases that include lands within PHMA will include specific management thresholds based on GRSG Habitat Objectives Table (Table 2-6) and Land Health Standards (43 CFR, Part4180.2) and ecological site potential, and one or more defined responses that will allow the authorizing officer to make adjustments to livestock grazing that have already been subjected to NEPA analysis. | Potential change under Alternatives 3, 4, 5, and 6. |
| MD LG-12: Site specific Greater Sage-Grouse habitat and management objectives will be developed for BLM land within Greater Sage-Grouse PHMA. These objectives will be incorporated into the respective allotment management plans (AMPs) or livestock grazing permits as appropriate. (Map 2-1) | Potential change under Alternatives 3, 4, 5, and 6. |
| MD LG-14: The BLM will prioritize (1) the review of grazing permits/leases, in particular to determine if modification is necessary prior to renewal, and (2) the processing of grazing permits/leases in PHMA. In setting workload priorities, precedence will be given to existing permits/leases in these areas not meeting Land Health Standards, with focus on those containing riparian areas, including wet meadows. The BLM may use other criteria for prioritization to respond to urgent natural resource concerns (ex., fire) and legal obligations. | Potential change under Alternatives 3, 4, 5, and 6. |
| LG-16: Allotments within SFA, followed by those within PHMA, and focusing on those containing riparian areas, including wet meadows, will be prioritized for field checks to help ensure compliance with the terms and conditions of the grazing permits. Field checks can include monitoring for actual use, utilization, and use supervision. | Potential change under Alternatives 3, 4, 5, and 6. |
| Management Direction LG-1.4: In PHMA, work cooperatively on integrated ranch planning within GRSG habitat so operations with deeded/BLM allotments can be planned as single units. | Potential change under Alternatives 3, 4, and 5. |
| Management Direction LG-17: At the time a permittee or lessee voluntarily relinquishes a permit or lease, the BLM will consider whether the public lands where that permitted use was authorized should remain available for livestock grazing or be used for other resource management objectives, such as reserve common allotments or fire breaks. This does not apply to or impact grazing preference transfers, which are addressed in 43 CFR 4110.2-3.<br><br>MD LG-11: All allotments wholly located in Greater Sage-Grouse PHMA will be considered for retirement, where the base property owner relinquishes their preference. | Potential change under Alternatives 3, 4, 5, and 6. |

**Table 2: Billings Habitat Objectives for GRSG**

| Attribute | Indicator | Desired Condition | Reference |
|---|---|---|---|
| **Breeding, Nesting, and Early Brood-Rearing (Seasonal Use Period: March 1 – June 15)** | | | |
| Lek Security | Proximity of trees | .65-$Km^2$ (.388 miles) avoidance of coniferous habitats | Doherty 2008 |
| | Collision Risks | Fences and other structures that pose a high collision risk are absent or mitigated with visual markers within 1.25 miles of leks active within 5 years. | Connelly et al. 2000<br>Stiver et al. 2015 |
| | Proximity of sagebrush to leks | Adjacent protective sagebrush cover within 100 m (328 ft.) of an active lek | Stiver et al. 2015 |
| Cover | Sagebrush canopy cover | 5-25% | Herman–Brunson 2007<br>Swanson 2009<br>Doherty et al. 2010<br>Hagen et al. 2007<br>Doherty et al. 2011<br>Foster et al. 2014<br>Wright et al. 2005 |
| | Sagebrush height | 6-31 inches (15-50cm) | Schroeder et al. 1999<br>Swanson 2009<br>Holloran et al. 2005<br>Doherty et al. 2011<br>Lane 2005 |
| | Predominant sagebrush shape | Predominately spreading shape | Stiver et al. 2015 |
| | Perennial grass cover (including bunchgrasses/important native grasses) | ≥10% | Doherty et al. 2011<br>Holloran et al. 2005<br>Doherty et al. 2010<br>Hagen et al. 2007<br>Lane 2005 |
| | Perennial grass and forb height (including residual grasses) | Adequate nest cover based on ecological site potential and seasonal precipitation; 4.4-11.3 inches (11.4-29 cm) | Doherty et al. 2014 |
| | Perennial forb canopy cover | ≥3% | Doherty et al. 2011<br>Holloran, et al. 2005<br>Doherty et al. 2010<br>Hagen et al. 2007 |

| Attribute | Indicator | Desired Condition | Reference |
|---|---|---|---|
| **Brood-Rearing/Summer 1 (Seasonal Use Period: June 16 – October 31)** | | | |
| Cover | Sagebrush canopy cover | 5-25% | Herman–Brunson 2007<br>Swanson 2009<br>Doherty et al. 2010<br>Doherty et al. 2011<br>Foster et al. 2014<br>Lane 2005 |
| | Sagebrush height | 6-31 inches (15-50cm) | Schroeder et al. 1999<br>Holloran et al. 2005<br>Doherty et al. 2011<br>Lane 2005 |
| | Perennial grass and forb canopy cover | ≥10% | Doherty et al. 2011<br>Holloran et al. 2010<br>Hagen et al. 2007 |
| | Riparian areas/mesic meadows | Proper Functioning Condition | BLM 1997c<br>Prichard et al. 1999<br>Prichard 1998 |
| | Upland and riparian perennial forb availability | Preferred forbs are common with several preferred species present. | Stiver et al. 2015<br>Doherty et al. 2011 |
| **Winter 1 (Seasonal Use Period: November 1 – February 28)** | | | |
| Cover and Food | Sagebrush canopy cover | ≥10% | Schroeder et al. 1999<br>Swanson 2009<br>Foster et al. 2014 |
| | Sagebrush height | ≥25cm | Connelly et al. 2000 |

### 2.3.2 Relevant Appendices

The following table shows which appendices from the 2015 plan have management direction that may change through this RMP amendment. The appendices can be found on the Billings RMP ePlanning website.

| ARMPA Appendix Name | Potential for Change in 2023 Plan |
|---|---|
| A: Approved RMP Maps | Yes |
| B: Greater Sage-Grouse: Applying Lek Buffers | No |
| C: Greater Sage-Grouse Required Design Features | Yes |
| D: The Greater Sage-Grouse Monitoring Framework | No |
| E: Greater Sage-Grouse (GRSG) Disturbance Caps | Yes |
| F: Greater Sage-Grouse - Mitigation and Mitigation Measures | Yes |
| G: Adaptive Management Strategy for GRSG Habitat Management | Yes |
| H: Best Management Practices | Yes |
| I: Incorporating GRSG RMP Decisions into Grazing Authorizations | No |
| J: Fluid Minerals: Procedures in Oil and Gas Recovery and Operations and Summary of the Billings Reasonably Foreseeable Development Scenario | No |
| K: Biological Opinion | No |
| L: Wildlife Resources | No |
| M: Coal Resources: Coal Development Potential and Unsuitability Criteria | No |
| N: SRMA and ERMA Tables | No |
| O: Visual Resource Management Program | No |
| P: Air Quality Resource Management Plan: Adaptive Management Strategy for Oil and Gas Resources | No |
| Q: Implementation and Monitoring | No |
| R: Bureau of Land Management Billings Field Office and Pompeys Pillar National Monument Sign Plan | No |
| S: Oil and Gas Lease Stipulations | Yes |
| T: Areas of Critical Environmental Concern | No |
| U: Cultural and Heritage Resources | No |
| V: Recreational Setting Characteristics | No |
| W: Realty, Cadastral Survey, and Lands | No |
| X: Lands with Wilderness Characteristics | No |
| Y: Screening Criteria Checklist for Ten Year Grazing Permit / Lease Renewal and Transfers | No |
| Z: PFC – Proper Functioning Condition | No |
| AA: 1975 Memorandum between Montana and Wyoming - Administration of the Pryor Mountain Wild Horse Range | No |
| AB: Summary of Eligibility, Suitability, and Tentative Classification Determinations for Rivers in the Billings Field Office | No |
| AC: Land Health Standards | No |

# Appendix 2.4
# Butte RMP Revision

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## 2.4 BUTTE RMP REVISION

This appendix presents the approved RMP revision language from the 2009 record of decision for the Butte RMP that relate to GRSG management. The Butte RMP was not amended with GRSG decisions in 2015 or 2019 due to the limited extent and quality of GRSG habitat present within the Butte Field Office (see 2015 Idaho and Southwestern Montana GRSG Plan). The table below notes which goals, objectives, appendices, and management decisions/actions have a potential to change as a result of the current planning effort and if so, under which alternatives changes are being considered. Note that any references to tables and appendices are to those applicable 2009 appendices that are listed in **Section 2.4.2** of this appendix.

### 2.4.1 Existing GRSG RMP Management – 2009 Butte RMP Revision

**Table 1. Summary of Goals, Objectives, and Management Actions in Butte RMP**

| Butte RMP Revision | Potential for Change in 2023 Plan |
|---|---|
| ***Management Decisions: Vegetation Communities*** | |
| **Wildlife. MA 27.** Vegetation altering activities could occur in sage grouse habitat where they do not result in long-term loss of habitats or contribute to the need to federally list sage grouse. Sufficient sagebrush densities and cover will be retained in sage grouse habitat. (Goals WF5, WF7, SE4) | Potential change under Alternatives 3, 4, 5, and 6. |
| **Grassland and Shrubland Vegetation. MA 1:** When necessary, sagebrush and grassland distribution and vigor will be restored through vegetative treatments such as reducing conifer encroachment, reducing noxious weeds, and ensuring proper grazing practices (season of use or intensity). (Goals GS1, LG2, FM2, NW1, WF1, WF2) | No change proposed. |
| **Grassland and Shrubland Vegetation. MA 2:** Management of sagebrush habitats will be a priority based on concerns over the conservation status of sage grouse, pygmy rabbit, and other species associated with sagebrush and grassland habitats. (Goals GS1, GS2, WF1, WF2, WF5, WF7). | No change proposed. |
| ***Management Decisions: Terrestrial and Aquatic Wildlife Resources*** | |
| **Wildlife. Goal WF7 –** Protect, maintain, restore, and rehabilitate sagebrush habitat in occupied or historic sage grouse habitat (as mapped by MFWP). | Potential change under Alternatives 3, 4, 5, and 6. |
| **Wildlife. MA 25.** Sage grouse management activities will be designed and implemented to be consistent with adopted conservation strategies such as the Bureau of Land Management National Sage-Grouse Habitat Conservation Strategy (USDI-BLM 2004) and Management Plan and Conservation Strategies for Sage Grouse in Montana – Final (MSGWG 2005) and current, accepted science. (Goals WF6, WF7, GS1, GS2, SE4) | Potential change under Alternatives 3, 4, 5, and 6. |
| **Grassland and Shrubland Vegetation. Goal 1:** Management of sagebrush habitats will be a priority based on concerns over the conservation status of sage grouse, pygmy rabbit, and other species associated with sagebrush and grassland habitats. (Goals GS1, GS2, WF1, WF2, WF5, WF7) | No change proposed. |

| Butte RMP Revision | Potential for Change in 2023 Plan |
|---|---|
| **Wildlife. MA 26.** To the extent possible, BLM will: maintain large patches of high quality sagebrush in occupied or historic sage grouse habitat (as mapped by MFWP); maintain connections between sagebrush habitats; and enlarge the size of sagebrush patches in occupied or historic sage grouse habitat. (Goals GS2, WF2, WF5, WF6, WF7, SE4) | No change proposed. |
| ***Management Decisions: Fluid Mineral Resources*** | |
| Fluid Leaseable Minerals Table 23 Lease Terms and Stipulations.<br>Sage Grouse Strutting Grounds (leks) NSO ¼ | Potential change under Alternatives 3, 4, 5, and 6. |
| Fluid Leaseable Minerals Table 23 Lease Terms and Stipulations.<br>Sage Grouse Winter/Spring Range TL 12/1-5/15 | Potential change under Alternatives 3, 4, 5, and 6. |

**Table 2. Dillon and Butte Habitat Objectives of GRSG**

| Attribute | Indicator | Habitat Condition | Reference |
|---|---|---|---|
| **LEK HABITAT (Seasonal Use Period March 1 – May 15)1** | | | |
| Lek Security | Proximity of trees | Trees (i.e., in Idaho mainly juniper, conifers, and does not include old-growth juniper, pinyon pine and mountain mahogany; in Montana mainly Douglas-fir) absent or uncommon on shrub/grassland ecological sites within 1.86 miles (3 km) of occupied leks. | Baruch-Mordo et al.2013<br>Stiver et al. 2015 |
| | Proximity of sagebrush to leks | Adjacent protective sagebrush cover within 328 ft. (100 m) of an occupied lek | Stiver et al. 2015 |
| **NESTING/EARLY BROOD REARING (Seasonal Use Period May 1 – June 30) 1** | | | |
| Cover and Food | Sagebrush cover [2] | 15-25% | Connelly et al. 2000<br>Connelly et al. 2003<br>Hagen et al. 2007 |
| | Sagebrush height<br>Arid sites[3]<br>Mesic sites[4] | <br>12-31 inches (30-80cm)<br>16-31 inches (40-80cm) | Connelly et al. 2000 |
| | Predominant sagebrush shape | Predominantly spreading shape[5] | Stiver et al. 2015 |
| | Perennial grass cover (such as native bunchgrasses) [2]<br>Arid sites[3]<br>Mesic sites[4] | <br><br><br>>10%<br>>15% | Connelly et al. 2000<br>Stiver et al. 2015 |
| | Perennial grass (and forb) height (includes residual grasses) | ≥ 7 inches | Connelly et al. 2000<br>Connelly et al. 2003<br>Hagen et al. 2007<br>Stiver et al. 2015 |
| | Perennial forb cover [2]<br>Arid sites[3]<br>Mesic sites[4] | <br>>5%<br>>10% | Connelly et al. 2000 |
| | Perennial forb availability | Preferred forbs are common with several species present6 | Stiver et al. 2015 |

| Attribute | Indicator | Habitat Condition | Reference |
|---|---|---|---|
| **LATE BROOD-REARING/SUMMER (July-October)1 Late brood-rearing areas, such as riparia** | | | |
| Cover and Food | Sagebrush cover[2] | Uplands 10-25%<br>Riparian/Meadow: Sagebrush cover within 100 m | Connelly et al. 2000 |
| | Sagebrush height | 16 to 32 inches (40-80cm) | Connelly et al. 2000 |
| | Perennial grass and forb cover [2] | >15% | |
| | Upland and riparian perennial forb availability [2] | Preferred forbs are common with appropriate numbers of species present,6 | Stiver et al. 2015 |
| | Riparian and/or meadow habitat condition | Proper Functioning Condition | Stiver et al. 2015 |
| **WINTER November-March1 (Apply to areas of known or likely winter-use)** | | | |
| Cover and Food | Sagebrush cover and height above snow, | Sagebrush is at least 10 inches (25 cm) above snow and ≥10% cover[16] | Connelly et al. 2000<br>Stiver et al. 2015 |

Notes:

[1] Seasonal dates can be adjusted by local unit according to geographic region.

[2] Since plant species and/or life forms may overlap, total vegetative cover, inclusive of shrubs, forbs and grasses may exceed 100%.

[3] Arid corresponds to the 10 – 12 inch precipitation zone; Artemisia tridentata wyomingensis is a common big sagebrush subspecies for this type site (Stiver et al. 2015).

[4] Mesic corresponds to the >12 inch precipitation zone; Artemisia tridentata vaseyana is a common big sagebrush sub-species for this type site (Stiver et al. 2015).

[5] Collectively the indicators for sagebrush (cover, height, and shape), perennial grass and perennial forb (cover, height and/or availability) represent the desired condition range for nesting/early brood rearing habitat characteristics, consistent with the breeding habitat suitability matrix identified in Stiver et al. 2015. Sagebrush plants that are more tree or columnar-shaped provide less protective cover near the ground than sagebrush plants with a spreading shape (Stiver et al. 2015). Some sagebrush plants are naturally columnar (e.g., Great Basin big sagebrush), and a natural part of the plant community. However, a predominance of columnar shape arising from animal impacts may warrant management investigation or adjustments at site specific scales.

[6] Preferred forbs are listed in Stiver et al. 2015. Overall total forb cover may be greater than that of preferred forb cover since not all forb species are listed as preferred.

[15] Some late brood habitat occurs at higher elevations outside of mapped nesting habitat and some is embedded within nesting landscapes especially areas such as wet meadows, riparian areas, springs and seeps.

[16] Winter habitat metrics are a guideline but snow depths and habitat availability may vary widely depending on winter severity, topography and elevation.

### 2.4.2 Relevant Appendices

The following table shows which appendices from 2009 plan have management direction that may change through this RMP amendment. The appendices can be found on the Butte RMP ePlanning website.

| ARMPA Appendix Name | Potential for Change in 2023 Plan |
|---|---|
| A: Travel Planning | No |
| B: Laws | No |
| C: Visual Resource Management (VRM) | No |
| D: SIMPPLLE Model | No |
| E: Best Management Practices | Yes |
| F: Land Health Standards | No |
| G: Wildlife | No |
| H: Recreation Opportunity Spectrum (ROS) | No |
| I: Areas of Critical Environmental Concern (ACEC) | No |
| J: Wild and Scenic Rivers (WSR) | No |
| K: Cultural | No |
| L: Lands and Realty | No |
| M: Fluid Minerals | Yes |
| N: Implementation and Monitoring | No |

# Appendix 2.5
# Dillon RMP Amendment

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## 2.5 DILLON RMP AMENDMENT

This appendix presents the GRSG approved RMP amendment language from the 2015 record of decision for the Dillon RMP. The Dillon RMP was not amended in 2019. The table below notes which goals, objectives, appendices, and management decisions/actions have a potential to change as a result of the current planning effort and if so, under which alternatives changes are being considered. Note that any references to tables and appendices are to those applicable 2015 appendices that are listed in **Section 2.5.2** of this appendix.

### 2.5.1 Existing GRSG RMP Management – Dillon RMP Amendment

**Table 1. Summary of Goals, Objectives, and Management Actions in Dillion 2015 ARMPs/Amendments**

| Dillon 2015 RMP Revision | Potential for Change in 2023 Plan |
|---|---|
| ***Management Decisions: Vegetation Communities*** | |
| **Objective SSS 1:** Maintain or make progress toward all lands within PHMA and IHMA (at least 70%) capable of producing sagebrush so there is a minimum of 15 percent sagebrush cover and conifers absent to uncommon within 1.86 miles of occupied leks. | Potential change under Alternatives 3, 4, 5, and 6. |
| **Objective VEG 3:** In all SFA and PHMA, the desired condition is to maintain all lands ecologically capable of producing sagebrush (but no less than 70%) with a minimum of 15% sagebrush canopy cover or as consistent with specific ecological site conditions. The attributes necessary to sustain these habitats are described in Interpreting Indicators of Rangeland Health (BLM Tech Ref 1734-6). | No change proposed. |
| **MD VEG 8:** Remove conifers encroaching into sagebrush habitats, in a manner that considers tribal cultural values. Prioritize treatments closest to occupied GRSG habitats and near occupied leks, and where juniper encroachment is phase 1 or phase 2. Use of site-specific analysis and tools like the FIAT report (Chambers et. al., 2014) will help refine the location for specific areas to be treated. | Potential change under Alternatives 3, 4, 5, and 6. |

| Dillon 2015 RMP Revision | Potential for Change in 2023 Plan |
|---|---|
| **Objective VEG 2:** Increase the amount and functionality of seasonal habitats by:<br>a. Increasing or enhancing canopy cover and average patch size of sagebrush.<br>b. Increasing the amount, condition and connectivity of seasonal habitats.<br>c. Protecting or improving GRSG migration/movement corridors.<br>d. Reducing conifer encroachment within GRSG seasonal habitats.<br>e. Improving understory (grass, forb) and/or riparian condition within breeding and late broodrearing habitats.<br>f. Reducing the extent of annual grasslands within and adjacent to PHMA and IHMA. Decadal treatment objectives by population area are identified in Table 2-3, Estimated Acres of Treatment Needed within a 10-Year Period to Achieve Vegetation Objectives on BLM Administered Lands1. | Potential change under Alternatives 3, 4, 5, and 6. |
| **Objective VEG 1:** Reconnect and expand areas of higher native plant community integrity/rangeland health to increase the extent of high quality habitat and, where possible, to accommodate the future effects of climate change. | No change proposed. |
| **MD VEG 1:** Implement habitat rehabilitation or restoration projects in areas that have potential to improve GRSG habitat using a full array of treatment activities as appropriate, including chemical, mechanical and seeding treatments. | No change proposed. |
| **MD VEG 2:** Implement vegetation rehabilitation or manipulation projects to enhance sagebrush cover or to promote diverse and healthy grass and forb understory to achieve the greatest improvement in GRSG habitat based on FIAT Assessments, HAF assessments, other vegetative assessment data and local, site specific factors that indicate sagebrush canopy cover or herbaceous conditions do not meet habitat management objectives (i.e. is minimal or exceeds optimal characteristics). This may necessitate the use of prescribed fire as a site preparation technique to remove annual grass residual growth prior to the use of herbicides in the restoration of certain lower elevation sites (e.g., Wyoming big sagebrush) but such efforts will be carefully planned and coordinated to minimize impacts on GRSG seasonal habitats. | Potential change under Alternatives 3, 4, 5, and 6. |
| **MD VEG 3:** Require use of native seeds for restoration based on availability, adaptation (ecological site potential), and probability of success (Richards et al. 1998). Non-native seeds may be used as long as they support GRSG habitat objectives (Pyke 2011) to increase probability of success, when adapted seed availability is low or to compete with invasive species especially on harsher sites. | No change proposed. |

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| **MD VEG 4:** Implement management changes in restoration and rehabilitation areas, as necessary, to maintain suitable GRSG habitat, improve unsuitable GRSG habitat and to ensure long-term persistence of improved GRSG habitat (Eiswerth and Shonkwiler 2006). Management changes can be considered during livestock grazing permit renewals, travel management planning, and renewal or reauthorization of ROWs. | No change proposed. |
| **MD VEG 5:** Consider establishing seed harvest areas that are managed for seed production (Armstrong 2007) to provide a reliable source of locally adapted seed to use during rehabilitation and restoration activities. | No change proposed. |
| **MD VEG 9:** Incorporate results of the FIAT Assessments into projects and activities addressing invasive species as appropriate. | Potential change under Alternatives 3, 4, 5, and 6. |
| **MD VEG 10:** Implement noxious weed and invasive species control using integrated vegetation management actions per national guidance and local weed management plans for Cooperative Weed Management Areas in cooperation with State and Federal agencies, affected counties, and adjoining private lands owners. | No change proposed. |
| **MD VEG 11:** Conduct integrated weed management actions for noxious and invasive weed populations that are impacting or threatening GRSG habitat quality using a variety of eradication and control techniques including chemical, mechanical and other appropriate means. | No change proposed. |
| **MD VEG 12:** Require project proponent (projects described in MD SSS 27 and which are included in the anthropogenic disturbance cap evaluation) to ensure that noxious weeds and invasive species caused as a result of the project are treated to eliminate establishment on the disturbed project construction areas for at least 3 years and monitored and treated during the life of the project. | No change proposed. |
| **MD VEG 13:** Treat areas that contain cheatgrass and other invasive or noxious species to minimize competition and favor establishment of desired species. | No change proposed. |
| **MD VEG 6:** Allocate use of native seed to GRSG or ESA listed species habitat in years when preferred native seed is in short supply. This may require reallocation of native seed from ESR projects outside of PHMA or IHMA to those inside it. Where probability of success or native seed availability is low, nonnative seeds may be used as long as they meet GRSG habitat conservation objectives (Pyke 2011). Re-establishment of appropriate sagebrush species/subspecies and important understory plants, relative to site potential, shall be the highest priority for rehabilitation efforts. | Potential change under Alternatives 3, 4, 5, and 6. |

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| **MD VEG 7:** During land health assessments, evaluate the relative value of existing nonnative seeding within GRSG habitat as: 1) a component of a grazing system allowing improvement of adjacent native vegetation, 2) development of a forage reserve, 3) incorporation into a fuel break system (Davies et al. 2011) or 4) restoration/diversification for GRSG habitat improvement. Where appropriate and feasible, diversify seedings, or restore to native vegetation when potential benefits to GRSG habitat outweigh the other potential uses of the non-native seeding, with emphasis on PHMA and IHMA. Allow recolonization of seedings by sagebrush and other native vegetation. | No change proposed. |
| ***Management Decisions: Terrestrial and Aquatic Wildlife Resources*** | |
| **Goal SSS 1:** Maintain and/or increase the abundance, distribution and connectivity of GRSG by conserving, enhancing and restoring GRSG habitat to maintain resilient populations by reducing, eliminating or minimizing threats to GRSG habitats. | Potential change under Alternatives 3, 4, 5, and 6. |
| **Goal SSS 2:** Provide for the needs of GRSG and their habitat while also providing for resource uses in accordance with BLM's direction for multiple use and sustained yield as described in FLPMA. | Potential change under Alternatives 3, 4, 5, and 6. |
| **Objective SSS 3:** Maintain a resilient population of GRSG in Idaho and Southwestern Montana. | Potential change under Alternatives 3, 4, 5, and 6. |
| **Goal SSS 5:** Conserve, enhance, and restore the sagebrush ecosystem upon which GRSG populations depend in an effort to maintain and/or increase their abundance and distribution, in cooperation with other conservation partners. | Potential change under Alternatives 3, 4, 5, and 6. |
| **Goal SSS 4:** Reduce the risk of West Nile Virus or other disease outbreaks from BLM management actions. | Potential change under Alternatives 3, 4, 5, and 6. |
| **MD SSS - 5:** Prioritize activities and mitigation to conserve, enhance and restore GRSG habitats (i.e., fire suppression activities, fuels management activities, vegetation treatments, invasive species treatments etc.) first by Conservation Area, if appropriate (Conservation Area under adaptive management or at risk of meeting an adaptive management soft or hard trigger), followed by PHMA, then IHMA then GHMA within the Conservation Areas. Local priority areas within these areas will be further refined as a result of completing the GRSG Wildfire and Invasive Species Habitat Assessments as described in Appendix H. This can include projects outside GRSG habitat when those projects will provide a benefit to GRSG habitat. | Potential change under Alternatives 3, 4, 5, and 6. |

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| **MD SSS 2:** Within each Conservation Area designate GRSG Habitat Management Areas: Priority, Important and General Habitat Management Areas (Figure 2-1). Priority Habitat Management Areas (PHMA) focus on conserving the two key meta-populations in the subregion. PHMA encompasses areas with the highest conservation value to GRSG, based on the presence of larger leks, habitat extent, important movement and connectivity corridors and winter habitat. PHMA include adequate area to accommodate continuation of existing land uses and landowner activities. Important Habitat Management Areas (IHMA) contain additional habitat and populations that provide a management buffer for the PHMA and to connect patches of PHMA. IHMA encompasses areas of generally moderate to high conservation value habitat and/or populations and in some Conservation Areas includes areas beyond those identified by USFWS as necessary to maintain redundant, representative and resilient populations (Priority Areas for Conservation (PACs)). IHMA are typically adjacent to PHMA but generally reflect somewhat lower GRSG population status and/or reduced habitat value due to disturbance, habitat fragmentation or other factors. There are no IHMA designated within the Southwestern Montana Conservation Area. General Habitat Management Areas (GHMA) encompass habitat that is outside of PHMA or IHMA. GHMA contain approximately 10 percent of the occupied leks that are also of relatively low male attendance compared to leks in PHMA or IHMA. GHMA are generally characterized by lower quality disturbed or patchy habitat of low lek connectivity. | Potential change under Alternatives 3, 4, 5, and 6. |
| **MD SSS- 3:** In Montana, designate PHMA to encompass Montana Fish, Wildlife, and Parks 2009 Greater Sage Grouse Core Area designations. | Potential change under Alternatives 3, 4, 5, and 6. |
| **MD SSS 10 -** Designate Sagebrush Focal Areas (SFA) as shown on Figure 1-2. SFA will be managed as PHMA, with the following additional management:<br>* Recommended for withdrawal from the General Mining Act of 1872, as amended, subject to valid existing rights.<br>* Managed as NSO, without waiver, exception, or modification, for fluid mineral leasing.<br>* Prioritized for vegetation management and conservation actions in these areas, including, but not limited to land health assessments, wild horse and burro management actions, review of livestock grazing permits/leases, and habitat restoration (see specific management sections). | Potential change under Alternatives 3, 4, 5, and 6. |
| **Objective SSS 4:** Designate GRSG management areas and associated management to maintain a resilient population and to designate strategically located adjacent areas to provide a buffer from unpredictable habitat loss such as wildfire to the resilient population areas. | Potential change under Alternatives 3, 4, 5, and 6. |

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| **Objective SSS 5:** Identify and strategically protect larger intact sagebrush areas and areas of lower fragmentation to maintain GRSG population persistence. | No change proposed. |
| **MD SSS-1:** Designate five GRSG Conservation Areas (see Glossary) within the subregion to form the geographic basis for achieving population objectives; evaluating the disturbance density and adaptive regulatory triggers; and tailor adaptive management responses. These conservation areas are depicted in Figure 2-13. These areas are referred to as Mountain Valleys, Desert, West Owyhee, Southern and Southwestern Montana Conservation Areas.<br><br>Conservation Area Description<br><br>[….]<br><br>Southwestern Montana – located in southwestern Montana - encompassing the Dillon Butte BLM Field Office and Beaverhead-Deerlodge National Forest boundaries (the Butte RMP is not being amended and since there are limited GRSG federal GHMA, management actions do not apply in the Butte Field Office). | Potential change under Alternatives 3, 4, 5, and 6. |
| **MD SSS 6 -** The management area map and Biologically Significant Unit (BSU) baseline map will be reevaluated in conjunction with plan evaluation processes (i.e. approximately every 5 years). This reevaluation can indicate the need to adjust PHMA, IHMA or GHMA or the habitat baseline. These adjustments can occur upon completion of the appropriate analysis and process (e.g., plan amendment) to review the allocation decisions based on the map. Results from the Wildfire and Invasive Species Assessments, such as identified focal or emphasis areas will also be used to help inform mapping adjustments during this evaluation. | Potential change under Alternatives 3, 4, 5, and 6. |
| **MD SSS 7 -** GRSG habitat within the project area will be assessed during project-level NEPA analysis within the management area designations (PHMA, IHMA, GHMA). Project proposals and their effects will be evaluated based on the habitat and values affected. | Potential change under Alternatives 3, 4, 5, and 6. |

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| **MD SSS 8** - Idaho BLM will annually update the Key Habitat map, in order to reflect habitat changes resulting from wildfire, succession, and vegetation treatments that occurred or were observed since the last update. Key habitat includes areas of generally intact sagebrush that provide sage-grouse habitat during some portion of the year. This map also identifies potential restoration areas (perennial grassland annual grasslands, conifer encroachment and recent burns). This map a broad scale current vegetation map that changes as habitat is lost or restored. The Key Habitat Map is not an allocation decision such as PHMA, IHMA, and GHMA. Updates to the map will also occur if it is determined that mapping errors or omissions have occurred, or that radio-telemetry studies indicate that GRSG are consistently utilizing an area. Updates are also intended to capture recommendations by the field offices, GRSG Local Working Groups, or agency partners in GRSG conservation. Project-level evaluations of GRSG habitat during the NEPA process can also be used to inform the annual update. | Potential change under Alternatives 3, 4, 5, and 6. |
| **MD SSS 9 -** Areas of habitat outside of delineated habitat management areas identified during the Key habitat update process will be evaluated during site specific NEPA for project level activities and GRSG required design features (Appendix C) and buffers (Appendix B) will be included as part of project design. These areas will be further evaluated during plan evaluation and the 5-year update to the management areas, to determine whether they should be included as PHMA, IHMA, or GHMA. | Potential change under Alternatives 3, 4, 5, and 6. |
| **MD SSS 32 -** Incorporate RDFs as described in Appendix C in the development of project or proposal implementation, reauthorizations or new authorizations and suppression activities, as conditions of approval (COAs) into any post-lease activities and as best management practices for locatable minerals activities, to the extent allowable by law, unless at least one of the following conditions can be demonstrated and documented in the NEPA analysis associated with the specific project:<br>a. A specific RDF is not applicable to the site-specific conditions of the project or activity;<br>b. A proposed design feature or BMP is determined to provide equal or better protection for GRSG or its habitat; or<br>c. Analysis concludes that following a specific RDF will provide no more protection to GRSG or its habitat than not following it, for the project being proposed. | Potential change under Alternatives 3, 4, 5, and 6. |
| **MD SSS 33 -** Conduct implementation and project activities, including construction and short-term anthropogenic disturbances consistent with seasonal habitat restrictions described in Appendix C. | No change proposed. |

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| **MD SSS 34 -** RDFs and seasonal habitat restrictions will not be required for emergency or short-term activities necessary to protect and preserve human life or property. | No change proposed. |
| **MD SSS 35 -** In undertaking BLM management actions, and consistent with valid and existing rights and applicable law in authorizing third-party actions, the BLM will apply the lek buffer-distances identified in the USGS Report Conservation Buffer Distance Estimates for Greater Sage-Grouse – A Review (Open File Report 2014-1239) in accordance with Appendix B. | Potential change under Alternatives 3, 4, 5, and 6. |
| **MD SSS 38:** Monitor the effectiveness of projects (e.g., fuel breaks. fuels treatments) until objectives have been met or until it is determined that objectives cannot be met, according to the monitoring schedule identified for project implementation. | No change proposed. |
| **MD SSS 43:** Monitor GRSG habitat as described in the monitoring framework plan (Appendix D) in coordination with IDFG and Montana FWP**.** | Potential change under Alternatives 3, 4, 5, and 6. |
| **MD SSS 37 -** Once FIAT Assessments are complete, annually complete a review of FIAT Assessment implementation efforts within GRSG habitat with appropriate USFWS and state agency personnel. | Potential change under Alternatives 3, 4, 5, and 6. |
| **MD SSS 41:** Use lek, nesting and winter habitat maps and key habitat map (updates) to annually assess GRSG population and habitat status in the context of the adaptive management triggers. | Potential change under Alternatives 3, 4, 5, and 6. |
| **MD SSS 42:** Continue to support updates to the Key Habitat map to track vegetation changes in relation to GRSG habitat on a yearly basis, until such a time this process is replaced. The process used to update the Key Habitat Map is described in Appendix F of the FEIS. | Potential change under Alternatives 3, 4, 5, and 6. |
| ***Management Decisions: Coordination*** | |
| **MD CC 1**: Collaborate, coordinate and utilize cooperative planning efforts to implement and monitor activities to achieve desired conditions and to maximize the utilization of available funding opportunities. Coordination efforts can include: adjacent landowners, federal and state agencies, local governments, tribes, communities, other agencies, resource advisory groups, public lands permit holders and nongovernmental organizations. | Potential change under Alternatives 3, 4, 5, and 6. |
| **MD CC 2:** Develop a cooperative MOU between the BLM, Forest Service and State of Idaho to establish the State of Idaho as a cooperating agency during implementation of the final decision. The MOU will identify responsibilities, role and interaction of the BLM, Forest Service and State of Idaho. Montana BLM will participate as appropriate on Montana's Sage-grouse Oversight Team to facilitate coordination and implementation of BLM's final decision and Montana's Executive Order No. 10-2014. | Potential change under Alternatives 3, 4, 5, and 6. |

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| **MD CC 3:** The BLM will consider any recommendations from the Governor of Idaho as a result of evaluation completed by the Sage-Grouse Implementation Task Force. | Potential change under Alternatives 3, 4, 5, and 6. |
| **MD CC 4:** Idaho: The BLM will coordinate with the State of Idaho and the Idaho Sage-Grouse Implementation Task Force regarding proposed management changes, the implementation of conservation measures, mitigation, and site-specific monitoring, related to adaptive management, anthropogenic disturbance and livestock grazing. | Potential change under Alternatives 3, 4, 5, and 6. |
| **MD CC 5:** Montana: The BLM will coordinate with the State of Montana and the Montana Sage-grouse Oversight Team regarding proposed management changes, the implementation of conservation measures, mitigation, and site-specific monitoring, related to adaptive management and anthropogenic disturbance. | Potential change under Alternatives 3, 4, 5, and 6. |
| **MD CC 6:** Upon completion of the Record of Decision the BLM will develop an initial Implementation Guide for BLM District and Field Offices within a year of issuance of the Record of Decision. This Guide will define and describe consistent application of the allocations, management actions, required design features, and etc. that are contained within the final plan and will be updated and expanded as needed to respond to issues and concerns. | Potential change under Alternatives 3, 4, 5, and 6. |
| **MD CC 7:** At the state level, BLM will coordinate with IDFG, MFWP, USFWS, and other conservation partners in collaborative efforts with adjacent states (Oregon, Nevada, Utah, Montana, Wyoming) in GRSG MZs IV and II to evaluate GRSG habitat and population status and trends and make appropriate regional recommendations for GRSG conservation at broader scales. | Potential change under Alternatives 3, 4, 5, and 6. |
| **MD CC 8**: At the state level, BLM will coordinate with the appropriate WAFWA Sage-grouse Technical Committee to develop consistent population and habitat monitoring approaches that facilitate GRSG conservation at the MZ scale. | Potential change under Alternatives 3, 4, 5, and 6. |
| **MD CC 9:** All prescribed burning will be coordinated with state and local air quality agencies to ensure that local air quality is not significantly impacted by BLM activities. | No change proposed. |
| ***Management Decisions: Habitat Objectives*** | |
| **[Original language updated through plan maintenance action in 2018]**<br><br>The habitat objectives for GRSG (Table 2.3-2) is a list of indicators, characteristics, and values that describe GRSG seasonal habitat use areas. The BLM used indicator values derived from a synthesis of local and regional GRSG habitat research and data to describe the typical vegetation communities that sage-grouse select. While the habitat objectives are not attainable on every site or every acre within designated GRSG habitat management areas, | Potential change under Alternatives 3, 4, 5, and 6. |

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| the values reflect a range of habitat conditions that generally lead to greater survival of individuals within a population. When permitting land use activities, BLM should consider the ecological site potential within designated habitat management areas to validate the habitat conditions achievable for a specific site.<br><br>The seasonal habitat descriptions in Table 2.3-2 vary across the range of sage-grouse, within a subregion, and between sites. They are not land health standards but are quantitative measures that inform the Special Status Species Habitat Land Health Standard for sage-grouse. These measurable values reflect ecological potential, and may be adjusted based on local factors influencing sage-grouse habitat selection. Local data or recent science may indicate that sage-grouse select for vegetation structure and composition in seasonal habitats not characterized by the values in the habitat objectives table. In these cases, it may be appropriate to adjust the values. Habitat objectives should be evaluated in the context of annual variability in ecological conditions and should not be used singly to determine habitat suitability for sage-grouse. They may be used to demonstrate trends over time, during plan evaluations for effectiveness of sage-grouse conservation, or when identify limiting habitat characteristics for a given area.<br><br>The indicators, characteristics, values and desired seasonal habitat conditions in the GRSG Plan Habitat Objectives Table are meant to inform the wildlife habitat component of the Land Health Standards evaluation process (LHS, 43 CFR 4180.2), but do not replace rangeland health assessments. Results from the LHS evaluation should be used to support BLM in land use authorization processes and during development of objectives for management actions such as vegetation treatments. BLM land use authorizations will contain terms and conditions regarding the actions needed to achieve or make progress toward achieving habitat objectives and land health standards. The Habitat Objectives Tables are to be used:<br>● To assess habitat suitability for sage-grouse following the BLM policy on sage-grouse habitat assessments<br>● To evaluate land use plan effectiveness for sage-grouse conservation, and<br>● As a basis to develop measurable project objectives for actions in BLM-designated GRSG Habitat Management areas when considered alongside land health standards, ecological potential and local information.<br>References: U.S. Department of the Interior, Bureau of Land Management. 2001. Rangeland health standards handbook H-4180-1. https://www.blm.gov/sites/blm.gov/files/uploads/Media_Library_BLM_Policy_h4180-1.pdf | *(See above.)* |

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| ***Management Decisions: Disturbance*** | |
| **Goal SSS 3:** Manage anthropogenic development and human disturbance to minimize the likelihood of adverse population level effects on GRSG. | Potential change under Alternatives 3, 4, 5, and 6. |
| **MD SSS 27 -** For Idaho and Montana, if the 3 percent anthropogenic disturbance cap is exceeded on lands (regardless of land ownership) within GRSG PHMA (or IHMA in Idaho) Habitat Management Areas in any given BSU, then no further discrete anthropogenic disturbances (subject to applicable laws and regulations, such as the General Mining Law of 1872, as amended, valid existing rights, etc.) will be permitted by BLM within GRSG PHMA and IHMA in any given BSU until the disturbance has been reduced to less than the cap, as measured according to the Disturbance and Adaptive Management Appendix (Appendix E) for the intermediate scale.<br><br>For Montana, if the 3 percent disturbance cap is exceeded on lands (regardless of land ownership) or if anthropogenic disturbance and habitat loss associated with conversion to agricultural tillage or fire exceed 5% within a project analysis area in PHMA, then no further discrete anthropogenic disturbances (subject to applicable laws and regulations, such as the 1872 Mining Law, valid existing rights, etc.) will be permitted by BLM within PHMA in a project analysis area until the disturbance has been reduced to less than the cap. If the BLM determines that the State of Montana has adopted a GRSG Habitat Conservation Program that contains comparable components to those found in the State of Wyoming's Core Area Strategy including an all lands approach for calculating anthropogenic disturbances, a clear methodology for measuring the density of operations, and a fully operational Density Disturbance Calculation Tool, the 3% disturbance cap will be converted to a 5% cap for all sources of habitat alteration within a project analysis area.<br><br>In both Idaho and Montana, within existing designated utility corridors, the 3% disturbance cap may be exceeded at the project scale if the site specific NEPA analysis indicates that a net conservation gain to the species will be achieved. This exception is limited to projects which fulfill the use for which the corridors were designated (ex., transmission lines, pipelines) and the designated width of a corridor will not be exceeded as a result of any project co-location.<br><br>[Management action clarified in 2018 to reflect State of Montana process, under DOI-BLM-MT-2018-0005-CX. RMP Maintenance Action Language: This maintenance action is to clarify that the BLM has determined that the State's all lands approach to analyzing disturbance is operational and effective. Therefore, the BLM will adopt and implement the State's approach as identified in Attachments D (Stipulations for Uses and Activities) and H (definitions) of Montana Executive Order 12-2015.] | Potential change under Alternatives 3, 4, 5, and 6. |

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| **MD SSS 28 -** New anthropogenic disturbances within PHMA or IHMA within a Conservation Area where the disturbance cap is already exceeded from any source or where the proposed development will result in the cap being exceeded will not be allowed in within that Conservation Area until enough habitat has been restored within that Conservation Area to maintain the area under this cap (subject to valid existing rights). | Potential change under Alternatives 3, 4, 5, and 6. |
| **MD SSS 30 -** In Montana, the BLM will apply the project/action screen and mitigation process (Appendix J). | Potential change under Alternatives 3, 4, 5, and 6. |
| **Montana 1:** BLM will establish an inter-agency State GRSG Conservation Team at the state level (both Idaho and Montana) to help guide conservation of GRSG through compensatory mitigation, within 90 days of the issuance of the Record of Decision. | Potential change under Alternatives 3, 4, 5, and 6. |
| **Montana 2:** The BLM, in coordination with the GRSG Conservation Team will develop a Mitigation Strategy within one year of the issuance of the Record of Decision. In Idaho this strategy will be consistent with the Idaho Mitigation Framework (Appendix F). | Potential change under Alternatives 3, 4, 5, and 6. |
| **Montana 3:** In all GRSG habitat, in undertaking BLM management actions, and, consistent with valid existing rights and applicable law, in authorizing third-party actions that result in habitat loss and degradation (Appendix E, Table E-1), the BLM will require and ensure mitigation that provides a net conservation gain to the species including accounting for any uncertainty associated with the effectiveness of such mitigation. This will be achieved by avoiding, minimizing, and compensating for impacts by applying beneficial mitigation actions. | Potential change under Alternatives 3, 4, 5, and 6. |
| **Montana 4:** Mitigate anthropogenic development (Appendix E, Table E-1) impacts on GRSG habitat through application of appropriate mitigation in accordance with the Mitigation Framework (Appendix F and L). | Potential change under Alternatives 3, 4, 5, and 6. |
| **Montana 5:** Consistent with regulations for minerals activities, require a full reclamation bond specific to the site when surface disturbing activities are proposed. Ensure reclamation bonds are sufficient to cover costs to fully rehabilitate lost GRSG habitat. Base the reclamation costs on the assumption that contractors for the BLM will perform the work. Areas are considered fully rehabilitated when they meet the conditions described in Table 2-2. | Potential change under Alternatives 3, 4, 5, and 6. |
| **MD SSS 17 -** Habitat Hard Triggers are defined as:<br>- A 20 percent loss of Key Habitat within the BSU of the PHMA of a Conservation Area when compared to the 2011 baseline, inclusive of all land ownerships or<br>- A 20 percent loss of Key Habitat within the BSU of the IHMA of a Conservation Area when compared to the 2011 baseline. | Potential change under Alternatives 3, 4, 5, and 6. |

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| **MD SSS 18 -** Habitat Soft Triggers are defined as:<br>- A 10 percent loss of Key Habitat within the BSU of the PHMA of a Conservation Area when compared to the 2011 baseline; or<br>- A 10 percent loss of Key Habitat within the BSU of the IHMA of a Conservation Area when compared to the 2011 baseline. | Potential change under Alternatives 3, 4, 5, and 6. |
| **MD SSS 19 -**Population Hard Triggers are defined as:<br>- A 20 percent decline in the current 3-year average of total maximum number of males counted compared to the 2011 maximum male baseline and a finite rate of change significantly below 1.0 within PHMA within a Conservation Area over the same 3-year period; or<br>- A 20 percent decline in the current 3-year average of total maximum number of males counted compared to the 2011 maximum male baseline and a finite rate of change significantly below 1.0 within IHMA within a Conservation Area over the same 3-year period.<br>- Significance is defined by the 90 percent confidence interval around the current 3-year finite rate of change. If the 90 percent confidence interval is less than, and does not include 1.0, then the finite rate of change is considered significant. The finite rate of change and variance will be calculated following Garton et al. (2011). | Potential change under Alternatives 3, 4, 5, and 6. |
| **MD SSS 20 -**Population Soft Triggers are defined as:<br>- A 10 percent decline in the current 3-year average of total maximum number of males counted compared to the 2011 maximum male baseline and a finite rate of change below 1.0 within PHMA within a Conservation Area over the same 3-year period; or<br>- A 10 percent decline in the current 3-year average of total maximum number of males counted compared to the 2011 maximum male baseline and a finite rate of change below 1.0 within IHMA within a Conservation Area over the same 3-year period. | Potential change under Alternatives 3, 4, 5, and 6. |
| **MD SSS 21 -** When any of the Criteria for Soft Triggers have been met the Implementation Team will evaluate causal factors and recommend additional potential implementation level activities (Appendix E). | Potential change under Alternatives 3, 4, 5, and 6. |
| **MD SSS 22 -** When any of the Criteria for Hard Triggers have been met then all PHMA management actions will be applied to the IHMA within that Conservation Area and the Implementation Team will evaluate causal factors and recommend additional potential implementation level activities. | Potential change under Alternatives 3, 4, 5, and 6. |
| **MD SSS 23 -** If an adaptive regulatory trigger is tripped and livestock grazing is identified as a probable limiting factor then adjustments will follow the Adaptive Grazing Management Response described in Appendix E. | Potential change under Alternatives 3, 4, 5, and 6. |

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| **MD SSS 24 -** Remove any adaptive management response when the habitat or maximum male population count (i.e., 3-year average) returns to or exceeds the 2011 baseline levels within the associated Conservation Area in accordance with the Adaptive Management Strategy (Appendix E). In such a case, changes in management allocations resulting from a tripped trigger will revert back to the original allocation (MD SSS 22). | Potential change under Alternatives 3, 4, 5, and 6. |
| **MD SSS 25:** Montana: Follow the NPT Adaptive Management Guidance and Sideboards. When a hard trigger is hit in a BSU, the designated response will be put in place in that BSU. Triggers and responses have been developed with local state and USFWS experts (Appendix E). | Potential change under Alternatives 3, 4, 5, and 6. |
| **MD SSS 26 -** Idaho and Montana: When a hard trigger is hit in a BSU within a PAC that has multiple BSUs, including those that cross state lines, the WAFWA Management Zone Greater Sage-Grouse Conservation Team will convene to determine the causal factor, put project-level responses in place, as appropriate and discuss further appropriate actions to be applied. The team will also investigate the status of the hard triggers in other BSUs within the PAC and will invoke the appropriate plan response. | Potential change under Alternatives 3, 4, 5, and 6. |
| **MD SSS 12 -** Utilize monitoring information collected through the Monitoring Framework (Appendix D) to determine when adaptive regulatory triggers have been met. | Potential change under Alternatives 3, 4, 5, and 6. |
| **MD SSS- 4:** Annually prioritize Conservation Areas at the state scale considering results of the annual adaptive regulatory trigger evaluations relative to implementation of restoration and mitigation activities. | Potential change under Alternatives 3, 4, 5, and 6. |
| ***Management Decisions: Wildland Fire Ecology and Management*** | |
| **Objective FIRE 2:** Manage wildfires to minimize loss of sagebrush and protect GRSG habitat. | No change proposed. |

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| **MD FIRE 31:** If prescribed fire is used in GRSG habitat, the NEPA analysis for the Burn Plan will address:<br>· why alternative techniques were not selected as a viable options;<br>· how GRSG goals and objectives will be met by its use;<br>· how the COT Report objectives will be addressed and met;<br>· a risk assessment to address how potential threats to GRSG habitat will be minimized.<br><br>Allow prescribed fire as a vegetation or fuels treatment in Wyoming big sagebrush sites or other xeric sagebrush species sites, or in areas with a potential for post-fire exotic annual dominance only after the NEPA analysis for the Burn Plan has addressed the four bullets outlined above. Prescribed fire can be used to meet specific fuels objectives that will protect Greater Sage-Grouse habitat in PHMA (e.g., creation of fuel breaks that will disrupt the fuel continuity across the landscape in stands where annual invasive grasses are a minor component in the understory, burning slash piles from conifer reduction treatments, used as a component with other treatment methods to combat annual grasses and restore native plant communities).<br><br>Allow prescribed fire in known sage-grouse winter range only after the NEPA analysis for the Burn Plan has addressed the four bullets outlined above. Any prescribed fire in winter habitat will need to be designed to strategically reduce wildfire risk around and/or in the winter range and designed to protect winter range habitat quality. | No change proposed. |
| **MD FIRE 15:** Suppression priorities: The protection of human life is the single, overriding priority. Setting priorities among protecting human communities and community infrastructure, other property and improvements, and natural and cultural resources will be done based on the values to be protected, human health and safety, and the costs of protection. Maintaining GRSG habitat will be the highest natural resources priority immediately after human life and property, commensurate with threatened and endangered species habitat or other critical habitats to be protected. | No change proposed. |
| **Objective FIRE 1:** Design fuel treatments to restore, enhance, or maintain GRSG habitat. | No change proposed. |
| **MD FIRE 29:** Prioritize the use of native seeds for fuels management treatment based on availability, adaptation (site potential), and probability of success. Where probability of success or native seed availability is low or non-economical, nonnative seeds may be used to meet GRSG habitat objectives to trend toward restoring the fire regime. When reseeding, use fire resistant native and nonnative species, as appropriate, to provide for fuel breaks. | No change proposed. |

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| **MD FIRE 1**: (Wildfire Preparedness): Support development and implementation of Rangeland Fire Protection Associations (RFPAs) in coordination with the State of Idaho. | Potential change under Alternatives 3, 4, 5, and 6. |
| **MD FIRE 2:** Develop a consistent approach to fire restrictions within GRSG habitat through the existing coordinated inter-agency approach to fire restrictions based upon National Fire Danger Rating System thresholds (fuel conditions, drought conditions, and predicted weather patterns). | No change proposed. |
| **MD FIRE 3:** Annually incorporate into existing fire management plans results and updates from the Wildfire and Invasive Species Habitat Assessments (FIAT Assessments) described in Appendix H, to communicate/explain the resource value of GRSG habitat, including fire prevention messages and actions to reduce human-caused ignitions. | Potential change under Alternatives 3, 4, 5, and 6. |
| **MD FIRE 4**: Continue to participate with the Wildland Fire Leadership Council, a cooperative, interagency organization dedicated to achieving consistent implementation of the goals, actions, and policies in the National Fire Plan and the Federal Wildland Fire Management Policy. | No change proposed. |
| **MD FIRE 5:** Continue annual coordination meetings held between cooperating agencies that have fire suppression responsibilities. Incorporate Rangeland Fire Protection Associations and other stakeholders into this coordination. Discuss priority suppression areas and distribute maps showing priority suppression areas at both the Conservation Area and the local office levels as based on the adaptive management strategy and FIAT Assessments. | Potential change under Alternatives 3, 4, 5, and 6. |
| **MD FIRE 6:** Ensure firefighter personnel receive annual orientation regarding GRSG habitat and sagebrush management issues as related to wildfire suppression. | No change proposed. |
| **MD FIRE 7:** As part of the FIAT Assessments, identify roads, trails, and recreational use areas with high frequency of human caused fires within or adjacent to the PHMA or IHMA. Consider these areas during annual fire restriction evaluations, and as appropriate, through site specific management. | Potential change under Alternatives 3, 4, 5, and 6. |
| **MD FIRE 8:** Coordinate with Federal, State and local jurisdictions on fire and litter prevention programs to reduce human caused ignitions. | No change proposed. |
| **MD FIRE 9:** Implement activities identified within the FIAT Assessments. | Potential change under Alternatives 3, 4, 5, and 6. |

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| **MD FIRE 10:** Complete Wildland Fire and Invasive Species Assessments (FIAT Assessments) as described within Appendix H and incorporate results into appropriate Fire Management Plans as they are completed. FIAT Assessments are interdisciplinary evaluations of the threats posed by wildfire and invasive species, as well as identification of focal and emphasis habitats/treatment opportunities for fuels management, fire management, and restoration. These FIAT Assessments identify focal and emphasis habitats and describe strategies for fuels management, suppression and restoration activities. Focal and Emphasis Habitats identified through the FIAT Assessment to further refine priority areas for treatments to reduce the threats posed by wildfire, invasive annual grass and conifer expansion**.** | Potential change under Alternatives 3, 4, 5, and 6. |
| **MD FIRE 11:** As part of the FIAT Assessments incorporate a wildfire response time analysis focusing on response time to identified priority areas within PHMA and IHMA or on those fires that have the potential to impact PHMA and IHMA. Incorporate findings into Unit Initial Attack program that determines initial attack resources. | Potential change under Alternatives 3, 4, 5, and 6. |
| **MD FIRE 12:** As part of the FIAT Assessment incorporate a water capacity analysis for suppression purposes, including potential private water sources. Utilized the analysis to ensure water availability for response to fire in or threatening PHMA and IHMA during initial attack. | Potential change under Alternatives 3, 4, 5, and 6. |
| **MD FIRE 13:** During high fire danger conditions, stage initial attack and secure additional resources closer to priority areas identified in the FIAT Assessments, based on anticipated fires and weather conditions, with particular consideration of the West Owyhee, Southern and Desert Conservation Areas to ensure quicker response times in or near GRSG habitat after considerations and placement of resources to protect human life and property. | Potential change under Alternatives 3, 4, 5, and 6. |
| **MD FIRE 14:** Utilize a full range of fire management strategies and tactics through strategic wildfire suppression planning consistent with appropriate management response and within acceptable risk levels, to achieve resource objectives for GRSG habitat consistent with land use plan direction. Utilizing both direct and indirect attack as appropriate to limit the overall amount of GRSG habitat burned. This can include suppressing fires in intact sagebrush habitats; limiting fire growth in GHMA when suppression resources are available or managing wildfire for resource benefit in areas of conifer (juniper) encroachment. | No change proposed. |
| **MD FIRE 16:** Ensure close coordination with federal and state firefighters including the Rangeland Fire Protection Associations during suppression activities. | No change proposed. |

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| **MD FIRE 17:** Design and implement fuels treatments that will reduce the potential start and spread of unwanted wildfires and provide anchor points or control lines for the containment of wildfires during suppression activities with an emphasis on maintaining, protecting, and expanding sagebrush ecosystems and successfully rehabilitated areas and strategically and effectively reduce wildfire threats in the greatest area. | No change proposed. |
| **MD FIRE 18:** Enhance (or maintain/retain) sagebrush canopy cover and community structure to match expected potential for the ecological site and consistent with GRSG habitat objectives unless fuels management objectives requires additional reduction in sagebrush cover to meet strategic protection of GRSG habitat. Closely evaluate the benefits of the fuel management treatments against the additional loss of sagebrush cover on the local landscape in the NEPA process. | No change proposed. |
| **MD FIRE 19:** Apply appropriate seasonal restrictions for implementing vegetation and fuels management treatments according to the type of seasonal habitats present. Allow no treatments in known winter range unless the treatments are designed to strategically reduce wildfire risk around and/or in the winter range and will protect, maintain, increase, or enhance winter range habitat quality.<br><br>Ensure chemical applications are utilized where they will assist in success of fuels treatments.<br><br>Strategically place treatments on a landscape scale to prevent fire from spreading into PHMA or WUI. | No change proposed. |
| **MD FIRE 20:** Develop a fuels continuity and management strategy to expand, enhance, maintain and protect GRSG habitat informed by the FIAT Assessments completed as described in Appendix H. | Potential change under Alternatives 3, 4, 5, and 6. |
| **MD FIRE 21:** When developing the fuels management strategy as part of the FIAT Assessment described in Appendix H consider up-to-date fuels profiles; land use plan direction; current and potential habitat fragmentation; sagebrush and GRSG ecological factors; active vegetation management steps to provide critical breaks in fuel continuity where appropriate; incorporate a comparative risk analysis with regard to the risk of increased habitat fragmentation from a proposed action versus the risk of large scale fragmentation posed by wildfires if the action is not taken. | Potential change under Alternatives 3, 4, 5, and 6. |
| **MD FIRE 22:** Fuel treatments will be designed through an interdisciplinary process to expand, enhance, maintain, and protect GRSG habitat which considers a full range of cost-effective fuel reduction techniques, including: chemical, biological (including grazing and targeted grazing), mechanical and prescribed fire treatments. | No change proposed. |

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| **MD FIRE 23:** Existing and proposed linear ROWs can be considered for use and maintenance as vegetated fuel breaks in appropriate areas (this activity may or may not be part of the ROW permit or the responsibility of the permit holder, in cases where this activity is considered part of mitigation for project design then it will be appropriately included as part of the ROW permit and the responsibility of the permit holder for development and maintenance). | No change proposed. |
| **MD FIRE 24:** Fuel breaks will incorporate existing vegetation treatments (seedings), rocky areas or other appropriate topography or features or be located adjacent to existing linear disturbance areas where appropriate. Fuel breaks should be placed in areas with the greatest likelihood of compartmentalizing a fire and/or to foster suppression options to protect existing intact habitat. | No change proposed. |
| **MD FIRE 25:** Strategically pre-treat areas to reduce fine fuels consistent with areas and results identified within the Wildfire and Invasive Species Assessments. | Potential change under Alternatives 3, 4, 5, and 6. |
| **MD FIRE 26:** Protect vegetation restoration and rehabilitation efforts/projects from subsequent fire events. | No change proposed. |
| **MD FIRE 27:** Targeted grazing as a fuels treatment to adjust the vegetation conditions to reduce the potential start and spread of wildfires may be implemented within existing grazing authorizations if feasible such as through temporary non-renewable authorizations, or through contracts, agreements or other appropriate means separate from existing grazing authorizations and permits**.** | No change proposed. |
| **MD FIRE 28:** Targeted grazing to achieve fuels management objectives should conform to the following criteria:<br>a. Targeted grazing should be implemented strategically on the landscape, and directly involve the minimum footprint and grazing intensity required to meet fuels management objectives.<br>b. Conform to the applicable Standards for Rangeland Health and Guidelines for Livestock Grazing Management (Idaho or Montana) at the assessment scale (pasture/watershed).<br>c. Where feasible and applicable coordinate with the grazing permittee to strategically reduce fuels through livestock management within the Mandatory Terms and Conditions of the applicable grazing authorizations. | No change proposed. |
| **MD FIRE 30:** Maintain effectiveness of fuels projects, including fuel breaks, to ensure long-term success, including persistence of seeded species and/or other treatment components while maintaining the integrity of adjacent vegetation. | No change proposed. |

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| **MD FIRE 32:** Utilize the findings and Restoration/Rehabilitation Strategy developed as part of the FIAT Assessment process described in Appendix H to determine if GRSG rehabilitation actions are needed, based on ecological potential, and direct emergency stabilization and rehabilitation (ESR) (BLM) actions after fire. | Potential change under Alternatives 3, 4, 5, and 6. |
| **MD FIRE 33:** Incorporate GRSG Habitat Management Objectives into ESR/BAER plans based on site potential and in accordance with the Restoration/Rehabilitation Strategy developed as a result of the FIAT Assessments. | Potential change under Alternatives 3, 4, 5, and 6. |
| **MD FIRE 34:** Provide adequate rest from livestock grazing to allow natural recovery of existing vegetation and successful establishment of seeded species within burned/ESR areas. All new seedings of grasses and forbs should not be grazed until at least the end of the second growing season, and longer as needed to allow plants to mature and develop robust root systems which will stabilize the site, compete effectively against cheatgrass and other invasive annuals, and remain sustainable under long-term grazing management. Adjust other management activities, as appropriate, to meet ESR objectives. | No change proposed. |
| **MD FIRE 35:** Adjust, as appropriate, livestock management on adjacent unburned areas to mitigate the effect of the burn on local GRSG populations. | No change proposed. |
| **MD FIRE 36:** Following seedling establishment, modify grazing management practices if needed to achieve long-term vegetation and habitat objectives. | No change proposed. |
| ***Management Decisions: Lands and Realty*** | |
| **Objectives LR 1:** Effects of infrastructure projects, including siting, will be minimized using the best available science, updated as monitoring information on current infrastructure projects becomes available. | Potential change under Alternatives 3, 4, 5, and 6. |
| **MD LR 5:** Consistent with MD LR 3, MD LR 4, and MD RE 1, Rights-of-way for development of new or amended ROWs and land use authorizations (including permits and leases) in PHMA will only be considered when consistent with the Anthropogenic Disturbance Screening Criteria (MD SSS 29);<br><br>Rights-of-way for development of new or amended ROWs and land use authorizations (including permits and leases) in IHMA can be considered consistent with the IHMA Anthropogenic Disturbance Development Criteria (MD SSS 30). GHMA: New ROW and land use authorizations can be considered. | Potential change under Alternatives 3, 4, 5, and 6. |

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| **MD SSS 31 -** Co-locating new infrastructure within existing ROWs and maintaining and upgrading ROWs is preferred over the creation of new ROWs or the construction of new facilities in all management area. Colocation for various activities is defined as:<br>* Communication Sites – The installation of new equipment/facilities on or within or adjacent to existing authorized equipment/facilities or within a communication site boundary as designated in the Communication Site Plan.<br>* Electrical Lines – Installation of new ROWs adjacent to current ROWs boundaries, not necessarily placed on the same power poles<br>* Other Rights-of-Way – The installation of new ROWs within the existing footprint of an approved ROW boundary or adjacent to an approved ROW boundary.<br>* Designated Corridors – The installation of new rights-of-way within the existing corridor or adjacent to the existing corridor. | No change proposed. |

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| **MD LR 14:** Lands classified as PHMA, IHMA, and GHMA for GRSG will be retained in federal management unless: (1) the agency can demonstrate that disposal of the lands, including land exchanges, will provide a net conservation gain to the GRSG or (2) the agency can demonstrate that the disposal, including land exchanges, of the lands will have no direct or indirect adverse impact on conservation of the GRSG. Land tenure adjustments will be subject to the following disposal, exchange, and acquisition criteria, which include retaining lands with GRSG habitat. Retention of areas with GRSG will reduce the likelihood of habitat conversion to agriculture, urbanization, or other uses that will remove sagebrush habitat and potentially impact sensitive plants.<br><br>Criteria:<br>a. Acquire habitat within PHMA and IHMA, when possible (i.e. willing landowner), and retain ownership of habitat within all Areas, except if disposal will allow for additional or more contiguous federal ownership patterns.<br>b. Lands within PHMA, IHMA and GHMA will be retained unless disposal of those lands will increase the extent or provide for connectivity of PHMA, IHMA or GHMA.<br>c. Evaluate potential land exchanges containing historically low-quality GRSG habitat that may be too costly to restore in exchange for lands of higher quality habitat, lands that connect seasonal GRSG habitats or lands providing for threatened and endangered species. These potential exchanges should lead to an increase in the extent or continuity of or provide for improved connectivity of PHMA. Higher priority will be given to exchanges for those in-tact areas of sagebrush that will contribute to the expansion of sagebrush areas within PHMA currently in public ownership. Lower priority will be given to other lands that will promote enhancement in the PHMA and IHMA (i.e., areas with fragmented or less in-tact sagebrush).<br>d. Identify lands for acquisition that increase the extent of or provide for connectivity of PHMA. | No change proposed. |

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| **MD LR 2:** PHMA: Designate and manage PHMA as ROW avoidance areas, consistent with MD SSS 29 and subject to RDFs and buffers (Appendices B and C). IHMA: Designate and manage IHMA as ROW avoidance areas, consistent with MD SSS 30 and subject to RDFs and buffers. GHMA (Idaho and Montana): Designate and manage GHMA as open with proposals subject to RDFs and buffers.<br><br>**MD LR 12:** PHMA (Idaho and Montana) and IHMA (Idaho), and GHMA (Montana only) are designated as avoidance areas for high voltage transmission line and large pipeline ROWs, except for Gateway West and Boardman to Hemingway Transmission Projects. All authorizations in these areas, other than the following identified projects, must comply with the conservation measures outlined in this proposed plan, including the RDFs and avoidance criteria presented in MD SSS 29 and MD SSS 30 of this document. The BLM is currently processing an application for Gateway West and Boardman to Hemingway Transmission Projects and the NEPA review for this project is well underway. Conservation measures for GRSG are being analyzed through the project's NEPA review process, which should achieve a net conservation benefit for the GRSG. | Potential change under Alternatives 3, 4, 5, and 6. |
| **Industrial Solar, Wind, Nuclear, and Hydropower Development**<br>**MD RE 1:** PHMA: Designate and manage PHMA as exclusion areas for utility scale (20 MW) wind and solar testing and development, nuclear and hydropower energy development. IHMA: Designate and manage IHMA as avoidance areas for wind and solar testing and development, nuclear and hydropower development. GHMA (Idaho): Designate and manage GHMA as open for wind and solar testing and development and nuclear and hydropower development subject to RDFs and buffers. GHMA (Montana): Designate and manage GHMA as avoidance for wind and solar testing and development and nuclear and hydropower development. | Potential change under Alternatives 3, 4, 5, and 6. |
| **MD LR 13:** Consider the likelihood of development of not-yet-constructed surface disturbing activities – as defined in Table 2 of the Monitoring Framework (Appendix D) – under valid existing rights. | No change proposed. |
| **MD LR 10:** When a ROW grant expires and is not requested to be renewed, is relinquished, or terminated, the lease holder will be required to reclaim the site by removing overhead lines and other infrastructure and to eliminate avian predator nesting opportunities provided by anthropogenic development on public lands associated with the now void ROW grant (e.g., remove power line and communication facilities no longer in service). | No change proposed. |

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| **MD LR 1:** Existing designated corridors, including Section 368 Corridors, will remain Open in all habitat management areas (subject to the ongoing settlement agreement).<br>Also see MD LR 10 and MD SSS 31 | Potential change under Alternatives 3, 4, 5, and 6. |
| **MD LR 3:** PHMA: Development of commercial service airports and facilities (as defined by FAA 2014 – publically owned airports that have at least 2,500 passenger boardings each calendar year and receive scheduled passenger service) will not be allowed within PHMA. IHMA and GHMA are Avoidance and Open respectively for these types of ROW applications as described in MD LR 2. | Potential change under Alternatives 3, 4, 5, and 6. |
| **MD LR 4:** PHMA: Development of new or expansion of existing landfills will not be allowed within PHMA. IHMA and GHMA are Avoidance and Open respectively for these types of ROW applications as described in MD LR 2. | Potential change under Alternatives 3, 4, 5, and 6. |
| **MD LR 6:** In PHMA, if a higher voltage transmission line is required adjacent to an existing line (i.e. the project is an incremental upgrade/capacity increase of existing development (i.e. power line capacity upgrade):<br>· the existing transmission line must be removed and area rehabilitated within a specified<br>amount of time after the new line is installed and energized; and<br>· the new line must be constructed in the same alignment as the existing line unless an<br>alternate route will benefit GRSG or GRSG habitat. | No change proposed. |
| **MD LR 7:** Process unauthorized use. If the unauthorized use is subsequently authorized, it will be authorized consistent with direction from this plan including RDFs and buffers. If the use is not subsequently authorized the site will be reclaimed by removing these unauthorized (trespass) features and rehabilitating the habitat. | No change proposed. |
| **MD LR 8:** Land use authorizations that are temporary (less than 3 years) in nature and are not otherwise excluded or restricted will be subject to seasonal or timing restrictions (Appendix C) and mitigation requirements regarding habitat loss as needed. | No change proposed. |
| **MD LR 9:** New ROW applications for water facilities (ditches, canals, pipelines), or amendments to existing water facilities which include additional structures to improve fish passage or benefits to fisheries (new diversions, fish screens) will be allowed on a case-by-case basis subject to RDFs to reduce impacts on GRSG habitat and mitigation requirements regarding GRSG habitat loss as needed. | Potential change under Alternative 3. |
| **MD LR 11:** As opportunities and priorities indicate work with existing ROW holders to retrofit<br>existing towers and structures consistent with RDFs described in Appendix C. | No change proposed. |

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| ***Management Decisions: Fluid Mineral Resources*** | |
| **MD MR 20:** BLM owns surface – non-federal mineral estate owner: Where the federal government owns the surface and the mineral estate is in non-federal ownership in PHMA, IHMA, and GHMA, apply appropriate surface use COAs, stipulations, and mineral RDFs through ROW grants or other surface management instruments, to the maximum extent permissible under existing authorities, in coordination with the mineral estate owner/lessee. | No change proposed. |
| **MD MR 19:** BLM Owns Mineral Estate – non-federal surface owner: Where the federal government owns the mineral estate in PHMA, IHMA, and GHMA, and the surface is in non-federal ownership, apply the same stipulations, COAs, and/or conservation measures and RDFs applied if the mineral estate is developed on BLM-administered lands in that management area, to the maximum extent permissible under existing authorities, and in coordination with the landowner. | No change proposed. |
| *Fluid Minerals*<br>**Objective MR 1:** Priority will be given to leasing and development of fluid mineral resources, including geothermal, outside of PHMA, IHMA, and GHMA. When analyzing leasing and authorizing development of fluid mineral resources, including geothermal, in PHMA, IHMA, and GHMA, and subject to applicable stipulations for the conservation of GRSG, priority will be given to development in non-habitat areas first and then in the least suitable habitat for GRSG. The implementation of these priorities will be subject to valid existing rights and any applicable law or regulation, including, but not limited to, 30 USC 226(p) and 43 CFR 3162.3-1(h). | Potential change under Alternatives 3, 4, 5, and 6. |
| **MD MR 1:** Idaho and Montana: Areas within SFA will be open to fluid mineral leasing and development and geophysical exploration subject to NSO without waiver, exception, or modification. Areas within PHMA (outside SFA) and IHMA will be open to mineral leasing and development and geophysical exploration subject to NSO with a limited exception (MD MR 3). GHMA will be open to mineral leasing and development and geophysical exploration subject to CSU which includes buffers and standard stipulations. | Potential change under Alternatives 3 and 6. |

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| **MD MR 3:** PHMA and IHMA: No waivers or modifications to a fluid mineral lease NSO stipulation will be granted. The Authorized Officer may grant an exception to a fluid mineral lease NSO stipulation only where the proposed action:<br>i. Will not have direct, indirect, or cumulative effects on GRSG or its habitat; or,<br>ii. Is proposed to be undertaken as an alternative to a similar action occurring on a nearby parcel, and will provide a clear conservation gain to GRSG. Exceptions based on conservation gain (ii) may only be considered in (a) PHMA of mixed ownership where federal minerals underlie less than fifty percent of the total surface, or (b) areas of the public lands where the proposed exception is an alternative to an action occurring on a nearby parcel subject to a valid Federal fluid mineral lease existing as of the date of this RMP amendment. Exceptions based on conservation gain must also include measures, such as enforceable institutional controls and buffers, sufficient to allow the BLM to conclude that such benefits will endure for the duration of the proposed action's impacts.<br>Any exceptions to this lease stipulation may be approved by the Authorized Officer only with the concurrence of the State Director. The Authorized Officer may not grant an exception unless the applicable state wildlife agency, the USFWS, and the BLM unanimously find that the proposed action satisfies (i) or (ii). Such finding shall initially be made by a team of one field biologist or other GRSG expert from each respective agency. In the event the initial finding is not unanimous, the finding may be elevated to the appropriate BLM State Director, USFWS State Ecological Services Director, and state wildlife agency head for final resolution. In the event their finding is not unanimous, the exception will not be granted. Approved exceptions will be made publically available at least quarterly. | Potential change under Alternatives 3, 4, 5, and 6. |
| **Objective MR 2:** Where a proposed fluid mineral development project on an existing lease can adversely affect GRSG populations or habitat, the BLM will work with the lessees, operators, or other project proponents to avoid, minimize and apply compensatory mitigation to the extent compatible with lessees' rights to drill and produce fluid mineral resources. The BLM will work with the lessee, operator, or project proponent in developing an APD or Geothermal Drilling Permit (GDP) for the lease to avoid, minimize, and apply compensatory mitigation to impacts on GRSG or its habitat and will ensure that the best information about the GRSG and its habitat informs and helps to guide development of such Federal leases. | Potential change under Alternatives 3, 4, 5, and 6. |

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| **MD MR 4:** Incorporate required design features and best management practices appropriate to the management area as COAs when post leasing activity is proposed into any post-lease authorizations. | No change proposed. |
| **MD MR 5:** In Montana, prior to leasing conduct a Master Leasing Plan process when all four of the following criteria are met:<br>· A substantial portion of the area to be analyzed in the MLP is not currently leased.<br>· There is a majority Federal mineral interest.<br>· The oil and gas industry has expressed a specific interest in leasing, and there is a moderate or high potential for oil and gas confirmed by the discovery of oil and gas in the general area.<br>· Additional analysis or information is needed to address likely resource or cumulative impacts if oil and gas development were to occur where there are:<br>– multiple-use or natural/cultural resource conflicts;<br>– impacts on air quality;<br>– impacts on the resources or values of any unit of the National Park System, national wildlife refuge, or National Forest wilderness area, as determined after consultation or coordination with the NPS, the USFWS, or the Forest Service; or<br>– impacts on other specially designated areas. – analyzing likely development scenarios and varying mitigation levels. | Potential change under Alternatives 3, 4, 5, and 6. |
| **MD MR 7:** Encourage unitization when deemed necessary for proper development and operation of an area (with strong oversight and monitoring). The unitization must be designed in a manner to minimize adverse impacts on GRSG according to the Federal Lease Form, 3100-11, Sections 4 and 6. | No change proposed. |
| **MD MR 8:** Issue Written Orders of the Authorized Officer (43 CFR 3161.2) requiring reasonable protective measures consistent with the lease terms where necessary to avoid or minimize impacts on GRSG populations or habitat. | No change proposed. |
| ***Management Decisions: Solid Leasable Minerals*** | |
| **MD MR 15:** PHMA are closed to leasing. IHMA and GHMA: Areas within Known Phosphate Leasing Areas (KPLAs) will remain open to leasing subject to standard stipulations. IHMA areas outside of KPLAs are open to prospecting and subsequent leasing provided the Anthropogenic Disturbance Development Criteria (MD SSS 30) and the anthropogenic disturbance cap (MD SSS 27) can be met. RDFs and buffers shall be applied to prospecting permits. GHMA: Lands outside KPLAs are available for prospecting and subsequent leasing and initial mine development subject to RDFs, buffers, and standard stipulations. | Potential change under Alternatives 3 and 6. |

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| **MD MR 16:** Require seasonal and daily timing restrictions (Appendix C) in undeveloped nonenergy mineral leases when exploration activities or initial mine development is proposed (e.g. exploration drilling, timber removal, shrub clearing, etc.) as COAs. | Potential change under Alternatives 3 and 6. |
| **MD MR 17:** Include RDFs as COAs to mine plans in undeveloped non-energy mineral leases for exploration activities or initial mine development. | Potential change under Alternatives 3 and 6. |
| **MD MR 18:** At the time an application for a new coal lease or lease modification is submitted to the BLM, the BLM will determine whether the lease application area is "unsuitable" for all or certain coal mining methods pursuant to 43 CFR 3461.5. PHMA is essential habitat for maintaining GRSG for purposes of the suitability criteria set forth at 43 CFR 3461.5(o)(1). | Potential change under Alternatives 3, 4, 5, and 6. |
| ***Management Decisions: Locatable Materials*** | |
| **MD MR 10:** Recommend SFA for withdrawal from the General Mining Act of 1872, as amended, subject to valid existing rights. | Potential change under Alternative 3. |
| **MD MR 9:** Apply reasonable and appropriate RDFs to locatable minerals, to the extent consistent with applicable law to prevent unnecessary or undue degradation of GRSG habitat when a Plan of Operations is submitted for BLM approval, in accordance with 43 CFR 3809.411(d)(2). | Potential change under Alternative 3. |
| ***Management Decisions: Mineral Materials*** | |
| **MD MR 11**: PHMA: All PHMA will be closed to mineral materials development. However, existing freeuse permits and the expansion of existing free use permits may be considered only if the following criteria are met:<br>· the project area disturbance cap is not exceeded within a BSU;<br>· the activity is subject to the provisions set forth in the mitigation framework [Appendix F];<br>· all applicable required design features are applied; and<br>· the activity is permissible under the Idaho exception and development criteria (MD SSS 29 and MD SSS 30)<br>– IHMA: All IHMA will be open to mineral materials development, consistent with the Idaho Anthropogenic Disturbance Criteria (MD SSS 30), and subject to RDFs, and buffers. Sales from existing community pits within IHMA will be subject to seasonal timing restrictions (Appendix C).<br>– GHMA: All GHMA will be open to mineral materials development, subject to RDFs and buffers. Sales from existing community pits within GHMA will be subject to seasonal timing restrictions (Appendix C). | Potential change under Alternatives 3 and 6. |

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| **MD MR 14:** Montana: PHMA are closed to new mineral material sales. However, these areas remain "open" to free use permits and the expansion of existing active pits, only if the following criteria are met:<br>· the activity is within the BSU and project area disturbance cap;<br>· the activity is subject to the provisions set forth in the mitigation framework [Appendix F];<br>· all applicable required design features are applied; and<br>· the activity is permissible under the Montana screening criteria (MD SSS 30) Appendix J. | Potential change under Alternatives 3 and 6. |
| **MD MR 12:** Restore salable mineral pits no longer in use to meet GRSG habitat management objectives. | No change proposed. |
| **MD MR 13:** Require reclamation bonding that will require restoration of GRSG habitat on new site authorizations for mineral material pits in IHMA (this will not apply to free use permits issued to a government entity such as a county road district, but will apply to non-profit entities). | Potential change under Alternatives 3 and 6. |
| ***Management Decisions: Recreation*** | |
| **REC-2:** In PHMA and IHMA, do not construct new recreation facilities (e.g., campgrounds, trails, trailheads, staging areas) unless the development will have a net conservation gain to GRSG habitat (such as concentrating recreation, diverting use away from critical areas, etc.), or unless the development is required for visitor health and safety or resource protection. | No change proposed. |
| **REC-1:** Manage existing recreation uses and sites to minimize adverse effects on GRSG or their habitat through incorporation of RDFs, buffers and seasonal restrictions. | No change proposed. |
| ***Management Decisions: Comprehensive Trails and Travel Management*** | |
| **MD TTM 3:** Develop Travel Management Plans for each Field Office as described in the BLM Travel Management Handbook 8342.1 and according to the travel management planning guidelines (Appendix L of FEIS). | No change proposed. |

| Dillon 2015 RMP Revision | Potential for Change in 2023 Plan |
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| **MD TTM 4:** During subsequent travel management planning design and designate a travel system to minimize adverse effects on GRSG. Locate areas and trails to minimize disturbance of GRSG and/or to have a neural or positive effect on GRSG habitat and populations. Give special attention to protect endangered or threatened species and their habitats. Allow for route upgrade, closure of existing routes, timing restrictions, seasonal closures, and creation of new routes to help protect habitat and meet user group needs, thereby reducing the potential for pioneering unauthorized routes. The emphasis of the comprehensive travel and transportation planning within PHMA will be placed on having a neutral or positive effect on GRSG habitat. Individual route designations will occur during subsequent travel management planning efforts**.** | No change proposed. |
| **MD TTM 2:** In PHMA, IHMA, and GHMA, temporary closures will be considered in accordance with 43 CFR subpart 8364 (Closures and Restrictions); 43 CFR subpart 8351 (Designated National Area); 43 CFR subpart 6302 (Use of Wilderness Areas, Prohibited Acts, and Penalties); 43 CFR subpart 8341 (Conditions of Use) and other applicable law and policy. | No change proposed. |
| **MD TTM 5:** Conduct road construction, upgrades, and maintenance activities to avoid disturbance during the lekking season – see Appendix C. | No change proposed. |
| ***Management Decisions: Livestock Grazing*** | |
| **MD LG 16:** The NEPA analysis for renewals and modifications of livestock grazing permits/leases that include lands within SFA and PHMA will include specific management thresholds, based on GRSG Habitat Objectives Table, Land Health Standards (43 CFR 4180.2) and ecological site potential, and one or more defined responses that will allow the authorizing officer to make adjustments to livestock grazing that have already been subjected to NEPA analysis. | Potential change under Alternatives 3, 4, 5, and 6. |
| **MD LG 1:** Maintain existing areas designated as available or unavailable for livestock grazing. Existing active AUMs for livestock grazing within the planning area will not be changed at the broad scale, though the number of AUMs available on an allotment may be adjusted based on site-specific conditions to meet management objectives during term permit renewals, AMP development, or other appropriate implementation planning. Additional temporary adjustments can be made annually to livestock numbers, the number of AUMs, and season of use in accordance with applicable regulations. | Potential change under Alternative 3. |

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| **MD LG 4**: PHMA & IHMA: During the land health assessment process, identify the type(s) of seasonal habitat the assessed areas are capable of supporting. Utilize the habitat assessment framework, (Stiver et al. 2015) or other BLM approved methodology, in accordance with current policy and guidance to determine whether vegetation structure, condition and composition are meeting GRSG habitat objectives including riparian and lentic areas (Objective SSS 2; Table 2-2). Use appropriate Ecological Site Descriptions, reference sheets and state and transition models to inform desired habitat conditions and Expected responses to management changes for the land unit being assessed. | Potential change under Alternatives 3, 4, 5, and 6. |
| **MD LG 2:** Prioritize BLM land health assessments and processing of BLM grazing permits consistent with management area prioritization (MD SSS 4), unless other higher priority considerations exist (MD LG 15) or other factors such as threatened, endangered and proposed species habitat that livestock grazing can affect. Where possible, conduct land health assessments at the watershed, or other meaningful landscape-scale. | Potential change under Alternatives 3, 4, 5, and 6. |
| **MD LG 15:** The BLM will prioritize (1) the review of grazing permits/leases, in particular to determine if modification is necessary prior to renewal, and (2) the processing of grazing permits/leases in Sagebrush Focal Areas (SFA) followed by PHMA outside of the SFA. In setting workload priorities, precedence will be given to existing permits/leases in these areas not meeting Land Health Standards, with focus on those containing riparian areas, including wet meadows. Management and conservation action prioritization will occur at the Conservation Area (CA) scale and be based on GRSG population and habitat trends: Focusing management and conservation actions first in SFA followed by areas of PHMA outside SFA. The BLM may use other criteria for prioritization to respond to urgent natural resource concerns (e.g., fire) and legal obligations. | Potential change under Alternatives 3, 4, 5, and 6. |
| **MD LG 17:** Allotments within SFA, followed by those within PHMA, and focusing on those containing riparian areas, including wet meadows, will be prioritized for field checks to help ensure compliance with the terms and conditions of the grazing permits. Field checks can include monitoring for actual use, utilization, and use supervision. Management and conservation action prioritization will occur at the Conservation Area (CA) scale and be based on GRSG population and habitat trends: Focusing management and conservation actions first in SFA followed by areas of PHMA outside SFA. | Potential change under Alternatives 3, 4, 5, and 6. |

| Dillon 2015 RMP Revision | Potential for Change in 2023 Plan |
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| **MD LG 12:** During the land health assessment and grazing permit renewal process, evaluate existing livestock management range improvements with respect to their effect on GRSG habitat. Consider removal of projects that are not needed for effective livestock management, are no longer in working condition, and/or negatively affect GRSG habitat, with the exception of functional projects needed for management of habitat for other threatened, endangered or proposed species or other sensitive resources. | Potential change under Alternatives 3, 4, 5, and 6. |
| **MD LG 13:** Prioritize removal, modification or marking of fences or other structures in areas of high collision risk following appropriate cooperation, consultation and coordination to reduce the incidence of GRSG mortality due to fence strikes (Stevens et al. 2012). | Potential change under Alternatives 3, 4, 5, and 6. |
| **MD LG 9:** Evaluate the locations where salt/supplements are placed, coordinate salt/supplements placement to reduce impacts on GRSG habitat (e.g., existing disturbed areas). | Potential change under Alternatives 3, 4, 5, and 6. |
| **MD LG 11:** Design any new structural range improvements, following appropriate cooperation, consultation and coordination, to minimize and/or mitigate impacts on GRSG habitat. Any new structural range improvements should be placed along existing disturbance corridors or in unsuitable habitat, to the extent practical, and are subject to RDFs (Appendix C). Structural range improvement in this context, include, but are not limited to: fences, exclosures, corrals or other livestock handling structures; pipelines, troughs, storage tanks (including moveable tanks used in livestock water hauling), windmills, ponds/reservoirs, solar panels and spring developments. | Potential change under Alternatives 3, 4, 5, and 6. |
| **MD LG 3**: Where opportunities exist, coordinate with other land managers to encourage livestock operations that utilize mixed federal, private and/or state land to be managed at the landscape scale to benefit GRSG and their habitat across land ownerships. | Potential change under Alternatives 3, 4, 5, and 6. |

| Dillon 2015 RMP Revision | Potential for Change in 2023 Plan |
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| **MD LG 6:** When livestock management practices are determined to not be compatible with meeting or making progress towards achievable habitat objectives following appropriate consultation, cooperation and coordination, implement changes in grazing management through grazing authorization modifications, or allotment management plan implementation. Potential modifications include, but are not limited to, changes in:<br>• Season or timing of use;<br>• Numbers of livestock;<br>• Distribution of livestock use;<br>• Duration and/or level of use;<br>• Kind of livestock (e.g., cattle, sheep, horses, or goats) (Briske et al. 2011); and<br>• Grazing schedules (including rest or deferment).<br>*Not in Priority Order | Potential change under Alternatives 3, 4, 5, and 6. |
| **MD LG 14:** In response to weather conditions (i.e. drought) adjust grazing management (i.e., delay turnout, adjust pasture rotations, adjust the amount and/or duration of grazing) as appropriate to provide for adequate food and cover for GRSG. | Potential change under Alternatives 3, 4, 5, and 6. |
| **MD LG 18:** At the time a permittee or lessee voluntarily relinquishes a permit or lease, the BLM will consider whether the public lands where that permitted use was authorized should remain available for livestock grazing or be used for other resource management objectives, such as reserve common allotments or fire breaks. This does not apply to or impact grazing preference transfers, which are addressed in 43 CFR 4110.2-3. | Potential change under Alternatives 3, 4, 5, and 6. |
| **MD LG 7**: Where opportunities exist, establish forage reserves to facilitate restoration and rehabilitation efforts in GRSG habitat areas. A forage reserve is an area that is set aside for use as needed by various permittees who might be displaced by wildfire, ESR, restoration efforts, etc. rather than having a term permit issued for grazing like a regular allotment. | Potential change under Alternatives 3, 4, 5, and 6. |
| **MD LG 5:** When modifying grazing management, analyze indirect impacts on habitat, including changes in fuel loading and wildfire behavior. | Potential change under Alternatives 3, 4, 5, and 6. |
| **MD LG 8:** PHMA & IHMA - Where practical, design pasture rotations to utilize non-native perennial grass seedings and/or annual grasslands, during GRSG nesting season annually or periodically. | Potential change under Alternatives 3, 4, 5, and 6. |
| **MD LG 10:** Incorporate RDFs into Terms and Conditions for crossing permits to limit disturbance of occupied leks when trailing livestock across BLM administered lands in the spring. Work with permittees in locating over-nighting, watering and bedding locations to minimize impacts on seasonal habitats. | Potential change under Alternatives 3, 4, 5, and 6. |

| Dillon 2015 RMP Revision | Potential for Change in 2023 Plan |
|---|---|
| ***Management Decisions: Wild Horse and Burros*** | |
| **WHB-1:** Manage herd management areas (HMAs) in GRSG habitat within established AML ranges to achieve and maintain GRSG habitat objectives (Table 2-2). | Potential change under Alternatives 3, 4, 5, and 6. |
| **WHB-2:** Complete rangeland health assessments for HMAs containing GRSG habitat using an interdisciplinary team of specialists (e.g. range, wildlife, and riparian). The priorities for conducting assessments are: 1) HMAs Containing SFA; 2) HMAs containing PHMA; 3) HMAs containing IHMA; 4) HMAs containing GHMA; 5) HMAs containing sagebrush habitat outside of PHMA, IHMA, and GHMA mapped habitat; 6) HMAs without GRSG Habitat. | Potential change under Alternatives 3, 4, 5, and 6. |
| **WHB-3:** Prioritize gathers and population growth suppression techniques in HMAs in GRSG habitat, unless removals are necessary in other areas to address higher priority environmental issues, including herd health impacts. Place higher priority on Herd Areas not allocated as HMAs and occupied by wild horses and burros in SFA followed by PHMA. | Potential change under Alternatives 3, 4, 5, and 6. |
| **WHB-4:** In SFA and PHMA outside of SFA, assess and adjust AMLs through the NEPA process within HMAs when wild horses or burros are identified as a significant causal factor in not meeting land health standards, even if current AML is not being exceeded. | Potential change under Alternatives 3, 4, 5, and 6. |
| **WHB-5:** In SFA and PHMA outside of SFA, monitor the effects of wild horse and burro use in relation to GRSG seasonal habitat objectives on an annual basis to help determine future management actions. | Potential change under Alternatives 3, 4, 5, and 6. |
| **WHB-6:** Develop or amend herd management area plans (HMAPs) to incorporate GRSG habitat objectives and management considerations for all HMAs within GRSG habitat, with emphasis placed on SFA and other PHMA. | Potential change under Alternatives 3, 4, 5, and 6. |
| **WHB-7:** Consider removals or exclusion of wild horse and burros during or immediately following emergency situations (such as fire, floods, and drought) to facilitate meeting GRSG habitat objectives where HMAs overlap with GRSG habitat. | Potential change under Alternatives 3, 4, 5, and 6. |
| **WHB-8:** When conducting NEPA analysis for wild horse and burro management activities, water developments, or other rangeland improvements for wild horses, address the direct and indirect impacts on GRSG populations and habitat. Implement any water developments or rangeland improvements using the criteria identified for domestic livestock. | Potential change under Alternatives 3, 4, 5, and 6. |
| **WHB-9:** Coordinate with professionals from other federal and state agencies, researchers at universities, and others to utilize and evaluate new management tools (e.g., population growth suppression, inventory techniques, and telemetry) for implementing the wild horse and burro program. | Potential change under Alternatives 3, 4, 5, and 6. |

## Table 2: Dillon Habitat Objectives for GRSG

| Attribute | Indicator | Desired Conditions | Reference |
|---|---|---|---|
| **LEK HABITAT (Seasonal Use Period March 1 – May 15)1** | | | |
| Lek Security | Proximity of trees | Trees (i.e., in Idaho mainly juniper, conifers, and does not include old-growth juniper, pinyon pine and mountain mahogany; in Montana mainly Douglas-fir) absent or uncommon on shrub/grassland ecological sites within 1.86 miles (3 km) of occupied leks. | Baruch-Mordo et al.2013<br>Stiver et al. 2015 |
| | Proximity of sagebrush to leks | Adjacent protective sagebrush cover within 328 ft. (100 m) of an occupied lek | Stiver et al. 2015 |
| **NESTING/EARLY BROOD REARING (Seasonal Use Period May 1 – June 30) 1** | | | |
| Cover and Food | Sagebrush cover [2] | 15-25% | Connelly et al. 2000<br>Connelly et al. 2003<br>Hagen et al. 2007 |
| | Sagebrush height<br>Arid sites[3]<br>Mesic sites[4] | <br>12-31 inches (30-80cm)<br>16-31 inches (40-80cm) | Connelly et al. 2000 |
| | Predominant sagebrush shape | Predominantly spreading shape[5] | Stiver et al. 2015 |
| | Perennial grass cover (such as native bunchgrasses) [2]<br>Arid sites[3]<br>Mesic sites[4] | <br><br><br>>10%<br>>15% | Connelly et al. 2000<br>Stiver et al. 2015 |
| | Perennial grass (and forb) height (includes residual grasses) | ≥ 7 inches | Connelly et al. 2000<br>Connelly et al. 2003<br>Hagen et al. 2007<br>Stiver et al. 2015 |
| | Perennial forb cover [2]<br>Arid sites[3]<br>Mesic sites[4] | <br>>5%<br>>10% | Connelly et al. 2000 |
| | Perennial forb availability | Preferred forbs are common with several species present6 | Stiver et al. 2015 |
| **LATE BROOD-REARING/SUMMER (July-October)1 Late brood-rearing areas, such as riparia** | | | |
| Cover and Food | Sagebrush cover[2] | Uplands 10-25%<br>Riparian/Meadow: Sagebrush cover within 100 m | Connelly et al. 2000 |
| | Sagebrush height | 16 to 32 inches (40-80cm) | Connelly et al. 2000 |
| | Perennial grass and forb cover [2] | >15% | |
| | Upland and riparian perennial forb availability [2] | Preferred forbs are common with appropriate numbers of species present,6 | Stiver et al. 2015 |
| | Riparian and/or meadow habitat condition | Proper Functioning Condition | Stiver et al. 2015 |
| **WINTER November-March1 (Apply to areas of known or likely winter-use)** | | | |
| Cover and Food | Sagebrush cover and height above snow, | Sagebrush is at least 10 inches (25 cm) above snow and ≥10% cover[16] | Connelly et al. 2000<br>Stiver et al. 2015 |

Notes:

[1] Seasonal dates can be adjusted by local unit according to geographic region.

[2] Since plant species and/or life forms may overlap, total vegetative cover, inclusive of shrubs, forbs and grasses may exceed 100%.

[3] Arid corresponds to the 10 – 12 inch precipitation zone; Artemisia tridentata wyomingensis is a common big sagebrush subspecies for this type site (Stiver et al. 2015).
[4] Mesic corresponds to the >12 inch precipitation zone; Artemisia tridentata vaseyana is a common big sagebrush sub-species for this type site (Stiver et al. 2015).
[5] Collectively the indicators for sagebrush (cover, height, and shape), perennial grass and perennial forb (cover, height and/or availability) represent the desired condition range for nesting/early brood rearing habitat characteristics, consistent with the breeding habitat suitability matrix identified in Stiver et al. 2015. Sagebrush plants that are more tree or columnar-shaped provide less protective cover near the ground than sagebrush plants with a spreading shape (Stiver et al. 2015). Some sagebrush plants are naturally columnar (e.g., Great Basin big sagebrush), and a natural part of the plant community. However, a predominance of columnar shape arising from animal impacts may warrant management investigation or adjustments at site specific scales.
[6] Preferred forbs are listed in Stiver et al. 2015. Overall total forb cover may be greater than that of preferred forb cover since not all forb species are listed as preferred.
[15] Some late brood habitat occurs at higher elevations outside of mapped nesting habitat and some is embedded within nesting landscapes especially areas such as wet meadows, riparian areas, springs and seeps.
[16] Winter habitat metrics are a guideline but snow depths and habitat availability may vary widely depending on winter severity, topography and elevation.

### 2.5.2 Relevant Appendices

The following table shows which appendices from the 2015 plan have management direction that may change through this RMP amendment. The appendices can be found on the Idaho and Southwestern Montana GRSG ePlanning website.

| ARMPA Appendix Name | Potential for Change in 2023 Plan |
|---|---|
| A: Approved RMP Amendment Maps | Yes |
| B: Buffers | Yes |
| C: Required Design Features | Yes |
| D: Monitoring Framework | Yes |
| E: Anthropogenic Disturbance and Adaptive Management | Yes |
| F: Greater Sage-Grouse - Mitigation | Yes |
| G: Fluid Mineral Lease Stipulations, Waivers, Modifications, and Exceptions | Yes |
| H: Fire and Invasives Assessment Tool (FIAT) | Yes |
| I: US Fish and Wildlife Service Concurrence Letter | No |
| J: Montana Action Screen and Mitigation Process | Yes |

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# Appendix 2.6
# HiLine RMP

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## 2.6 HiLine RMP

This appendix presents the approved RMP revision language from the record of decision for the HiLine RMP that relate to GRSG management. The table below notes which goals, objectives, appendices, and management decisions/actions have a potential to change as a result of the current planning effort and if so, under which alternatives changes are being considered. Note that any references to tables and appendices are to those applicable RMP appendices that are listed in **Section 2.6.2** of this appendix.

### 2.6.1 Existing GRSG RMP Management – HiLine RMP

**Table 1. Summary of Goals, Objectives, and Management Actions in HiLine RMP**

| HiLine RMP Revision | Potential Change in 2023 Plan |
|---|---|
| ***Management Decisions: Vegetation Communities*** | |
| Vegetation Objective 4: In all SFA and PHMA, the desired condition is to maintain all lands ecologically capable of producing sagebrush (such as big sagebrush) (but no less than 70%) with a minimum of 15% sagebrush cover or as consistent with specific ecological site conditions. The attributes necessary to sustain these habitats are described in Interpreting Indicators of Rangeland Health (BLM Tech Ref 1734-6). | Potential change under Alternatives 3, 4, 5, and 6. |
| (Same as Vegetation MD-5): Conifers encroaching into sagebrush habitats will be removed, in a manner that considers tribal cultural values. Treatments will be prioritized closest to occupied sage-grouse habitats and near occupied leks, and where juniper encroachment is phase 1 or phase 2. Use of site-specific analysis and principles like those included in the Fire and Invasives Assessment Tool (FIAT) report (Chambers, et al. 2014) and other ongoing modeling efforts to address conifer encroachment will help refine the location for specific priority areas to be treated. | Potential change under Alternatives 3, 4, 5, and 6. |
| (Same as Vegetation MD-3): The BLM will consult with MFWP and seek concurrence regarding the anticipated benefits and/or impacts of any vegetation treatments that may impact wildlife habitat including priority sage-grouse habitat. | No change proposed. |
| (Same as Vegetation MD-10): The BLM will use land treatments to achieve and maintain fire regimes, and watershed, grazing management, and wildlife objectives. Within the Greater Sage-Grouse PHMA and the Grassland Bird/Greater Sage-Grouse PHMA, treatments that conserve, enhance or restore Greater Sage-Grouse habitat will be allowed as well as treatments that benefit other resources and do not adversely affect sage-grouse or their habitat. | Potential change under Alternatives 3, 4, 5, and 6. |
| (Same as Wildlife MD-35): Sagebrush habitats will be managed so that mid-scale (i.e. landscape level) shrub cover should include a mix of height classes with herbaceous understory adequate for meeting Greater Sage-Grouse requirements as well as habitat requirements for other sage-associated species such as mule deer and pronghorn. | No change proposed. |

| HiLine RMP Revision | Potential Change in 2023 Plan |
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| MD-1: Quantifiable vegetation objectives for sage-grouse habitat are presented in Table 2.3-2. The actions needed to meet or progress toward meeting these objectives will be incorporated into the respective AMPs or livestock grazing permits as appropriate. | Potential change under Alternatives 3, 4, 5, and 6. |
| ***Management Decisions: Terrestrial and Aquatic Wildlife Resources*** | |
| Goal SSS-1: Maintain and/or increase GRSG abundance and distribution by conserving, enhancing, or restoring the sagebrush ecosystem upon which populations depend, in cooperation with other conservation partners. | Potential change under Alternatives 3, 4, 5, and 6. |
| (Same as Wildlife MD-39): The BLM will emphasize restoration and rehabilitation of sagebrush in areas that are capable of, but no longer support sagebrush to contribute to the distribution and connectivity of habitat patches. | No change proposed. |
| (Same as Wildlife MD-40): Greater Sage-Grouse habitats associated with silver sagebrush north of the Milk River will be enhanced to improve habitat conditions for nesting and brood rearing. Specific management actions will be derived from the results of ongoing research and best available science. | No change proposed. |
| Development in Highly Important Landscapes (Same as Wildlife MD-24): The BLM will designate SFA as shown in Figure 2.3-1 (927,074 acres). All BLM-administered lands within the SFA boundary will be managed as PHMA with the following additional management: 1) Recommended for withdrawal from the General Mining Act of 1872, subject to valid existing rights.<br>2) Managed as NSO, without WEMs, for fluid mineral leasing.<br>3) Prioritized for vegetation management and conservation actions in these areas, including, but not limited to land health assessments, review of livestock grazing permits/leases, and habitat restoration (see specific management sections). | Potential change under Alternatives 3, 4, 5, and 6. |
| (Same as Wildlife MD-18): Fragmentation of large intact blocks of important wildlife habitat will be minimized, particularly in PHMA for Greater Sage-Grouse and grassland birds. | No change proposed. |
| Application of Lek Buffers (Same as Wildlife MD-23): In undertaking BLM management actions, and consistent with valid and existing rights and applicable law in authorizing third-party actions, the BLM will apply the lek buffer-distances identified in the U.S. Geological Survey (USGS) Report Conservation Buffer Distance Estimates for Greater Sage-Grouse – A Review (Open File Report 2014-1239) in accordance with Appendix B. | Potential change under Alternatives 3, 4, 5, and 6. |

| HiLine RMP Revision | Potential Change in 2023 Plan |
|---|---|
| ***Management Decisions: Habitat Objectives*** | |
| **[Original language updated through plan maintenance action in 2018]**<br><br>The habitat objectives for GRSG (Table 2.3-2) is a list of indicators, characteristics, and values that describe GRSG seasonal habitat use areas. The BLM used indicator values derived from a synthesis of local and regional GRSG habitat research and data to describe the typical vegetation communities that sage-grouse select. While the habitat objectives are not attainable on every site or every acre within designated GRSG habitat management areas, the values reflect a range of habitat conditions that generally lead to greater survival of individuals within a population. When permitting land use activities, BLM should consider the ecological site potential within designated habitat management areas to validate the habitat conditions achievable for a specific site.<br>The seasonal habitat descriptions in Table 2.3-2 vary across the range of sage-grouse, within a subregion, and between sites. They are not land health standards but are quantitative measures that inform the Special Status Species Habitat Land Health Standard for sage-grouse. These measurable values reflect ecological potential, and may be adjusted based on local factors influencing sage-grouse habitat selection. Local data or recent science may indicate that sage-grouse select for vegetation structure and composition in seasonal habitats not characterized by the values in the habitat objectives table. In these cases, it may be appropriate to adjust the values. Habitat objectives should be evaluated in the context of annual variability in ecological conditions and should not be used singly to determine habitat suitability for sage-grouse. They may be used to demonstrate trends over time, during plan evaluations for effectiveness of sage-grouse conservation, or when identify limiting habitat characteristics for a given area. The indicators, characteristics, values and desired seasonal habitat conditions in the GRSG Plan Habitat Objectives Table are meant to inform the wildlife habitat component of the Land Health Standards evaluation process (LHS, 43 CFR 4180.2), but do not replace rangeland health assessments. Results from the LHS evaluation should be used to support BLM in land use authorization processes and during development of objectives for management actions such as vegetation treatments. BLM land use authorizations will contain terms and conditions regarding the actions needed to achieve or make progress toward achieving habitat objectives and land health standards. The Habitat Objectives Tables are to be used:<br>• To assess habitat suitability for sage-grouse following the BLM policy on sage-grouse habitat assessments<br>• To evaluate land use plan effectiveness for sage-grouse conservation, and | Potential change under Alternatives 3, 4, 5, and 6. |

| HiLine RMP Revision | Potential Change in 2023 Plan |
|---|---|
| • As a basis to develop measurable project objectives for actions in BLM-designated GRSG Habitat Management areas when considered alongside land health standards, ecological potential and local information.<br>References: U.S. Department of the Interior, Bureau of Land Management. 2001. Rangeland health standards handbook H-4180-1. https://www.blm.gov/sites/blm.gov/files/uploads/Media_Library_BLM_Policy_h4180-1.pdf | *(See above.)* |
| (Same as Wildlife MD-38): Greater Sage-Grouse habitat suitability determinations will be based upon existing guidelines modified with data from recent habitat inventories and assessments in the planning area. Relevant range-wide research findings will also be included in habitat suitability determinations. | No change proposed. |
| ***Management Decisions: Disturbance*** | |
| Wildlife Objective 7: Protect priority Greater Sage-Grouse habitats from anthropogenic disturbances that would reduce distribution or abundance of sage-grouse. | Potential change under Alternatives 3, 4, 5, and 6. |
| Disturbance: (Same as Wildlife MD-25 & MD-26) The Montana/Dakotas BLM will use a 3% disturbance cap at the BSU and project scale, until the State strategy, similar to Wyoming's Core Strategy of 5% for all lands and all disturbances, is fully implemented. The density calculation (an average of 1 facility per 640 acres) applies to energy and mining facilities. The disturbance cap will not be applied to foreclose development of locatable minerals on unpatented claims located under the General Mining Act of 1872; the disturbance from locatable mining will be accounted for in determining the percent disturbance and whether the cap has been exceeded.<br>-If the 3% anthropogenic disturbance cap is exceeded on lands (regardless of landownership) or if anthropogenic disturbance and habitat loss associated with conversion to agricultural tillage or fire exceed 5% within a project analysis area, then no further discrete anthropogenic disturbances (subject to applicable laws and regulations, such as the General Mining Act of 1872, valid existing rights, etc.) will be permitted by the BLM within a project analysis area until the disturbance has been reduced to less than the cap. Within existing designated utility corridors, the 3% disturbance cap may be exceeded at the project scale if the site-specific NEPA analysis indicates that a net conservation gain to the species will be achieved. This exception is limited to projects which fulfill the use for which the corridors were designated (ex., transmission lines, pipelines) and the designated width of a corridor will not be exceeded as a result of any project co-location.<br>-If the BLM determines that the State of Montana has adopted a Greater Sage-Grouse Habitat Conservation Program that contains comparable components to those found in the State of Wyoming's Core Area Strategy including an all lands approach for calculating anthropogenic disturbances, a clear methodology for measuring the density | Potential change under Alternatives 3, 4, 5, and 6. |

| HiLine RMP Revision | Potential Change in 2023 Plan |
|---|---|
| of operations, and a fully operational density disturbance calculation tool, the 3% disturbance cap will be converted to a 5% cap for all sources of habitat alteration within a project analysis area.<br>[Management action clarified in 2018 to reflect State of Montana process, under DOI-BLM-MT-20 I 8-0005-CX. RMP Maintenance Action Language: This maintenance action is to clarify that the BLM has determined that the State's all lands approach to analyzing disturbance is operational and effective. Therefore, the BLM will adopt and implement the State's approach as identified in Attachments D (Stipulations for Uses and Activities) and H (definitions) of Montana Executive Order 12-2015.] | *(See above.)* |
| Mitigation: (MD-6) Mitigation measures for all resources are included in Appendices H and I. The BLM may add additional mitigation measures as deemed necessary by further environmental analysis and as developed through consultation with other federal, state, and local regulatory and resource agencies.<br><br>In all sage-grouse habitat, in undertaking BLM management actions, and, consistent with valid existing rights and applicable law, in authorizing third-party actions that result in habitat loss and degradation, the BLM will require and ensure mitigation that provides a net conservation gain to the species including accounting for any uncertainty associated with the effectiveness of such mitigation. This will be achieved by avoiding, minimizing, and compensating for impacts by applying beneficial mitigation actions. | Potential change under Alternatives 3, 4, 5, and 6. |
| Adaptive Management Strategy: (MD-5) Adaptive Management: Follow the adaptive management strategy outlined in Appendix J. | Potential change under Alternatives 3, 4, 5, and 6. |
| ***Management Decisions: Wildland Fire Ecology and Management*** | |
| Same as MD-11 (Fire): The BLM will protect sensitive status species habitat (such as Greater Sage-Grouse habitat) during suppression and prescribed fire activities as described in this document and consistent with the Secretarial Order on Rangeland Fire and BLM Policy. Fire management-related activities, including prescribed fire, should preserve or enhance the habitat quality for Greater Sage-Grouse and other sensitive status species, especially in priority habitat areas. Where applicable, the BLM will use BMPs (Appendix H) to design fuels treatment objectives to protect existing sagebrush ecosystems, modify fire behavior, restore native plants, and create landscape patterns which benefit sage-grouse habitat (Appendix I). The use of heavy equipment during wildfire suppression and rehabilitation is allowable in sage-grouse habitat although cross-country travel should be limited through these areas. Wildfire suppression facilities shall be located to the extent possible in areas that minimize disturbance to high quality sage-grouse habitat. | No change proposed. |

| HiLine RMP Revision | Potential Change in 2023 Plan |
|---|---|
| Same as MD-12 (Fire): If prescribed fire is used in Greater Sage-Grouse habitat, the NEPA analysis for the Burn Plan will address:<br>*why alternative techniques were not selected as viable options;<br>*how Greater Sage-Grouse goals and objectives would be met by its use;<br>*how the COT Report objectives would be addressed and met;<br>*a risk assessment to address how potential threats to Greater Sage-Grouse habitat would be minimized. | Potential change under Alternatives 3, 4, 5, and 6. |
| Same as MD-13 (fire): Prescribed fire as a vegetation or fuels treatment shall only be considered after the NEPA analysis for the Burn Plan has addressed the four bullets outlined above. Prescribed fire could be used to meet specific fuels objectives that would protect Greater Sage-Grouse habitat in PHMA (e.g., creation of fuel breaks that would disrupt the fuel continuity across the landscape in stands where annual invasive grasses are a minor component in the understory, burning slash piles from conifer reduction treatments, used as a component with other treatment methods to combat annual grasses and restore native plant communities). | Potential change under Alternatives 3, 4, 5, and 6. |
| Same as MD-14 (fire): Prescribed fire in known winter range shall only be considered after the NEPA analysis for the Burn Plan has addressed the four bullets outlined above. Any prescribed fire in winter habitat would need to be designed to strategically reduce wildfire risk around and/or in the winter range and designed to protect winter range habitat quality. | Potential change under Alternatives 3, 4, 5, and 6. |
| Same as Wildlife MD-43h: If prescribed fire is to be used for vegetation treatments, the burn plan will clearly indicate how COT objectives will be addressed and met by its use, and why alternative techniques were not selected. | Potential change under Alternatives 3, 4, 5, and 6. |
| ***Management Decisions: Lands and Realty*** | |
| (Land Tenure: Same as Lands and Realty MD-8): Lands classified as priority habitat and general habitat (or habitat classification appropriate for the sub-region) for Greater Sage-Grouse will be retained in federal management unless:<br>(1) The agency can demonstrate that disposal of the lands, including land exchanges, will provide a net conservation gain to the Greater Sage-Grouse; or<br>(2) The agency can demonstrate that the disposal, including land exchanges, of the lands will have no direct or indirect adverse impact on conservation of the Greater Sage-Grouse. | No change proposed. |
| (MD-3): GHMA are open to minor ROWs and avoidance for major ROWs (high voltage transmission lines of 100 kilovolts or greater and pipelines 24 inches or greater in diameter). | Potential change under Alternatives 3, 4, 5, and 6. |
| MD-1 (Solar and Wind): PHMA will be exclusion areas for solar and wind energy rights-of-way. GHMA will be avoidance areas for solar and wind energy rights-of-way. | Potential change under Alternatives 3, 4, 5, and 6. |

| HiLine RMP Revision | Potential Change in 2023 Plan |
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| (Same as Wildlife MD-41): New distribution power lines on BLM land within 1 mile of Greater Sage-Grouse leks will be buried [GHMA]. | No change proposed. |
| (Same as Wildlife MD-43c) The area [PHMA] will be an avoidance area for the issuance of rights-of-way except within designated corridors. Rights-of-way and similar facilities will be located adjacent to other facilities in a corridor where practical. The BLM will consider opportunities to remove, bury, or modify existing power lines (e.g., burying, anti-perching devices or line location). | Potential change under Alternatives 3, 4, 5, and 6. |
| ***Management Decisions: Fluid Mineral Resources*** | |
| Action FL-10: Where the federal government owns the surface and the mineral estate is in non-federal ownership in PHMA and GHMA, apply appropriate surface use COAs, stipulations, and mineral RDFs through ROW grants or other surface management instruments, to the maximum extent permissible under existing authorities, in coordination with the mineral estate owner/lessee. | No change proposed. |
| Fluids 9: Where the federal government owns the mineral estate in PHMA and GHMA, and the surface estate is in non-federal ownership, apply the same stipulations, COAs, and/or conservation measures and RDFs applied if the mineral estate is developed on BLM-administered lands in that management area, to the maximum extent permissible under existing authorities, and in coordination with the landowner. | No change proposed. |
| Objective FM 1 and 2: Priority will be given to leasing and development of fluid mineral resources, including geothermal, outside of PHMA and GHMA. When analyzing leasing and authorizing development of fluid mineral resources, including geothermal, in PHMA and GHMA, and subject to applicable stipulations for the conservation of GRSG, priority will be given to development in non-habitat areas first and then in the least suitable habitat for GRSG. The implementation of these priorities will be subject to valid existing rights and any applicable law or regulation, including, but not limited to, 30 US Code 226(p) and 43 CFR, Part 3162.3-1(h).<br><br>Where a proposed fluid mineral development project on an existing lease could adversely affect GRSG populations or habitat, the BLM will work with the lessees, operators, or other project proponents to avoid, minimize, and apply compensatory mitigation for adverse impacts to the extent compatible with lessees' rights to drill and produce fluid mineral resources. The BLM will work with the lessee, operator, or project proponent in developing an application for permit to drill for the lease to avoid and minimize impacts on GRSG or its habitat and will ensure that the best information about the GRSG and its habitat informs and helps to guide development of such Federal leases. | Potential change under Alternatives 3, 4, 5, and 6. |

| HiLine RMP Revision | Potential Change in 2023 Plan |
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| (Similar to Wildlife MD-43a): The area [PHMA] will include a NSO stipulation, without modifications or waivers, for oil and gas leasing unless there is a more restrictive stipulation in place to protect other resource values (e.g., no lease in the Mountain Plover ACEC). | Potential change under Alternatives 3, 4, 5, and 6. |
| (MD-4): GHMA are open to fluid mineral leasing with moderate and standard constraints. | Potential change under Alternatives 3, 4, 5, and 6. |
| MD-2: The SFA are open to leasing with NSO with no waivers, exceptions, or modifications (WEMs). | Potential change under Alternatives 3, 4, 5, and 6. |
| (Same as Wildlife MD-43b): Exploration and development activities for existing oil and gas leases will be managed according to BMPs (Appendix N), or other mitigation measures, through COA in authorizing APDs or plans of development. Consistent with surface use rights granted, the existing lease may be subject to "restrictions deriving from specific, nondiscretionary statutes; and such reasonable measures as may be required by the authorized officer to minimize adverse impacts on other resource values, land uses or users not addressed in the lease stipulations at the time operations are proposed" (43 CFR, Part 3101.1-2). Overall consideration shall be given to minimizing the impact on sage-grouse through a project design that avoids, minimizes, and applies compensatory mitigation for direct and indirect impacts on sage-grouse habitat or use and includes applicable and technically feasible COA (Appendix I). Selection and application of these measures shall be based on current science and research on the impacts on important breeding, nesting, brood-rearing, and wintering areas. | No change proposed. |
| ***Management Decisions: Locatable Minerals*** | |
| (Also included as a part of Solid Minerals MD-14): A recommended withdrawal for 927,074 acres from locatable mineral entry to protect the SFA. | Potential change under Alternative 3. |
| (Same as Solid Minerals MD-15): Within the limits of the Mining Laws, the BLM will apply COAs (Appendix I) to Plans of Operations to prevent undue and unnecessary degradation to Greater Sage-Grouse habitat. | Potential change under Alternative 3. |
| ***Management Decisions: Mineral Materials*** | |
| (Same as Wildlife MD 43l): PHMA are closed to new mineral material sales. However, these areas remain "open" to free use permits and the expansion of existing active pits, only if the following criteria are met:<br>*the activity is within the BSU and project area disturbance cap;<br>*the activity is subject to the provisions set forth in the mitigation framework (Appendix I); and<br>*all applicable RDFs are applied (Appendix C). | Potential change under Alternatives 3 and 6. |

| HiLine RMP Revision | Potential Change in 2023 Plan |
|---|---|
| (Similar to Solid Minerals MD-22): PHMA are closed to new mineral material sales. However, these areas remain "open" to free use permits and the expansion of existing active pits, only if the following criteria are met: * The activity is within the BSU and project area disturbance cap;<br>*The activity is subject to the provisions set forth in the mitigation framework (Appendix F); and<br>*All applicable RDFs are applied and the activity is permissible under the specific subregional screening criteria (Appendix C). | Potential change under Alternatives 3 and 6. |
| ***Management Decisions: Recreation*** | |
| Management Direction REC-1: In PHMA, do not construct new recreation facilities (e.g., campgrounds, trails, trailheads, and staging areas) unless the development will have a net conservation gain to GRSG habitat (such as concentrating recreation, diverting use away from important areas, etc.), or unless the development is required for visitor health and safety or resource protection | No change proposed. |
| ***Management Decisions: Comprehensive Trails and Travel Management*** | |
| (Same as Wildlife MD-43m): New road construction will be limited to realignments of existing roads, if that realignment has a minimal impact on Greater Sage-Grouse habitat, eliminates the need to construct a new road, or is necessary for public safety. New road construction will include appropriate BMPs and mitigation (Appendices H and I). | No change proposed. |
| (Same as TM & OHV: MD-7): The BLM will pursue opportunities to conduct restoration of roads, primitive roads and trails not designated during travel management planning, with priority given to areas with special management concerns. This includes primitive routes that have not been designated as "primitive routes" within wilderness study areas (WSAs) and those that have been closed within areas that are being managed to protect or enhance wilderness characteristics or special status species such as the Greater Sage-Grouse. Restoration activities will be done in accordance with guidelines described in Appendix M, Reclamation. Applicable requirements such as specific seed mixes or transplanting recommendations will also be applied where special status species or issues are a concern (e.g., mitigation for Greater Sage-Grouse). | No change proposed. |

| HiLine RMP Revision | Potential Change in 2023 Plan |
|---|---|
| (Same as TM and OHV MD-28): In PHMA and GHMA, temporary closures will be considered in accordance with 43 CFR subpart 8364 (Closures and Restrictions); 43 CFR subpart 8351 (Designated National Area); 43 CFR subpart 6302 (Use of Wilderness Areas, Prohibited Acts, and Penalties); 43 CFR subpart 8341 (Conditions of Use).<br><br>(Same as TM and OHV MD-28): Temporary closure or restriction orders under these authorities are enacted at the discretion of the authorized officer to resolve management conflicts and protect persons, property, and public lands and resources. Where an authorized officer determines that off-highway vehicles (OHV) are causing or will cause considerable adverse effects upon soil, vegetation, wildlife, wildlife habitat, cultural resources, historical resources, threatened or endangered species, wilderness suitability, other authorized uses, or other resources, the affected areas shall be immediately closed to the type(s) of vehicle causing the adverse effect until the adverse effects are eliminated and measures implemented to prevent recurrence (43 CFR, Part 8341.2). A closure or restriction order should be considered only after other management strategies and alternatives have been explored. The duration of temporary closure or restriction orders should be limited to 24 months or less; however, certain situations may require longer closures and/or iterative temporary closures. This may include closure of routes or areas. | No change proposed. |
| ***Management Decisions: Livestock Grazing*** | |
| MD-2 (Similar to Livestock Grazing MD-9): Appropriate indicators and measurements specific to habitat for Greater Sage-Grouse, or any other wildlife species of concern, will be evaluated as part of standards and guidelines assessment and any necessary and appropriate habitat objectives specific to meeting the wildlife health standard for the site will be identified and incorporated into allotment management plans (AMPs) or the terms and conditions of livestock grazing permits. | Potential change under Alternatives 3, 4, 5, and 6. |
| (Same as MD-36): Consideration will be given to incorporating fine-scale and site-specific Greater Sage-Grouse habitat and management objectives as appropriate to the area into AMPs or livestock grazing permits. | Potential change under Alternatives 3, 4, 5, and 6. |
| (Same as Vegetation MD-11): Rangeland health monitoring and assessments will be conducted within current staffing capabilities. The allotments within the Greater Sage-Grouse PHMA and the Grassland Bird/Greater Sage-Grouse PHMA will be high priority for reassessment of land health standards and processing grazing permits as detailed in Appendix I. Rangeland health monitoring plans will be developed and implemented at the field office level. | Potential change under Alternatives 3, 4, 5, and 6. |

| HiLine RMP Revision | Potential Change in 2023 Plan |
|---|---|
| (Same as Livestock Grazing MD-17): Allotments within SFA, followed by those within PHMA, and focusing on those containing riparian areas, including wet meadows, will be prioritized for field checks to help ensure compliance with the terms and conditions of the grazing permits. Field checks could include monitoring for actual use, utilization, and use supervision. | Potential change under Alternatives 3, 4, 5, and 6. |
| (Same as Vegetation MD-9): Water developments will be installed and/or maintained to facilitate control of livestock use of vegetation, support other uses, and protect resource values. In order to minimize surface disturbance, have reliable water of better quality and not alter normal surface flow of water, alternative water developments will be emphasized before constructing new pits and reservoirs. The BLM will manage water developments within Greater Sage-Grouse habitat to reduce the spread of West Nile virus (Appendix I). | Potential change under Alternatives 3, 4, 5, and 6. |
| (Same as Wildlife MD-43g): Existing range improvements, including the location of supplements, will be evaluated and if necessary modified to conserve, enhance or restore sage-grouse habitat. | Potential change under Alternatives 3, 4, 5, and 6. |
| (Same as Riparian MD-10): Grazing techniques and practices detailed in Appendix I will be implemented to reduce hot season (summer) grazing on riparian and meadow complexes within the PHMA. Alternative water facilities will be installed to relieve grazing impacts on riparian areas inside of priority sage-grouse habitat. | Potential change under Alternatives 3, 4, 5, and 6. |
| MD-1: If monitoring data demonstrate that livestock use on an allotment in a priority Greater Sage-Grouse area is adversely affecting Greater Sage-Grouse or their habitat, the terms and conditions of grazing permits may be modified, or changes in active use could be considered in order to meet the standards for rangeland health as described in 43 CFR, Part 4180 and the Standards for Rangeland Health and Guidelines for Livestock Grazing Management (Appendix L) or to otherwise manage, maintain, or improve sage-grouse habitat. | Potential change under Alternatives 3, 4, 5, and 6. |
| LG-16: At the time a permittee or lessee voluntarily relinquishes a permit or lease, the BLM will consider whether the public lands where that permitted use was authorized should remain available for livestock grazing or be used for other resource management objectives, such as reserve common allotments or fire breaks. This does not apply to or impact grazing preference transfers, which are addressed in 43 CFR 4110.2-3. | Potential change under Alternatives 3, 4, 5, and 6. |

**Table 2. HiLine Habitat Objectives for GRSG**

| Habitat Indicators | Dominant Sagebrush, Soil Type and/or Ecological Site | | | | |
|---|---|---|---|---|---|
| | **Sagebrush on Saline and/or Sodic Soils** | **Sagebrush on Acid Shale Parent Materials** | **Silver Sagebrush on Overflow Sites** | **Silver Sagebrush on All Other Soils/Sites** | **Wyoming Big Sagebrush on All Other Soils/Sites Sage-Grouse Breeding Habitat** |
| Sagebrush Canopy Cover | > 5% | > 5% | 10-25% | > 2% | 15-25% |
| Sagebrush Height | > 6 inches | > 6 inches | > 12 inches | > 12 inches | > 12 inches |
| Perennial Grass Heights (includes residual grasses) | > 5 inches | > 7 inches | > 7 inches | > 7 inches | > 7 inches |
| Perennial Grass Canopy Cover (such as green needlegrass) | > 10% | > 10% | > 15% | > 15% | > 10% |
| Perennial Forb Canopy Cover | > 3% | > 3% | > 10% | > 5% | > 5% |
| Perennial Forb Availability | > 3 species | > 3 species | > 5 species | > 5 species | > 5 species |
| Riparian Areas & Wet Meadows | Proper Functioning Condition | | | | |
| Lek Security | Rocky Mountain juniper and/or Ponderosa pine with less than 1% canopy cover on shrub/grassland ecological sites within 3 kilometers (1.86 miles) of occupied leks Sage-Grouse | | | | |
| **Winter Habitat** | | | | | |
| Sagebrush Availability | >10% canopy and >10 inches visible above snow | | | | |

### 2.6.2 Relevant Appendices

The following table shows which appendices from the 2015 plan have management direction that may change through this RMP amendment. The appendices can be found on the HiLine RMP ePlanning website.

| ARMPA Appendix Name | Potential for Change in 2023 Plan |
|---|---|
| A: Approved RMP Amendment Maps | Yes |
| B: Applying Lek Buffer Distances when Approving Actions in Greater Sage-Grouse Habitat Management Areas | Yes |
| C: Required Design Features for Greater Sage-Grouse Habitat | Yes |
| D: The Greater Sage-Grouse Monitoring Framework | No |
| E: Greater Sage-Grouse Disturbance Caps | Yes |
| F: Greater Sage-Grouse Mitigation | Yes |
| G: Oil and Gas Lease Stipulations and Exception, Modification, and Waiver Criteria | Yes |
| H: Best Management Practices | Yes |
| I: Mitigation Measures and Conservation Actions for Greater Sage-Grouse Habitat | Yes |
| J: Adaptive Management Strategy for Greater Sage-Grouse Habitat Management | Yes |
| K: USFWS Concurrence | No |
| L: Standards for Rangeland Health and Guidelines for Livestock Grazing Management | No |
| M: Reclamation | No |
| N: Oil and Gas Best Management Practices (General Conditions of Approval) | No |
| O: Fire and Emergency Stabilization and Rehabilitation | No |
| P: Recreation Sites and Management Areas | No |

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# Appendix 2.7
# Lewistown RMP

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## 2.7 LEWISTOWN RMP

This appendix presents the approved RMP revision language from the record of decision for the Lewistown RMP that relate to GRSG management. The table below notes which goals, objectives, appendices, and management decisions/actions have a potential to change as a result of the current planning effort and if so, under which alternatives changes are being considered. Note that any references to tables and appendices are to those applicable RMP appendices that are listed in **Section 2.7.2** of this appendix.

### 2.7.1 Existing GRSG RMP Management – Lewistown RMP

**Table 1. Summary of Goals, Objectives, and Management Actions in Lewistown RMP**

| Lewistown RMP Revision | Potential Change in 2023 Plan |
|---|---|
| ***Management Decisions: Riparian Areas and Wetlands*** | |
| Action LG-1.14: Riparian-wetland areas will be managed for PFC within the LFO. Within PHMA and GHMA, manage wet meadows to maintain a component of perennial forbs with diverse species richness relative to site potential (e.g., reference state) to facilitate brood rearing. Also conserve or enhance these wet meadow complexes. | No change proposed. |
| Action LG-1.17: Human-made water developments, such as reservoirs and stock ponds, can develop riparian-wetland characteristics. Those that have the capability to support important wildlife values (such as GRSG habitats and fisheries) will be managed for such to the extent practical, with greater consideration given to the purpose of the development. When constructing or modifying water developments in PHMA, use RDFs (Appendix C) to reduce potential impacts from West Nile virus. | No change proposed. |
| Action LG-1.20: Analyze springs, seeps, and associated pipelines during the land health evaluation and determination process to determine if modifications are necessary to maintain the continuity of the predevelopment riparian area within PHMA. Make modifications, where necessary, in accordance with Montana water law, considering impacts on other water uses, when such considerations are neutral or beneficial to GRSG. | No change proposed. |
| ***Management Decisions: Vegetation Communities*** | |
| Objective VEG-1.1: In all SFA and PHMA, the desired condition is to maintain all lands ecologically capable of producing sagebrush (but no less than 70%) with a minimum of 15% sagebrush cover or as consistent with specific ecological site conditions. The attributes necessary to sustain these habitats are described in Interpreting Indicators of Rangeland Health (BLM Tech Ref 1734-6). | Potential change under Alternatives 3, 4, 5, and 6. |

| Lewistown RMP Revision | Potential Change in 2023 Plan |
|---|---|
| Action VG-1.12: Remove conifers encroaching into sagebrush habitats, in a manner that considers tribal cultural values. Prioritize treatments closest to occupied GRSG habitats and near occupied leks, and where juniper encroachment is phase 1 or phase 2. Use of site-specific analysis and principles like those included in the FIAT report (Chambers et. al., 2014) and other ongoing modeling efforts to address conifer encroachment will help refine the location for specific priority areas to be treated. | Potential change under Alternatives 3, 4, 5, and 6. |
| Action VEG-1.2: In PHMA and GHMA, prioritize restoration in seasonal habitats that are thought to be limiting GRSG distribution or abundance. | No change proposed. |
| Action VEG-1.4: Manage for suitable GRSG habitat within PHMA. | No change proposed. |
| Action VEG-1.3: In PHMA and GHMA, consideration for other threatened, endangered, or sensitive species will be evaluated in addition to GRSG when prioritizing restoration projects. | No change proposed. |
| Action VEG-1.10: Make reestablishment of suitable GRSG habitat a high priority for restoration. Other restoration efforts within the field office may take precedence over sagebrush habitat projects, based on future threatened and endangered species listing decisions, funding sources and requirements, access to sites, landowner, and other agency cooperation, potential project success, as well as others. Decisions regarding restoration of habitats within the field office will remain at the discretion of the authorized officer. | No change proposed. |
| Action VEG-1.9: In PHMA, restore native (or desirable) plants and create landscape patterns that most benefit GRSG. Consideration for other threatened, endangered, or sensitive species will be evaluated, in addition to GRSG, when creating landscape habitat patterns. | No change proposed. |
| Management Direction VEG-1.5: In PHMA, require use of native seeds for restoration based on availability, adaptation (ecological site potential), and probability of success. Where probability of success or adapted seed availability is low, non-native seeds may be used as long as they support GRSG habitat objectives. | No change proposed. |
| Action VEG-1.8: Choose appropriate seed mix for the location. | No change proposed. |

| Lewistown RMP Revision | Potential Change in 2023 Plan |
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| Action VEG-1.6: In PHMA, design post-restoration management to ensure long-term persistence. This can include changes in current resource management to achieve and maintain the desired condition of the restoration that benefits GRSG. Modifications to livestock grazing will be made in accordance with BLM grazing regulation 43 CFR, Part 4130.3-3, and after consultation, cooperation, and coordination with owners or lessees having lands or managing resources within the affected allotment(s), affected cooperative state grazing districts and the interested public, if the grazing permit is being modified to make these adjustments. Temporary or long-term adjustments in post-restoration livestock use will be implemented by documented agreement or by the decision of the authorized officer in accordance with BLM grazing regulation 43 CFR, Part 4160. | No change proposed. |
| Management Direction VEG-1.7: In PHMA, consider potential changes in climate when proposing restoration seedings when using native plants. Consider collection from the warmer component of the species current range when selecting native species. | No change proposed. |
| Management Direction VEG-1.11: In PHMA fire prone areas, where sagebrush seed is required for GRSG habitat restoration, consider establishing seed harvest areas that are managed for seed production and are a priority for protection from outside disturbances. | No change proposed. |
| Action VEG-1.1: In PHMA, prioritize implementation of restoration projects based on environmental variables that improve chances for project success in areas most likely to benefit GRSG. | No change proposed. |
| ***Management Decisions: Terrestrial and Aquatic Wildlife Resources*** | |
| Goal SSS-1: Maintain and/or increase GRSG abundance and distribution by conserving, enhancing, or restoring the sagebrush ecosystem upon which populations depend, in cooperation with other conservation partners. | Potential change under Alternatives 3, 4, 5, and 6. |
| Objective SSS-1.2: Habitat Delineation: Delineate PHMA to encompass the 75% breeding bird density map: 233,219 BLM surface acres (19% of total PHMA acres). See Figure 2-1, Lewistown Habitat Management Areas (Appendix A, Approved RMP Amendment Maps). | Potential change under Alternatives 3, 4, 5, and 6. |
| Objective SSS-1.3: Habitat Delineation: Delineate GHMA to encompass the remainder of the habitat presented in the 100% breeding bird density map: 112,341 BLM surface acres (11% of total GHMA acres). | Potential change under Alternatives 3, 4, 5, and 6. |

| Lewistown RMP Revision | Potential Change in 2023 Plan |
|---|---|
| Action SSS-1.5: Designate SFA as shown on Figure 2-1 (Appendix A) (53,440 acres). SFA will be managed as PHMA, with the following additional management:<br>1) Recommended for withdrawal from the General Mining Act of 1872 (as amended), subject to valid existing rights.<br>2) Prioritized for vegetation management and conservation actions in these areas, including, but not limited to land health assessments, wild horse and burro management actions, review of livestock grazing permits/leases, and habitat restoration (see specific management sections). | Potential change under Alternatives 3, 4, 5, and 6. |
| Wildlife Objective 8: Minimize fragmentation of large intact blocks of important wildlife habitat, particularly habitat areas for Greater Sage-Grouse and grassland birds. | Potential change under Alternatives 3, 4, 5, and 6. |
| Action SSS-1.1: In undertaking BLM management actions in PHMA and GHMA, and consistent with valid and existing rights and applicable law in authorizing third-party actions, the BLM will apply the lek buffer-distances identified in the US Geological Survey Report Conservation Buffer Distance Estimates for Greater Sage-Grouse – A Review (Open File Report 2014-1239) in accordance with Appendix B, Applying Lek Buffer Distances When Approving Actions.<br><br>Also MD WLH & SSS-97 | No change proposed. |
| ***Management Decisions: Habitat Objectives*** | |
| **[Original language updated through plan maintenance action in 2018]**<br><br>The habitat objectives for GRSG (Table 2.3-2) is a list of indicators, characteristics, and values that describe GRSG seasonal habitat use areas. The BLM used indicator values derived from a synthesis of local and regional GRSG habitat research and data to describe the typical vegetation communities that sage-grouse select. While the habitat objectives are not attainable on every site or every acre within designated GRSG habitat management areas, the values reflect a range of habitat conditions that generally lead to greater survival of individuals within a population. When permitting land use activities, BLM should consider the ecological site potential within designated habitat management areas to validate the habitat conditions achievable for a specific site.<br>The seasonal habitat descriptions in Table 2.3-2 vary across the range of sage-grouse, within a subregion, and between sites. They are not land health standards but are quantitative measures that inform the Special Status Species Habitat Land Health Standard for sage-grouse. These measurable values reflect ecological potential, and may be adjusted based on local factors influencing sage-grouse habitat selection. Local data or recent science may indicate that sage-grouse select for vegetation structure and composition in seasonal habitats not characterized by the values in the habitat objectives table. In these cases, it may be appropriate to adjust the values. Habitat objectives | Potential change under Alternatives 3, 4, 5, and 6. |

| Lewistown RMP Revision | Potential Change in 2023 Plan |
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| should be evaluated in the context of annual variability in ecological conditions and should not be used singly to determine habitat suitability for sage-grouse. They may be used to demonstrate trends over time, during plan evaluations for effectiveness of sage-grouse conservation, or when identify limiting habitat characteristics for a given area.<br><br>The indicators, characteristics, values and desired seasonal habitat conditions in the GRSG Plan Habitat Objectives Table are meant to inform the wildlife habitat component of the Land Health Standards evaluation process (LHS, 43 CFR 4180.2), but do not replace rangeland health assessments. Results from the LHS evaluation should be used to support BLM in land use authorization processes and during development of objectives for management actions such as vegetation treatments. BLM land use authorizations will contain terms and conditions regarding the actions needed to achieve or make progress toward achieving habitat objectives and land health standards. The Habitat Objectives Tables are to be used:<br>• To assess habitat suitability for sage-grouse following the BLM policy on sage-grouse habitat assessments<br>• To evaluate land use plan effectiveness for sage-grouse conservation, and<br>• As a basis to develop measurable project objectives for actions in BLM-designated GRSG Habitat Management areas when considered alongside land health standards, ecological potential and local information.<br>References: U.S. Department of the Interior, Bureau of Land Management. 2001. Rangeland health standards handbook H-4180-1. https://www.blm.gov/sites/blm.gov/files/uploads/Media_Library_BLM_Policy_h4180-1.pdf | *(See above.)* |
| ***Management Decisions: Disturbance*** | |
| Objective SSS-1.1: Protect PHMA from anthropogenic disturbances that will reduce distribution or abundance of GRSG. | No change proposed. |

| Lewistown RMP Revision | Potential Change in 2023 Plan |
|---|---|
| Action SSS-1.2: Disturbance: If the 3% anthropogenic disturbance cap is exceeded on lands (regardless of land ownership) within GRSG PHMA in any given BSU (see Figure 2-2, Lewistown GRSG Biologically Significant Units and Priority Habitat Management Areas [PHMA] [Appendix A]), then no further discrete anthropogenic disturbances (subject to applicable laws and regulations, such as the 1872 hard rock mining law, valid existing rights, etc.) will be permitted by BLM within GRSG PHMA in any given BSU until the disturbance has been reduced to less than the cap. (BSU for this RMPA is the summary of all the PHMA within a GRSG population as delineated in the COT report.)<br><br>If the 3% anthropogenic disturbance cap is exceeded on lands (regardless of land ownership), or if anthropogenic disturbance and habitat loss associated with conversion to agricultural tillage or fire exceed 5% within a project analysis area in PHMA, then no further discrete anthropogenic disturbances (subject to applicable laws and regulations, such as the 1872 Mining Law, as amended, valid existing rights, etc.) will be permitted by BLM within a project analysis area until the disturbance has been reduced to less than the cap. | Potential change under Alternatives 3, 4, 5, and 6. |
| Action SSS-1.4: Disturbance: Protect PHMA from anthropogenic disturbances that will reduce distribution or abundance of GRSG. See Appendix E, Greater Sage-Grouse Disturbance Caps. If the BLM determines that the State of Montana has adopted a GRSG Habitat Conservation Program that contains comparable components to those found in the State of Wyoming's Core Area Strategy including an all lands approach for calculating anthropogenic disturbances, a clear methodology for measuring the density of operations, and a fully operational density and (DDCT, the 3% disturbance cap will be converted to a 5% cap for all sources of habitat alteration within a project analysis area.<br><br>[Management action clarified in 2018 to reflect State of Montana process, under DOI-BLM-MT-2018-0005-CX. RMP Maintenance Action Language: This maintenance action is to clarify that the BLM has determined that the State's all lands approach to analyzing disturbance is operational and effective. Therefore, the BLM will adopt and implement the State's approach as identified in Attachments D (Stipulations for Uses and Activities) and H (definitions) of Montana Executive Order 12-2015.] | Potential change under Alternatives 3, 4, 5, and 6. |

| Lewistown RMP Revision | Potential Change in 2023 Plan |
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| SSS-1.3 : Subject to applicable laws and regulations and valid existing rights, if the average density of one energy and mining facility per 640 acres (the density cap) is exceeded on all lands (regardless of land ownership) in the PHMA within a proposed project analysis area, then no further disturbance from energy or mining facilities will be permitted by BLM: (1) until disturbance in the proposed project analysis area has been reduced to maintain the limit under the cap; or (2) unless the energy or mining facility is co-located into an existing disturbed area. | Potential change under Alternatives 3, 4, 5, and 6. |
| Action SSS-1.7: Implement Regional Mitigation Strategy (Appendix F). | Potential change under Alternatives 3, 4, 5, and 6. |
| Action SSS-1.6: Implement Adaptive Management Plan (Appendix I). | Potential change under Alternatives 3, 4, 5, and 6. |
| ***Management Decisions: Wildland Fire Ecology and Management*** | |
| Objective FIRE-1.2: Manage wildfires to minimize loss of sagebrush and protect GRSG habitat. | No change proposed. |
| Action FIRE-1.8: Follow the most current RDFs for fire and fuels (Appendix C). | No change proposed. |
| Action FIRE-1.4: Follow the most current RDFs for fire and fuels (Appendix C, Required Design Features). | No change proposed. |
| Action FIRE-1.1: If prescribed fire is used in GRSG habitat, the NEPA analysis for the Burn Plans will address:<br>*why alternative techniques were not selected as a viable options;<br>*how GRSG goals and objectives will be met by its use;<br>*how the COT report objectives will be addressed and met; and<br>*a risk assessment to address how potential threats to GRSG habitat will be minimized.<br>Prescribed fire as vegetation or fuels treatment shall only be considered after the NEPA analysis for the Burn Plan has addressed the four bullets outlined above. Prescribed fire can be used to meet specific fuels objectives that will protect GRSG habitat in PHMA (e.g., creation of fuel breaks that will disrupt the fuel continuity across the landscape in stands where annual invasive grasses are a minor component in the understory, burning slash piles from conifer reduction treatments, used as a component with other treatment methods to combat annual grasses and restore native plant communities).<br>Prescribed fire in known winter range shall only be considered after the NEPA analysis for the Burn Plan has addressed the four bullets outlined above. Any prescribed fire in winter habitat will need to be designed to strategically reduce wildfire risk around and/or in the winter range and designed to protect winter range habitat quality. | Potential change under Alternatives 3, 4, 5, and 6. |

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| Action FIRE-1.6: The protection of human life is the single, overriding priority. Setting priorities among protecting human communities and community infrastructure, other property and improvements, and natural and cultural resources will be done based on the values to be protected, human health and safety, and the costs of protection. In PHMA, prioritize suppression, after life and property, to conserve the habitat. See Appendix H, which will be completed to help further refine fire management actions once this plan is completed. | No change proposed. |
| Action FIRE-1.5: If prescribed fire is used, the burn plan will clearly indicate how COT objectives will be addressed and met, and why alternative techniques are not applicable. A fire risk assessment will be completed for implementation of prescribed fire used to meet the GRSG goals and objectives in PHMA (see Appendix H, GRSG Wildfire and Invasive Species Habitat Assessment). | Potential change under Alternatives 3, 4, 5, and 6. |
| Action FIRE-1.2: Design fuels management projects in PHMA to strategically and effectively reduce wildfire threats in the greatest area. This may require fuels treatments implemented in a more linear versus block design. | No change proposed. |
| FIRE-1.9: In PHMA, prioritize native seed allocation for use in GRSG habitat in years when preferred native seed is in short supply. This may require reallocation of native seed from emergency stabilization and rehabilitation (ES&R) projects outside of PHMA to those inside it. Use of native plant seeds for ES&R seedings is required based on availability, adaptation (site potential), and probability of success. Where probability of success or native seed availability is low, non-native seeds may be used as long as they meet GRSG habitat conservation objectives. Re-establishment of appropriate sagebrush species/subspecies and important understory plants, relative to site potential, shall be the highest priority for rehabilitation efforts. | No change proposed. |
| Action FIRE-1.10: In PHMA, design post ES&R management to ensure long-term persistence of seeded or pre-burn native plants. This can include changes in current resource management to achieve and maintain the desired condition of the restoration effort that benefits GRSG.<br><br>Modifications to livestock grazing will be made in accordance with BLM grazing regulation 43 CFR, Part 4130.3-3 and after consultation, cooperation and coordination with owners or lessees having lands or managing resources within the affected allotment(s), affected cooperative state grazing districts and the interested public, if the grazing permit is being modified to make these adjustments. Temporary or long-term adjustments in post-restoration livestock use will be implemented by documented agreement or by the decision of the authorized officer in accordance with BLM grazing regulation 43 CFR, Part 4160. | No change proposed. |

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| Management Direction FIRE-1.11: In PHMA, consider potential changes in climate when proposing post-fire seedings using native plants. Consider seed collections from the warmer component within a species' current range for selection of native seed. | No change proposed. |
| Management Direction FIRE-1.7: In GHMA, prioritize suppression where wildfires threaten PHMA | No change proposed. |
| ***Management Decisions: Lands and Realty*** | |
| Action LR-1.9: Lands classified as PHMA and GHMA will be retained in federal management unless: (1) the agency can demonstrate that disposal of the lands, including land exchanges, will provide a net conservation gain to the GRSG or (2) the agency can demonstrate that the disposal, including land exchanges, of the lands will have no direct or indirect adverse impact on conservation of the GRSG. See Figure 2-11, Lewistown Land Tenure (Appendix A). | No change proposed. |
| Action LR-1.13: When offered, PHMA will be a priority in consideration of land acquisitions (refer to Appendix H, Land Pattern Review and Land Adjustment, in Lewistown Field Office Proposed RMPA/Final EIS). Consider GRSG for all land tenure actions. | No change proposed. |
| Action LR-1.1: PHMA and GHMA will be managed as ROW avoidance areas for high voltage transmission lines (100 kilovolt [kV] and over) and large pipelines (24 inches in width and over) (345,560 acres) with limited exceptions, which must be based on an explicit rationale that biological impacts on GRSG are being avoided with the exception. See Figure 2-10a, Major Rights-of-Way (Appendix A).<br>· PHMA will also be managed as a minor ROW avoidance area (233,219 acres). See Figure 2-10b, Lewistown Minor Rights-of-Way (Appendix A).<br>· GMHA will be open to minor ROWs (112,341 acres).<br>· Where new ROWs are required, collocate new ROWs within existing ROWs or where it best minimizes impacts on GRSG and GRSG habitat.<br>· Appropriate RDFs identified within the terms of the authorization to minimize surface-disturbing and disruptive activities. See Appendix C for RDFs that may be applied based on site-specific project level NEPA analysis. | Potential change under Alternatives 3, 4, 5, and 6. |
| Action LR-1.2: PHMA will be managed as a ROW exclusion area for wind and solar energy (233,219 acres) and GHMA will be managed as a ROW avoidance area for wind and solar energy (112,341 acres). See Figure 2-8, Lewistown Wind, and Figure 2-9, Lewistown Solar (Appendix A). | Potential change under Alternatives 3, 4, 5, and 6. |

| Lewistown RMP Revision | Potential Change in 2023 Plan |
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| Action LR-1.6: Leases and permits (other than for cabin site leasing), which may be for occupancy, and film production, will be considered on a case-by-case basis; however, PHMA will be lease and permit avoidance areas. Leases and permits will be allowed in GHMA with appropriate stipulations and conservation measures identified within the terms of the authorization to minimize surface-disturbing and disruptive activities. Avoidance areas within GHMA may be identified. | Potential change under Alternatives 3, 4, 5, and 6. |
| Action LR-1.3: When addressing ROW authorizations in PHMA, identify and evaluate opportunities to remove, bury, or modify power lines within PHMA. Financial and technical feasibility will be evaluated during the environmental analysis process. | No change proposed. |
| Action LR-1.9: Consider the likelihood of development of not-yet-constructed surface-disturbing activities – as defined in Table D.2 of the Monitoring Framework (Appendix D)−under valid existing rights prior to authorizing new projects in PHMA. | No change proposed. |
| ***Management Decisions: Fluid Mineral Resources*** | |
| Action MR-1.11: Where the federal government owns the surface and the mineral estate is in non-federal ownership in PHMA and GHMA, apply appropriate surface use COAs, stipulations, and mineral RDFs through ROW grants or other surface management instruments, to the maximum extent permissible under existing authorities, in coordination with the mineral estate owner/lessee (Appendix C). | No change proposed. |
| Action MR-1.12: Where the federal government owns the mineral estate in PHMA and GHMA, and the surface estate is in non-federal ownership, apply the same stipulations, COAs, and/or conservation measures and RDFs (Appendix C) applied if the mineral estate is developed on BLM-administered lands in that management area, to the maximum extent permissible under existing authorities, and in coordination with the landowner. | No change proposed. |
| Action MR-1.1: Allow geophysical exploration within PHMA to obtain exploratory information for areas outside of and adjacent to PHMA areas. Allow only geophysical operations by helicopter-portable drilling methods and in accordance with seasonal timing restrictions and other restrictions that may apply (see Appendix C). | Potential change under Alternative 3. |
| FW–AU-01: Apply NSO stipulations to greater sage-grouse PHMA. | Potential change under Alternatives 3 and 6. |
| FW–AU-02: Apply NSO stipulations within 0.6 miles of a lek within GHMA. | Potential change under Alternative 3. |
| FW-AU-03: Apply CSU stipulations within 2 miles of a lek within GHMA. | Potential change under Alternatives 3, 4, 5, and 6. |

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| MD-1: No waivers or modifications to a fluid mineral lease NSO stipulation will be granted in PHMA. The authorized officer may grant an exception to a fluid mineral lease NSO stipulation only where the proposed action:<br>(i) would not have direct, indirect, or cumulative effects on Greater Sage-Grouse or its habitat; or<br>(ii) is proposed to be undertaken as an alternative to a similar action occurring on a nearby parcel, and would provide a clear conservation gain to Greater Sage-Grouse.<br>*Exceptions based on conservation gain (ii) may only be considered in (a) PHMA of mixed ownership where federal minerals underlie less than fifty percent of the total surface, or (b) areas of the public lands where the proposed exception is an alternative to an action occurring on a nearby parcel subject to a valid federal fluid mineral lease existing as of the date of this RMP revision. Exceptions based on conservation gain must also include measures, such as enforceable institutional controls and buffers, sufficient to allow the BLM to conclude that such benefits will endure for the duration of the proposed action's impacts.<br>*Any exceptions to this lease stipulation may be approved by the authorized officer only with the concurrence of the State Director. The authorized officer may not grant an exception unless the applicable state wildlife agency, the USFWS, and the BLM unanimously find that the proposed action satisfies (i) or (ii). Such finding shall initially be made by a team of one field biologist or other Greater Sage-Grouse expert from each respective agency. In the event the initial finding is not unanimous, the finding may be elevated to the appropriate BLM State Director, USFWS State Ecological Services Director, and state wildlife agency head for final resolution. In the event their finding is not unanimous, the exception will not be granted. Approved exceptions will be made publicly available at least quarterly. | Potential change under Alternatives 3, 4, 5, and 6. |

| Lewistown RMP Revision | Potential Change in 2023 Plan |
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| Action MR-1.2: During implementation level review and decisions, (e.g., approval of an application for permit to drill or Sundry Notice) and on completion of the environmental record of review (43 CFR, Part 3162.5), include appropriate documentation of compliance with NEPA. In this process evaluate, among other things:<br>· Whether the conservation measure is reasonable (43 CFR, Part 3101.1-2) with the valid existing rights; and<br>· Whether the action is in conformance with the ARMPA.<br>The following operating constraints will be applied to existing leases as COAs in PHMA and GHMA. Exceptions may be granted by the authorized officer if an environmental review demonstrates that effects can be mitigated to an acceptable level, if habitat for the species is not present in the area, or if portions of the area can be occupied without affecting GRSG. Exceptions may also be granted where the short-term effects on GRSG within PHMA and GHMA are mitigated by the long-term benefits. Permanent (longer than two months) structures that create movement must be designed or sited to minimize impacts on GRSG.<br>· As reasonable (43 CFR, Part 3101.1-2), in consideration of valid existing rights, and to achieve a net conservation gain, the BLM will require compensatory mitigation when impacts cannot be adequately avoided and minimized, and residual impacts will result in habitat loss and degradation. Compensatory mitigation actions will align with the recommendations in the Regional Mitigation Strategy (see Appendix F), as appropriate. A priority may be given to compensatory mitigation actions in the same PHMA as is being impacted, unless a greater benefit can be achieved elsewhere. Compensatory mitigation will be considered when no feasible options remain to adequately avoid and minimize impacts within and immediately adjacent to the impacted site.<br>· Make applicable RDFs (Appendix C) mandatory as COAs within PHMA and GHMA. RDFs provided in Appendix C will be site-specific restrictions applied to permits to drill as COAs after the completion of site- specific NEPA analysis. Standard stipulations (see Appendix G, Oil and Gas Lease Stipulations) apply to existing leases. See Figure 2-4, Lewistown Fluid Minerals (Oil and Gas) (Appendix A). Applied RDFs will have to be reasonable (43 CFR, Part 3101.1-2) with the valid existing rights and in conformance with the approved Judith and Headwaters RMPs. | Potential change under Alternatives 3, 4, 5, and 6. |
| ***Management Decisions: Solid Leasable Minerals*** | |
| Action MR-1.7: Close PHMA to nonenergy leasable mineral leasing. This includes not permitting any new leases to expand an existing mine. See Figure 2-7, Lewistown Non-Energy Leasable Minerals (Appendix A). | Potential change under Alternatives 3 and 6. |

| Lewistown RMP Revision | Potential Change in 2023 Plan |
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| Action MR-1.8: For existing nonenergy leasable mineral leases in PHMA, apply all appropriate RDFs from Appendix C, whether traditional or solution mining is used to extract resources. | No change proposed. |
| Action SL-Coal-6: At the time an application for a new coal lease or lease modification is submitted to the BLM, the BLM will determine whether the lease application area is "unsuitable" for all or certain coal mining methods pursuant to 43 CFR, Part 3461.5. PHMA is essential habitat for maintaining GRSG for purposes of the suitability criteria set forth at 43 CFR, Part 3461.5(o)(1). | No change proposed. |
| ***Management Decisions: Locatable Materials*** | |
| Action MR-1.4: Recommend SFA (53,440 acres) for withdrawal from the General Mining Act of 1872 (as amended), subject to valid existing rights.<br>Analyze proposed action in Plan of Operations and apply mitigating measures needed to prevent unnecessary or undue degradation, as appropriate and in accordance with applicable law. | Potential change under Alternative 3. |
| Action LR-1.15: SFA (53,440 acres) will be recommended for withdrawal from the General Mining Act of 1872 (as amended), subject to valid existing rights. | Potential change under Alternative 3. |
| ***Management Decisions: Mineral Materials*** | |
| Action MR-1.9:<br>In GHMA, the BLM will issue permits for salable minerals, where disposal is deemed to be in the public interest. | Potential change under Alternatives 3 and 6. |
| Action MR-1.10: In PHMA, restore salable mineral pits no longer in use to meet GRSG habitat conservation objectives | No change proposed. |
| FW-AU-04: PHMA are open to new mineral material sales for both free and commercial use following disturbance guidelines and other applicable conservation measures. | Potential change under Alternatives 3, 4, 5, and 6. |
| ***Management Decisions: Comprehensive Trails and Travel Management*** | |
| Action TTM-1.1: BLM-administered lands are designated limited to existing roads, primitive roads, and trails yearlong for off-highway vehicle use (OHVs; OHVs are restricted to existing roads, primitive roads, and trails).<br>Implement a comprehensive travel and transportation management (CTTM) plan to designate roads and trails (when travel management plan is complete).<br>Administrative off-road use for BLM personnel and BLM authorized activities will be allowed. BLM-implemented CTTM will not apply to private or other state or federal lands within the LFO. | No change proposed. |

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| Action TTM-1.5: Through site-specific planning, the BLM will designate roads, primitive roads, and trails for motorized use. Roads, primitive roads, and trails will be inventoried, mapped, and analyzed to the degree necessary to evaluate and designate the roads, primitive roads, and trails as open, seasonally open, or closed (BLM 2003). All CTTM planning shall be completed within 5 years of the signing of the ROD. The CTTM planning will be conducted using an interdisciplinary team approach to address all resource uses, including administrative, recreation, commercial, and associated modes of travel (motorized, mechanized, and nonmotorized types; BLM—Travel and Transportation Handbook [H-8342]). | No change proposed. |
| Action TTM-1.8: In PHMA, during site-specific travel and transportation management planning, the upgrading of existing routes that will change route category (road, primitive road, or trail) or capacity may be allowed when there are minimal impacts on GRSG and GRSG habitat, if it is necessary for motorist safety, or if it eliminates the need to construct a new road. All upgrades to existing routes will be evaluated on a case-by-case basis and will be subject to valid existing rights (e.g., existing ROWs or easements). | No change proposed. |
| Action TTM-1.6: In PHMA, during site-specific travel and transportation management planning, limit route construction to realignment of existing routes if that realignment has a minimal impact on GRSG habitat, if it eliminates the need to construct a new road, or if it is necessary for motorist safety. | No change proposed. |
| Action TTM-1.9: When travel plans are complete, restore roads, primitive roads and trails in PHMA that are not designated in travel management plans. This also includes primitive routes/roads that were not designated in wilderness study areas (WSA) that have been selected for protection in previous RMPs. | No change proposed. |

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| Action TTM-1.11: In PHMA and GHMA, temporary closures will be considered in accordance with 43 CFR, subpart 8364 (Closures and Restrictions); 43 CFR, subpart 8351 (Designated National Area); 43 CFR, subpart 6302 (Use of Wilderness Areas, Prohibited Acts, and Penalties); 43 CFR, subpart 8341 (Conditions of Use).<br><br>Temporary closure or restriction orders under these authorities are enacted at the discretion of the authorized officer to resolve management conflicts and protect persons, property, and public lands and resources. Where an authorized officer determines that OHVs are causing or will cause considerable adverse effects upon soil, vegetation, wildlife, wildlife habitat, cultural resources, historical resources, threatened or endangered species, wilderness suitability, other authorized uses, or other resources, the affected areas shall be immediately closed to the type(s) of vehicle causing the adverse effect until the adverse effects are eliminated and measures implemented to prevent recurrence (43 CFR, Part 8341.2). A closure or restriction order shall be considered only after other management strategies and alternatives have been explored. The duration of temporary closure or restriction orders shall be limited to 24 months or less; however, certain situations may require longer closures and/or iterative temporary closures. This may include closure of routes or areas. | No change proposed. |
| Action TTM-1.4: During route designation and travel planning in PHMA, travel management will evaluate the need for permanent or seasonal route or area closures where vehicle use is causing or will cause considerable adverse effects on habitat. | No change proposed. |
| Action TTM-1.7: In PHMA, during site-specific travel and transportation management planning, use existing routes or realignments, as described above, to access valid existing rights that are not yet developed. If valid existing rights cannot be accessed via existing routes, then build any new route to the absolute minimum standard necessary. | No change proposed. |
| ***Management Decisions: Livestock Grazing*** | |
| Action LG-1.1: GRSG habitat objectives will be considered when evaluating an allotment's conformance with land health standards (see Appendix F in the Lewistown Field Office Proposed RMPA/Final EIS) prior to renewing a grazing authorization. | Potential change under Alternatives 3, 4, 5, and 6. |
| Action LG-1.2: In PHMA and GHMA, conduct land health evaluations and determinations that include (at a minimum) indicators and/or measurements of structure/condition/composition of vegetation specific to achieving GRSG habitat objectives. Management actions will be developed and implemented within one year if land health determinations indicate that an allotment is not meeting standards due to current livestock grazing. Appendix D addresses mid-scale monitoring. | Potential change under Alternatives 3, 4, 5, and 6. |

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| (Same as Wildlife MD-43e): The area will remain available for livestock grazing. Site-specific Greater Sage-Grouse habitat and management objectives will be developed for BLM land and incorporated into the respective AMPs or livestock grazing permits as appropriate. Third order (fine-scale) and fourth order (site-scale) habitat indicators and characteristics for sage-grouse habitat seasonal use areas as described in the Sage-Grouse Habitat Assessment Framework (Stiver, et al. 2015) will be used to quantify habitat objectives. | Potential change under Alternatives 3, 4, 5, and 6. |
| Action LG-1.7: In PHMA, conduct land health evaluations and determinations that include (at a minimum) indicators and/or measurements of structure/condition/composition of vegetation specific to achieving GRSG habitat objectives. Management actions will be developed if land health determinations indicate that an allotment is not meeting standards due to current livestock grazing. Appendix D addresses mid-scale monitoring. | Potential change under Alternatives 3, 4, 5, and 6. |
| Action LG-1.9: In PHMA and GHMA, conduct land health evaluations and determinations that include (at a minimum) indicators and/or measurements of structure/condition/composition of vegetation specific to achieving GRSG habitat objectives. Management actions will be developed if land health determinations indicate that an allotment is not meeting standards due to livestock grazing in accordance with BLM grazing regulations 43 CFR, Part 4100. Appendix D addresses mid-scale monitoring. | Potential change under Alternatives 3, 4, 5, and 6. |
| (Same as Livestock Grazing MD-12): The BLM will prioritize (1) the review of grazing permits/leases, in particular to determine if modification is necessary prior to renewal, and (2) the processing of grazing permits/leases in SFA followed by PHMA outside of the SFA. In setting workload priorities, precedence will be given to existing permits/leases in these areas not meeting Land Health Standards, with focus on those containing riparian areas, including wet meadows. The BLM may use other criteria for prioritization to respond to urgent natural resource concerns (e.g., fire) and legal obligations. | Potential change under Alternatives 3, 4, 5, and 6. |
| Action LG-1.6: Allotments that have the best opportunities for conserving, enhancing, or restoring habitat for GRSG will receive high priority for monitoring, evaluation, and management. | Potential change under Alternatives 3, 4, 5, and 6. |

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| Action LG 1.5: The BLM will prioritize (1) the review of grazing permits/leases in particular to determine if modification is necessary prior to renewal): and (2) the processing of grazing permits/leases in in SFA, followed by PHMA. In setting will prioritize (1) the review of grazing permits/leases in particular to determine if modification is necessary prior to renewal): and (2) the processing of grazing permits/leases in in SFA, followed by PHMA. In setting workload priorities, precedence will be given to existing permits/leases in these areas not meeting Land Health Standards, with focus on those containing riparian areas, including wet meadows. The BLM may use other criteria for prioritization to respond to urgent natural resource concerns (e.g., fire) and legal obligations.<br>The NEPA analysis for renewals and modifications of livestock grazing permits/leases that include lands within PHMA will include specific management thresholds, based on GRSG Habitat Objectives (Table 2-2), Land Health Standards (43 CFR, Part 4180.2) and ecological site potential, and one or more defined responses that will allow the authorizing officer to make adjustments to livestock grazing that have already been subjected to NEPA analysis.<br><br>Ecological site descriptions, riparian PFC protocols, water quality data, and various types of appropriate vegetative, riparian, habitat, and any other applicable data will continue to be used as the basis in allotment evaluations to determine conformance to Standards for Land Health and Guidelines for Livestock Grazing Management (see Appendix F, in the Lewistown Field Office Proposed RMPA/Final EIS) | Potential change under Alternatives 3, 4, 5, and 6. |
| Action LG 1.5 [part]: Allotments within SFA, followed by those within PHMA, and focusing on those containing riparian areas, including wet meadows, will be prioritized for field checks to help ensure compliance with the terms and conditions of the grazing permits. Field checks can include monitoring for actual use, utilization, and use supervision. | Potential change under Alternatives 3, 4, 5, and 6. |
| Action LG-1.8: The BLM will monitor grazing permits/leases renewed or modified in accordance with the direction contained in this guidance as follows: Allotments within SFA, followed by those in other PHMA, and focusing on those with riparian areas, will be prioritized for monitoring to ensure compliance with the terms and conditions in the permits. The BLM will collect, at a minimum, the following monitoring data:<br>· Vegetation Condition<br>· Actual Use<br>· Utilization<br>· Use Supervision | Potential change under Alternatives 3, 4, 5, and 6. |

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| Action LG-1.21: Evaluate the role of existing seedings that are currently composed of primarily introduced perennial grasses in and adjacent to PHMA to determine if they should be restored to sagebrush or habitat of higher quality for GRSG. If these seedings are part of a grazing management plan that is providing value in conserving or enhancing native rangelands in PHMA and other priority wildlife habitats, then no restoration will be necessary. Assess the compatibility of these seedings for GRSG habitat or as a component of a grazing system during the land health evaluation and determination process. | Potential change under Alternatives 3, 4, 5, and 6. |
| Action LG-1.26: When developing or modifying water developments in PHMA and GHMA, use applicable RDFs (Appendix C) to reduce potential impacts from West Nile virus. | Potential change under Alternatives 3, 4, 5, and 6. |
| Action LG-1.27: During the land health evaluation and determination and grazing authorization renewal process (typically every 10 years), examine existing structural range improvements and location of supplements (salt or protein blocks) to ensure they conserve, enhance or restore PHMA.<br>· Identify and mark fences in high and moderate risk areas, as identified by the use of "The Fence Collision Risk Tool" (http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/) within PHMA, based on proximity to lek, lek size, and topography (Stevens 2011, Stevens et al. 2013).<br>· During the allotment evaluation and determination and grazing authorization renewal process, examine existing structural range improvements to ensure they conserve, enhance, or restore PHMA.<br>· In PHMA and GHMA, monitor for and treat invasive and noxious weed species associated with existing range improvement projects. | Potential change under Alternatives 3, 4, 5, and 6. |
| Action LG-1.24: In PHMA, site and design new structural range improvements and location of supplements (salt or protein blocks) to conserve, enhance, or restore said habitat through an improved grazing management system relative to GRSG habitat objectives. Structural range improvements, in this context, include cattle guards, fences, exclosures, corrals, or other livestock handling structures; pipelines, troughs, storage tanks (including movable tanks used in livestock water hauling), windmills, ponds/reservoirs, solar panels, and spring developments). | Potential change under Alternatives 3, 4, 5, and 6. |

| Lewistown RMP Revision | Potential Change in 2023 Plan |
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| Action LG-1.18: Within PHMA, reduce hot season grazing on riparian and meadow complexes to promote recovery or maintenance of appropriate vegetation and water quality. Use fencing/herding techniques or seasonal use or livestock distribution changes to reduce pressure on riparian or wet meadow vegetation used by GRSG in summer. Hot season use of riparian and wet meadow complexes may be authorized where consistent with overall GRSG habitat objectives and where use is currently resulting in vegetative conditions that are in conformance with land health standards. | Potential change under Alternatives 3, 4, 5, and 6. |
| Action LG-1.4: In PHMA, cooperate with ranchers and other agencies on integrated ranch planning so operations with intermingled land ownerships within BLM allotments can be planned as single units. | Potential change under Alternatives 3, 4, 5, and 6. |
| Action LG-1.10: Conserve, enhance, or restore PHMA based on ecological site descriptions (including wetlands and riparian areas). If an effective grazing system that meets GRSG habitat objectives is not already in place, analyze at least one allotment-specific alternative within the planning unit/permit renewal process that conserves, restores, or enhances PHMA. | Potential change under Alternatives 3, 4, 5, and 6. |
| Action LG-1.11: In PHMA, manage for vegetation composition and structure consistent with ecological site potential within the reference state to achieve GRSG seasonal habitat objectives. Natural ecological processes that impede localized site potential and that create a mosaic of habitat successional patterns will continue to occur. | Potential change under Alternatives 3, 4, 5, and 6. |
| Action LG-1.12: In PHMA, implement management actions within or outside of the watershed planning/permit renewal process to modify grazing management and to meet seasonal GRSG habitat objectives. Consider singly, or in combination, for changes in:<br>· Season or timing of use<br>· Numbers of livestock (includes temporary non-use or livestock removal)<br>· Distribution of livestock use<br>· Intensity of use<br>· Type of livestock | Potential change under Alternatives 3, 4, 5, and 6. |

| Lewistown RMP Revision | Potential Change in 2023 Plan |
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| Action LG-1.13: During drought periods, prioritize evaluating effects of the drought in PHMA, relative to their needs for food and cover. Drought management will continue to be in accordance with the Montana/Dakotas drought policy (see Appendix I, Drought Policy, in the Lewistown Field Office Proposed RMPA/Final EIS). Since there is a lag in vegetation recovery following drought, post-drought management will be implemented to allow for vegetation recovery that meets GRSG needs in PHMA. In accordance with BLM grazing regulation 43 CFR, Part 4130.3-3, consultation, cooperation, and coordination with owners or lessees having lands or managing resources within the area, the affected cooperative state grazing district, and interested public will be completed prior to adjusting post-drought livestock management if the grazing permit is being modified to make these adjustments. Implementation of adjustments will be initiated through documented agreement or by decision of the authorized officer in accordance with BLM grazing regulation 43 CFR, Part 4160. | Potential change under Alternatives 3, 4, 5, and 6. |
| Action LG 1.5 (part): At the time a permittee or lessee voluntarily relinquishes a grazing permit or lease, the BLM will consider whether the public lands where that permitted use was authorized shall remain available for livestock grazing or be used for other resource management objectives, such as reserve common allotments or fire breaks. This does not apply to or impact grazing preference transfers, which are addressed in 43 CFR, 4110.2-3. | Potential change under Alternatives 3, 4, 5, and 6. |

**Table 1. Lewistown Habitat Objectives for GRSG**

| Attribute | Indicator | Desired Condition | Reference |
|---|---|---|---|
| **BREEDING, NESTING, AND EARLY BROOD REARING (Seasonal Use Period: March 1 to June 30)** | | | |
| Lek Security | Proximity of trees | Trees or other tall structures are not within line of sight of lek and absent or uncommon within 3 kilometers (km) (1.9 miles) of the lek. | Connelly et al. 2000 |
| | Collision Risks | Fences and other structures that pose a high collision risk are absent or mitigated with visual markers. | Connelly et al. 2000. Stevens 2011 |
| | Proximity of sagebrush to leks | Adjacent protective sagebrush cover within 100 meters (m; 328 feet [ft.]) of an active lek. | Stiver et al. 2015 |
| Cover | Sagebrush cover | 10-25% | Berkeley et al. 2013<br>Connelly et al. 2000<br>Doherty et al. 2010<br>Lane 2005<br>Hagen et al. 2007<br>Sant et al. 2014 |
| | Sagebrush height | 40-80 centimeters (cm) (15.7-31.5 inches) individual sagebrush available within stand (for nesting) with a variety of heights (including those <40 cm [<15.7 inches]). | Connelly et al. 2000<br>Lane 2005 |
| | Predominant sagebrush shape | Spreading | Stiver et al. 2015 |
| | Perennial grass cover (such as bluebunch wheatgrass, green needlegrass and western wheatgrass) | ≥15% | Connelly et al. 2000<br>Lane 2005<br>Sant et al. 2014 |
| | Perennial grass and forb height (includes residual grasses) | ≥18 cm (≥7.1 inches) | Berkeley et al. 2013<br>Connelly et al. 2000<br>Doherty et al. 2014<br>Hagen et al. 2007<br>Taylor et al. 2012 |
| | Perennial forb cover | ≥10% | Connelly et al. 2000<br>Sant et al. 2014 |

| Attribute | Indicator | Desired Condition | Reference |
|---|---|---|---|
| **LATE BROOD-REARING/SUMMER (Seasonal Use Period: July 1 to October 31)** | | | |
| Cover | Sagebrush cover | 5-25% | Connelly et al. 2000<br>Lane 2005<br>Hagen et al. 2007<br>Sant et al. 2014 |
| | Sagebrush height | 40-80 cm (15.7-31.5 inches) individual sagebrush available within stand (for nesting) with a variety of heights (including those <40 cm [<15.7 inches]). | Connelly et al. 2000<br>Lane 2005 |
| | Perennial grass and forb cover | ≥25% | Connelly et al. 2000<br>Hagen et al. 2007<br>Sant et al. 2014 |
| | Riparian areas/mesic meadows | 80% or more of PHMA in Proper Functioning Condition (PFC) or higher. | Prichard et al. 1999<br>Schroeder et al. 1999<br>USDI BLM 1997 |
| | Upland and riparian perennial forb availability | Preferred forbs are common with several preferred species present | Connelly et al. 2000<br>Stiver et al. 2015 |
| **WINTER (Seasonal Use Period: November 1 to February 28)** | | | |
| Cover and Food | Sagebrush cover | ≥10% | Wallestad 1975<br>Connelly et al. 2000<br>Sant et al. 2014 |
| | Sagebrush height | ≥25cm (≥9.8 inches) | Connelly et al. 2000. |

### 2.7.2 Relevant Appendices

The following table shows which appendices from the 2015 and 2021 plans have management direction that may change through this RMP amendment. The 2015 Appendices can be found on the Lewistown GRSG ePlanning website. The 2021 Appendices can be found on the Lewistown RMP ePlanning website.

| ARMPA Appendix Name | Year | Potential for Change in 2023 Plan |
|---|---|---|
| A: Figures | 2021 | Yes |
| B: Collaboration and Coordination | 2021 | No |
| C: RMP Amendments, Implementation-Level Plans, and Related Land Use Plans | 2021 | No |
| D: Implementation and Monitoring | 2021 | No |
| E: Special Status Species Confirmed or Likely to Inhabit the Planning Area | 2021 | No |
| F: Design Features and Best Management Practices | 2021 | Yes (grazing BMPs) |
| G: Reclamation | 2021 | No |
| H: Draft Air Resource Management Plan: Adaptive Management Strategy for Oil and Gas Resources | 2021 | No |
| I: Fire and Emergency Stabilization and Rehabilitation | 2021 | No |
| J: Impoundments | 2021 | No |
| K: North Continental Divide Ecosystem Grizzly Bear Conservation Strategy | 2021 | No |
| L: Stipulations and Allocations Applicable to Fluid Minerals Leasing | 2021 | Yes |
| M: Summary of the Lewistown Field Office Wilderness Characteristics: 2014 Update | 2021 | No |
| N: BLM Standards for Rangeland Health and Guidelines for Livestock Grazing Management Grazing | 2021 | No |
| O: Allotments | 2021 | No |
| P: Drought Policy | 2021 | No |

| ARMPA Appendix Name | Year | Potential for Change in 2023 Plan |
|---|---|---|
| Q: Recreation Management Areas | 2021 | No |
| R: Land Ownership Adjustment Categories | 2021 | No |
| S: Withdrawal Segregations | 2021 | No |
| T: Areas of Critical Environmental Concern: Report on the Application of the Relevance and Importance Criteria | 2021 | No |
| U: Land Management Allocations | 2021 | No |
| V: Draft Wild and Scenic River Report | 2021 | No |
| W: Analysis Assumptions and Cumulative Effect Scenario | 2021 | No |
| X: Public Comments and BLM Response | 2021 | No |
| A - Approved RMP Amendment Maps | 2015 | Yes – See also 2021 |
| B - Applying Lek Buffer Distances When Approving Actions | 2015 | Yes |
| C - Required Design Features | 2015 | Yes – See also 2021 (grazing BMPs) |
| D - The Greater Sage-Grouse Monitoring Framework | 2015 | Yes |
| E - Greater Sage-Grouse Disturbance Caps | 2015 | Yes |
| F - Regional Mitigation Strategy | 2015 | Yes |
| G - Oil and Gas Stipulations | 2015 | N/A – See 2021 |
| H - GRSG Wildfire and Invasive Species Habitat Assessment | 2015 | Yes |
| I - Adaptive Management Strategy for Greater Sage-Grouse Habitat Management | 2015 | Yes |

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# Appendix 2.8
# Miles City RMP

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## 2.8 MILES CITY RMP

This appendix presents the approved RMP revision language from the record of decision for the Miles City RMP that relate to GRSG management. The table below notes which goals, objectives, appendices, and management decisions/actions have a potential to change as a result of the current planning effort and if so, under which alternatives changes are being considered. Note that any references to tables and appendices are to those applicable RMP appendices that are listed in **Section 2.8.2** of this appendix.

### 2.8.1 Existing GRSG RMP Management – Miles City RMP

**Table 1. Summary of Goals, Objectives, and Management Actions in Miles City RMP**

| Miles City RMP Revision | Potential Change in 2023 Plan |
|---|---|
| ***Management Decisions: Vegetation Communities*** | |
| Objective 5: In all PHMA, the desired condition is to maintain all lands ecologically capable of producing sagebrush (but no less than 70%) with a minimum of 15% sagebrush cover or as consistent with specific ecological site conditions. The attributes necessary to sustain these habitats are described in Interpreting Indicators of Rangeland Health (BLM Tech Ref 1734-6). | Potential change under Alternatives 3, 4, 5, and 6. |
| MD 2: Remove conifers encroaching into sagebrush habitats, in a manner that considers tribal cultural values. Prioritize treatments closest to occupied GRSG habitats and near occupied leks, and where juniper encroachment is phase 1 or phase 2. Use of site-specific analysis and principles like those included in the Fire and Invasive Species Team (FIAT) report (Chambers et. al., 2014) and other ongoing modeling efforts to address conifer encroachment will help refine the location for specific priority areas to be treated. | Potential change under Alternatives 3, 4, 5, and 6. |
| ***Management Decisions: Terrestrial and Aquatic Wildlife Resources*** | |
| Goal 1: Provide for the conservation, enhancement, restoration, and connectivity of the Northern Great Plains mixed grass prairie and shrubland, capable of supporting sustainable populations of GRSG and other wildlife species. | Potential change under Alternatives 3, 4, 5, and 6. |
| Objective 2: Conserve GRSG habitat while promoting movement and genetic diversity | Potential change under Alternatives 3, 4, 5, and 6. |
| PHMA Objective 2: Restore degraded GRSG habitat. | Potential change under Alternatives 3, 4, 5, and 6. |
| PHMA Objective 1: Maintain or increase GRSG habitat over the long-term, recognizing valid existing rights. | Potential change under Alternatives 3, 4, 5, and 6. |
| (GHMA) Goal 1: Maintain or increase habitat needed for GRSG through the management of surface disturbing and disruptive activities, including the loss and distribution of sagebrush habitat. | Potential change under Alternatives 3, 4, 5, and 6. |
| MD-1 (part): In undertaking BLM management actions and consistent with valid and existing rights and applicable law in authorizing third-party actions, the BLM will apply the lek buffer-distances identified in the United States geological Survey (USGS) Report (see Appendix B, GRSG Conservation Buffer). [GHMA] | Potential change under Alternatives 3, 4, 5, and 6. |
| RHMA Objective 1: Strive for proponents to develop area-wide Habitat Recovery Plans. | Potential change under Alternatives 3, 4, 5, and 6. |

| Miles City RMP Revision | Potential Change in 2023 Plan |
|---|---|
| RHMA Objective 2: Strive for no net loss of GRSG habitat. | Potential change under Alternatives 3, 4, 5, and 6. |
| RHMA Objective 3: Strive for the restoration of previously disturbed landscapes in a manner which increases or improves the quality and quantity of GRSG habitat. | Potential change under Alternatives 3, 4, 5, and 6. |
| All HMAs Objective 1: Maintain, improve and increase sagebrush habitats to sustain sagebrush obligates and other sagebrush dependent species. | Potential change under Alternatives 3, 4, 5, and 6. |
| In addition, surface occupancy and use within 2 miles of leks is restricted or prohibited. Prior to such activities, a plan to mitigate impacts on nesting GRSG or their habitat will be prepared by the proponent and implemented upon approval, by the Authorized Officer (AO) (CSU) (652,000 acres). [GHMA] | Potential change under Alternatives 3, 4, 5, and 6. |
| MD 3 (part): PHMA is managed according to the following prescriptions: In undertaking BLM management actions, and consistent with valid and existing rights and law in authorizing third-party actions, the BLM will apply the lek buffer-distances identified in the USGS Report Conservation Buffer Distance Estimates for Greater Sage-grouse – A Review (Open File Report 2014-1239), in accordance with Appendix B, GRSG Conservation Buffer. | Potential change under Alternatives 3, 4, 5, and 6. |
| ***Management Decisions: Habitat Objectives*** | |
| **[Original language updated through plan maintenance action in 2018]**<br><br>The habitat objectives for GRSG (Table 2.3-2) is a list of indicators, characteristics, and values that describe GRSG seasonal habitat use areas. The BLM used indicator values derived from a synthesis of local and regional GRSG habitat research and data to describe the typical vegetation communities that sage-grouse select. While the habitat objectives are not attainable on every site or every acre within designated GRSG habitat management areas, the values reflect a range of habitat conditions that generally lead to greater survival of individuals within a population. When permitting land use activities, BLM should consider the ecological site potential within designated habitat management areas to validate the habitat conditions achievable for a specific site.<br>The seasonal habitat descriptions in Table 2.3-2 vary across the range of sage-grouse, within a subregion, and between sites. They are not land health standards but are quantitative measures that inform the Special Status Species Habitat Land Health Standard for sage-grouse. These measurable values reflect ecological potential, and may be adjusted based on local factors influencing sage-grouse habitat selection. Local data or recent science may indicate that sage-grouse select for vegetation structure and composition in seasonal habitats not characterized by the values in the habitat objectives table. In these cases, it may be appropriate to adjust the values. Habitat objectives | Potential change under Alternatives 3, 4, 5, and 6. |

| Miles City RMP Revision | Potential Change in 2023 Plan |
|---|---|
| should be evaluated in the context of annual variability in ecological conditions and should not be used singly to determine habitat suitability for sage-grouse. They may be used to demonstrate trends over time, during plan evaluations for effectiveness of sage-grouse conservation, or when identify limiting habitat characteristics for a given area.<br><br>The indicators, characteristics, values and desired seasonal habitat conditions in the GRSG Plan Habitat Objectives Table are meant to inform the wildlife habitat component of the Land Health Standards evaluation process (LHS, 43 CFR 4180.2), but do not replace rangeland health assessments. Results from the LHS evaluation should be used to support BLM in land use authorization processes and during development of objectives for management actions such as vegetation treatments. BLM land use authorizations will contain terms and conditions regarding the actions needed to achieve or make progress toward achieving habitat objectives and land health standards. The Habitat Objectives Tables are to be used:<br>• To assess habitat suitability for sage-grouse following the BLM policy on sage-grouse habitat assessments<br>• To evaluate land use plan effectiveness for sage-grouse conservation, and<br>• As a basis to develop measurable project objectives for actions in BLM-designated GRSG Habitat Management areas when considered alongside land health standards, ecological potential and local information.<br>References: U.S. Department of the Interior, Bureau of Land Management. 2001. Rangeland health standards handbook H-4180-1. https://www.blm.gov/sites/blm.gov/files/uploads/Media_Library_BLM_Policy_h4180-1.pdf | *(See above.)* |

| Miles City RMP Revision | Potential Change in 2023 Plan |
|---|---|
| ***Management Decisions: Disturbance*** | |
| MD 3 (part): PHMA is managed according to the following prescriptions: If the 3% anthropogenic disturbance cap is exceeded on lands (regardless of land ownership) or if anthropogenic disturbance and habitat loss associated with conversion to agricultural tillage or fire exceed 5% within a analysis area in PHMA, then no further discrete anthropogenic disturbances (subject to applicable laws and regulations, such as the Mining Law of 1872, valid existing rights, etc.) will be permitted by BLM within PHMA in a analysis area until the disturbance has been reduced to less than the cap.<br><br>If the 3% anthropogenic disturbance cap is exceeded on lands (regardless of land ownership) within GRSG PHMA in any given BSU, then no further discrete anthropogenic disturbances (subject to applicable laws and regulations, such as the Mining Law of 1872, as amended, valid existing rights, etc.) will be permitted by BLM within GRSG PHMA in any given BSU until the disturbance has been reduced to less than the cap.<br><br>If the BLM determines that the State of Montana has adopted a GRSG Habitat Conservation Program that contains comparable components to those found in the State of Wyoming's Core Area Strategy including an all lands approach for calculating anthropogenic disturbances, a clear methodology for measuring the density of operations, and a fully operational Density Disturbance Calculation Tool, the 3% disturbance cap will be converted to a 5% cap for all sources of habitat alteration within an analysis area.<br><br>[Management action clarified in 2018 to reflect State of Montana process, under DOI-BLM-MT-2018-0005-CX. RMP Maintenance Action Language: This maintenance action is to clarify that the BLM has determined that the State's all lands approach to analyzing disturbance is operational and effective. Therefore, the BLM will adopt and implement the State's approach as identified in Attachments D (Stipulations for Uses and Activities) and H (definitions) of Montana Executive Order 12-2015.] | Potential change under Alternatives 3, 4, 5, and 6. |
| MD 1: In all GRSG habitat, in undertaking BLM management actions, and, consistent with valid existing rights and applicable law, in authorizing third-party actions that result in habitat loss and degradation, the BLM will require and ensure mitigation that provides a net conservation gain to the species including accounting for any uncertainty associated with the effectiveness of such mitigation. This will be achieved by avoiding, minimizing, and compensating for impacts by applying beneficial mitigation actions. | Potential change under Alternatives 3, 4, 5, and 6. |

| Miles City RMP Revision | Potential Change in 2023 Plan |
|---|---|
| MD 2: Will follow the adaptive management strategy outlined in Appendix H, GRSG Adaptive Management Strategy. The hard and soft trigger data will be analyzed as soon as it becomes available after the signing of the ROD and then at a minimum, analyzed annually thereafter. | Potential change under Alternatives 3, 4, 5, and 6. |
| ***Management Decisions: Wildland Fire Ecology and Management*** | |
| MD 3: If prescribed fire is used in GRSG habitat, the NEPA analysis for the Burn Plan will address:<br>-why alternative techniques were not selected as a viable options;<br>-how GRSG goals and objectives will be met by its use;<br>-how the COT Report objectives will be addressed and met;<br>-a risk assessment to address how potential threats to GRSG habitat will be minimized<br><br>Prescribed fire as vegetation or fuels treatment shall only be considered after the NEPA analysis for the Burn Plan has addressed the four bullets outlined above. Prescribed fire could be used to meet specific fuels objectives that will protect GRSG habitat in PHMA (e.g., creation of fuel breaks that will disrupt the fuel continuity across the landscape in stands where annual invasive grasses are a minor component in the understory, burning slash piles from conifer reduction treatments, used as a component with other treatment methods to combat annual grasses and restore native plant communities).<br><br>Prescribed fire in known winter range shall only be considered after the NEPA analysis for the Burn Plan has addressed the four bullets outlined above. Any prescribed fire in winter habitat will need to be designed to strategically reduce wildfire risk around and/or in the winter range and designed to protect winter range habitat quality. | Potential change under Alternatives 3, 4, 5, and 6. |
| MD 1: The BLM will prioritize fire management activities according to potential risks to life and property across the planning area. Wildfires adjacent to or near wildland urban or industrial interface will have the highest priority for fire suppression. In PHMA, prioritize suppression, after life and property, to conserve the habitat. In GHMA, prioritize suppression where wildfires threaten PHMA. | No change proposed. |
| ***Management Decisions: Lands and Realty*** | |
| MD 5: Lands classified as PHMA and GHMA for GRSG will be retained in federal management unless: (1) the agency can demonstrate that disposal of the lands, including land exchanges, will provide a net conservation gain to the GRSG or (2) the agency can demonstrate that the disposal, including land exchanges, of the lands will have no direct or indirect adverse impact on conservation of the GRSG. | No change proposed. |

| Miles City RMP Revision | Potential Change in 2023 Plan |
|---|---|
| MD 3 (part): PHMA is managed according to the following prescriptions: Major (high voltage transmission lines and large pipelines) and minor ROWs will avoid GRSG priority areas (817,000 acres). | Potential change under Alternatives 3, 4, 5, and 6. |
| MD 1 (part): Major ROWs (100 kv and over for high voltage transmission lines and 24 inch in width and over for large pipelines) and renewable energy ROWs will avoid GRSG GHMA (1,395,000 acres).<br><br>Minor ROWs will be allowed with design features to protect breeding, nesting and brood rearing in GRSG GHMA (1,365,000 acres). | Potential change under Alternatives 3, 4, 5, and 6. |
| MD 3 (part): PHMA is managed according to the following prescriptions: Renewable Energy ROWs will be excluded within GRSG priority areas (817,000 acres). | Potential change under Alternatives 3, 4, 5, and 6. |
| MD 1 (part): Surface-disturbing and disruptive activities will be allowed with required design features to minimize disturbance to GRSG habitat (87,000 acres).<br>-Renewable Energy ROWs will be excluded within all Restoration Areas.<br>-Major ROWs will be avoided and minor ROWs will be allowed with design features. | Potential change under Alternatives 3, 4, 5, and 6. |
| MD 4: Consider the likelihood of development of not-yet-constructed surface-disturbing activities – as defined in Table 2 of the Monitoring Framework (Appendix D)−under valid existing rights prior to authorizing new projects in PHMA. | No change proposed. |
| ***Management Decisions: Fluid Mineral Resources*** | |
| MD 8 (partial): Where the federal government owns the surface and the mineral estate is in non-federal ownership in PHMA and GHMA, apply appropriate surface use COAs, stipulations, and mineral RDFs through ROW grants or other surface management instruments, to the maximum extent permissible under existing authorities, in coordination with the mineral estate owner/lessee. | No change proposed. |
| MD 8 (partial): Where the federal government owns the mineral estate in PHMA and GHMA, and the surface is in non-federal ownership, apply the same stipulations, conditions of approval (COAs), and/or conservation measures and RDFs applied if the mineral estate is developed on BLM-administered lands in that management area, to the maximum extent permissible under existing authorities, and in coordination with the landowner. | Potential change under Alternatives 3, 4, 5, and 6. |
| MD-1 (part): Other surface-disturbing and disruptive activities (including Mineral Material Sales) will be allowed with design features to protect breeding, nesting, and brood-rearing GRSG habitat (1,365,000 acres). [GHMA] | Potential change under Alternatives 3, 4, 5, and 6. |

| Miles City RMP Revision | Potential Change in 2023 Plan |
|---|---|
| Objective 3: Priority will be given to leasing and development of fluid minerals outside of PHMA and GHMA. When analyzing leasing and authorizing development of fluid mineral resources in PHMA and GHMA, and subject to applicable stipulations for the conservation of GRSG, priority will be given to development in non-habitat areas first and then in the least suitable habitat for GRSG. The implementation of these priorities will be subject to valid existing rights and any applicable law or regulation, including, but not limited to, 30 United States Code (U.S.C.) 226(p) and 43 CFR, Part 3162.3-1(h). | Potential change under Alternatives 3, 4, 5, and 6. |
| Objective 4: Where a proposed fluid mineral development on an existing lease could adversely affect GRSG populations or habitat, the BLM will work with the lessees, operators, or other proponents to avoid, minimize and mitigate adverse impacts to the extent compatible with lessees' rights to drill and produce fluid mineral resources. The BLM will work with the lessees, operators, or other proponent in developing an application for permit to drill (APD) for the lease to avoid and minimize impacts on GRSG or its habitat and will ensure that the best information about the GRSG and its habitat informs and helps to guide development of such Federal leases. | No change proposed. |
| MD 3 (part): PHMA is managed according to the following prescriptions: Oil and gas leasing is open and surface occupancy and use is prohibited within sage grouse priority areas (NSO (1,329,000 acres). | Potential change under Alternatives 3, 4, 5, and 6. |
| MD-1 (part): Oil and gas leasing is open and surface occupancy and use is prohibited within 0.6 miles of the perimeter of leks (NSO) (61,000 acres). | Potential change under Alternatives 3, 4, 5, and 6. |

| Miles City RMP Revision | Potential Change in 2023 Plan |
|---|---|
| MD 3 (part): PHMA is managed according to the following prescriptions: No waivers or modifications to a fluid mineral lease no-surface occupancy stipulation will be granted. The AO may grant an exception to a fluid mineral lease no-surface occupancy stipulation only where the proposed action:<br>i. Will not have direct, indirect, or cumulative effects on GRSG or its habitat; or,<br>ii. Is proposed to be undertaken as an alternative to a similar action occurring on a nearby parcel, and will provide a clear conservation gain to GRSG.<br><br>Any exceptions to this lease stipulation may be approved by the AO only with the concurrence of the State Director. The AO may not grant an exception unless the applicable state wildlife agency, the USFWS, and the BLM unanimously find that the proposed action satisfied (i) or (ii). Such finding shall initially be made by a team of one field biologist or other GRSG expert from each respective agency. In the event the initial finding is not unanimous, the finding may be elevated to the appropriate BLM State Director, USFWS State Ecological Services Director, and state wildlife agency head for final resolution. In the event their finding is not unanimous, the exception will not be granted. Approved exceptions will be made publically available at least quarterly. | Potential change under Alternatives 3, 4, 5, and 6. |
| MD 1 (part): Surface-disturbing and disruptive activities will be allowed with required design features to minimize disturbance to GRSG habitat (87,000 acres).<br>-Oil and gas leasing is open and surface occupancy and use is subject to design features, to minimize disturbance to GRSG habitat in the Cedar Creek Area (CSU) (22,000 acres).<br>-In the West Decker (11,000 acres) and South Carter Area (164,000 acres) oil and gas leasing is open and surface occupancy and use is prohibited (NSO). | Potential change under Alternatives 3, 4, 5, and 6. |
| ***Management Decisions: Solid Leasable Minerals*** | |
| Action MR-3: At the time an application for a new coal lease or lease modification is submitted to the BLM, the BLM will determine whether the lease application area is "unsuitable" for all or certain coal mining methods pursuant to 43 CFR, Part 3461.5. PHMA is essential habitat for maintaining GRSG for purposes of the suitability criteria set forth at 43 CFR, Part 3461.5(o)(1). | Potential change under Alternatives 3, 4, 5, and 6. |

| Miles City RMP Revision | Potential Change in 2023 Plan |
|---|---|
| ***Management Decisions: Mineral Materials*** | |
| MD 3 (part): PHMA is managed according to the following prescriptions: PHMA are closed to new mineral material sales. However, these areas remain "open" to free use permits and the expansion of existing active pits, only if the following criteria are met:<br>-The activity is within the PHMA BSU and area disturbance cap.<br>-The activity is subject to the provisions set forth in the mitigation framework (Appendix F, GRSG Regional Mitigation Strategy).<br>-All applicable required design features are applied; and (if applicable) the activity is permissible under the specific subregional screening criteria. | Potential change under Alternatives 3 and 6. |
| ***Management Decisions: Recreation*** | |
| Management Direction REC-1: In PHMA, do not construct new recreation facilities (e.g., campgrounds, trails, trailheads, and staging areas) unless the development will have a net conservation gain to GRSG habitat (such as concentrating recreation, diverting use away from important areas, etc.), or unless the development is required for visitor health and safety or resource protection | No change proposed. |
| ***Management Decisions: Comprehensive Trails and Travel Management*** | |
| Objective 7: The BLM will strive to complete travel management planning using a developed strategy that sets time frames and prioritizes Travel Management Areas (TMAs). TMAs within the priority GRSG habitat area will strive to be prioritized and completed as funding and staffing allows. | No change proposed. |

| Miles City RMP Revision | Potential Change in 2023 Plan |
|---|---|
| MD 1: On BLM administered surface, including PHMA and GHMA, temporary closures will be considered in accordance with 43 CFR subpart 8364 (Closures and Restrictions); 43 CFR subpart 8351 (Designated National Area); 43 CFR subpart 6302 (Use of Wilderness Areas, Prohibited Acts, and Penalties); 43 CFR subpart 8341 (Conditions of Use).<br><br>Temporary closure or restriction orders under these authorities are enacted at the discretion of the AO to resolve management conflicts and protect persons, property, and public lands and resources. Where an AO determines that OHVs are causing or will cause considerable adverse effects upon soil, vegetation, wildlife, wildlife habitat, cultural resources, historical resources, threatened or endangered species, wilderness suitability, other authorized uses, or other resources, the affected areas shall be immediately closed to the type(s) of vehicle causing the adverse effect until the adverse effects are eliminated and measures implemented to prevent recurrence. (43 CFR, Part 8341.2) A closure or restriction order should be considered only after other management strategies and alternatives have been explored. The duration of temporary closure or restriction orders should be limited to 24 months or less; however, certain situations may require longer closures and/or iterative temporary closures. This may include closure of routes or areas. | No change proposed. |
| ***Management Decisions: Livestock Grazing*** | |
| MD LG-4: The NEPA analysis for renewals and modifications of livestock grazing permits/leases that include lands within PHMA will include specific management thresholds based on GRSG Habitat Objectives Table and Land Health Standards (43 CFR, Part 4180.2) and one or more defined responses that will allow the authorizing officer to make adjustments to livestock grazing that have already been subjected to NEPA analysis. | Potential change under Alternatives 3, 4, 5, and 6. |
| MD LG-3: The BLM will prioritize (1) the review of grazing permits/leases, in particular to determine if modification is necessary prior to renewal, and (2) the processing of grazing permits/leases in PHMA. In setting workload priorities, precedence will be given to existing permits/leases in these areas not meeting Land Health Standards, with focus on those containing riparian areas, including wet meadows. The BLM may use other criteria for prioritization to respond to urgent natural resource concerns (ex., fire) and legal obligations. | Potential change under Alternatives 3, 4, 5, and 6. |
| MD-5: Allotments within SFA, followed by those within PHMA, and focusing on those containing riparian areas, including wet meadows, will be prioritized for field checks to help ensure compliance with the terms and conditions of the grazing permits. Field checks can include monitoring for actual use, utilization, and use supervision. | Potential change under Alternatives 3, 4, 5, and 6. |

| Miles City RMP Revision | Potential Change in 2023 Plan |
|---|---|
| MD 1: Where deemed effective, water developments will be managed to reduce the spread of West Nile virus (see Appendix C, GRSG Required Design Features). | Potential change under Alternatives 3, 4, 5, and 6. |
| Management Direction 6: At the time a permittee or lessee voluntarily relinquishes a permit or lease, the BLM will consider whether the public lands where that permitted use was authorized should remain available for livestock grazing or be used for other resource management objectives, such as reserve common allotments or fire breaks. This does not apply to or impact grazing preference transfers, which are addressed in 43 CFR 4110.2-3. | Potential change under Alternatives 3, 4, 5, and 6. |

**Table 2. Miles City Habitat Objectives for GRSG**

| Attribute | Indicator | Desired Condition | References |
|---|---|---|---|
| **BREEDING, NESTING AND EARLY BROOD-REARING (Seasonal Use Period March 1-June 15)** | | | |
| Lek Security | Proximity of trees | .65–$Km^2$ (.388 miles) avoidance of coniferous habitats | Doherty 2008 |
| | Proximity of sagebrush to leks | Adjacent protective sagebrush cover within 328 ft. (100 m) of an occupied lek | Stiver et al. 2015 |
| Cover | Sagebrush canopy cover | 5-25% | Herman–Brunson 2007<br>Swanson 2009<br>Doherty et al. 2010<br>Hagen et al. 2007<br>Doherty et al. 2011<br>Foster et al. 2014<br>Wright and Wegner 2008 |
| | Sagebrush height | 6-31 inches (15-50cm) | Swanson 2009<br>Doherty et al. 2011<br>Schroeder et al. 1999<br>Holloran et al. 2005 |
| | Predominant sagebrush shape | Predominately spreading shape | Stiver et al. 2015 |
| | Perennial grass cover (such as western wheatgrass) | ≥10% | Doherty et al. 2010<br>Hagen et al. 2007<br>Doherty et al. 2011<br>Holloran et al. 2005 |
| | Perennial grass and forb height (includes residual grasses) | Adequate nest cover based on ecological site potential and seasonal precipitation; 4.4-11.3 inches (11.4-29 cm) | Doherty et al. 2014 |
| | Perennial forb canopy cover | ≥3% | Doherty et al. 2010<br>Hagen et al. 2007<br>Doherty et al. 2011<br>Holloran et al. 2005 |

| Attribute | Indicator | Desired Condition | References |
|---|---|---|---|
| **BROOD-REARING/SUMMER (Seasonal Use Period June 16-October 31)** | | | |
| Cover | Sagebrush canopy cover | 5-25% | Herman–Brunson 2007<br>Swanson 2009<br>Doherty et al. 2010<br>Hagen et al. 2007<br>Doherty et al. 2011<br>Foster et al. 2014 |
| | Sagebrush height | 6-31 inches (15-50cm) | Doherty et al. 2011<br>Foster et al. 2014<br>Schroeder et al. 1999<br>Holloran et al. 2005 |
| | Perennial grass canopy cover and forbs | ≥10% | Doherty et al. 2010<br>Hagen et al. 2007<br>Doherty et al. 2011<br>Holloran et al. 2005 |
| | Riparian areas/mesic meadows | Proper Functioning Condition | BLM 1997<br>Prichard et al. 1999<br>Prichard 1998 |
| | Upland and riparian perennial forb availability | Preferred forbs are common with several preferred species present. | Stiver et al. 2015<br>Doherty et al. 2011 |
| **WINTER (Seasonal Use Period November 1-February 28)** | | | |
| Cover and Food | Sagebrush canopy cover above snow | >10% | Swanson 2009<br>Foster et al. 2014<br>Schroeder et al. 1999 |
| | Sagebrush height above snow | 6-31 inches (15-50cm) | Doherty et al. 2011<br>Schroeder et al. 1999 |

### 2.8.2 Relevant Appendices

The following table shows which appendices from the 2015 plan have management direction that may change through this RMP amendment. The 2015 Appendices can be found on the Miles City RMP ePlanning website.

| ARMPA Appendix Name | Potential for Change in 2023 Plan |
|---|---|
| A: Approved RMP Maps | Yes |
| B: GRSG Conservation Buffer | Yes |
| C: GRSG Required Design Features | Yes |
| D: GRSG Monitoring Framework | Yes |
| E: GRSG Disturbance Cap | Yes |
| F: GRSG Regional Mitigation Strategy | Yes |
| G: Minerals Stipulations | Yes |
| H: Adaptive Management Strategy for GRSG Habitat Management | Yes |
| I: Air Resources and Climate | No |
| J: Fish, Aquatic and Wildlife Habitat Including Special Status Species | No |
| K: Livestock Grazing | No |
| L: Mitigation Measures and Conservation Actions | No |
| M: Monitoring | No |
| N: Reclamation | No |
| O: Recreation | No |
| P: Special Designation Areas | No |
| Q: Biological Opinion | No |

# Appendix 2.9

# Upper Missouri River Breaks National Monument RMP

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## 2.9 UPPER MISSOURI RIVER BREAKS NATIONAL MONUMENT RMP

This appendix presents the approved RMP revision language from the record of decision for the Upper Missouri River Breaks National Monument RMP that relate to GRSG management. The table below notes which goals, objectives, appendices, and management decisions/actions have a potential to change as a result of the current planning effort and if so, under which alternatives changes are being considered. Note that any references to tables and appendices are to those applicable RMP appendices that are listed in **Section 2.9.2** of this appendix.

### 2.9.1 Existing GRSG RMP Management – UMRBNM RMP

**Table 1. Summary of Goals, Objectives, and Management Actions in UMRBNM RMP**

| UMRBNM Revision | Potential Change in 2023 Plan |
|---|---|
| ***Management Decisions: Vegetation Communities*** | |
| The BLM will consider mechanical treatment as the primary method and prescribed fire as a secondary method to remove conifers encroaching on sage-grouse habitat, except where forested habitat is limited. | No change proposed. |
| The BLM will promote sage planting, where appropriate, on project areas (such as sites where sagebrush has been removed for crested wheat grass conversions) occurring within sage-grouse habitats and will reclaim and/or reseed areas disturbed by treatments. | No change proposed. |
| ***Management Decisions: Terrestrial and Aquatic Wildlife Resources*** | |
| Sage-grouse management will utilize the 2005 Management Plan and Conservation Strategies for Sage-Grouse in Montana – Final for overall guidance and direction. | Potential change under Alternatives 3, 4, 5, and 6. |
| ***Management Decisions: Habitat Objectives*** | |
| The BLM will manage for a healthy diverse vegetative community with a variety of forbs, and maintain big sagebrush and silver sage on sage-grouse wintering and nesting areas with a canopy cover of 15-30% and an average height of 12 inches. | Potential change under Alternatives 3, 4, 5, and 6. |
| ***Management Decisions: Disturbance*** | |
| **Greater Sage-Grouse –** The BLM will not authorize new surface-disturbing or disruptive activities within 1/4 mile of active leks, nor will it allow new surface-disturbing or disruptive activities within nesting areas (a 2-mile radius of an active lek) from March 1 to June 15. The BLM will not authorize any new surface-disturbing or disruptive activities in active sage-grouse winter habitat from December 1 to March 31. | Potential change under Alternatives 3, 4, 5, and 6. |

| UMRBNM Revision | Potential Change in 2023 Plan |
|---|---|
| The following mitigating measures will be applied to new surface-disturbing or disruptive activities for identified/important wildlife habitat in the Monument. Mitigating measures will be applied on a case-by-case basis during activity level planning after an on-site evaluation of the project area indicates the presence of a species. Exceptions to these mitigation measures may be granted by the authorized officer if an environmental review demonstrates there would be no adverse impacts, habitat for the species is not present in the area, or portions of the area can be occupied without affecting a particular species. Exceptions will also be considered for interim and final reclamation. | Potential change under Alternatives 3, 4, 5, and 6. |
| ***Management Decisions: Wildland Fire Ecology and Management*** | |
| The appropriate management response to all wildland fires will be based on firefighter and public safety and resource values on BLM, state, and private land while considering the natural role of fire. Fires could be managed with less than full suppression efforts and, in most cases, allowed to burn to natural barriers or roads. The cost of suppression will also be considered. Resource values, such as sage-grouse habitat, will be protected during wildland fire suppression through the knowledge of resource advisors assigned to wildland fire incidents and/or information on the location of critical resource areas available to incident commanders; however, protection for resource values will be secondary to life safety and property values. | No change proposed. |

| UMRBNM Revision | Potential Change in 2023 Plan |
|---|---|
| ***Management Decisions: Lands and Realty*** | |
| The BLM's goal is to provide reasonable access for the public and for private landowners, as well as for the administrative needs and authorized uses of industry and government agencies.<br>Under the Proclamation, all federal lands and interests in lands are "hereby appropriated and withdrawn from all forms of entry, location, selection, sale, or leasing or other disposition under the public land laws . . . and from disposition under all laws relating to mineral and geothermal leasing, other than by exchange that furthers the protective purposes of the monument. The establishment of this monument is subject to valid existing rights. . . . Lands and interests in lands within the proposed monument not owned by the United States shall be reserved as a part of the monument upon acquisition of title thereto by the United States."<br><br>In addition to the seven utility and transportation corridors that cross the Missouri River, the Klabzuba pipeline on the south side of the river will also be a designated corridor (Table 2.5). The corridor for the Klabzuba pipeline will only be on the south side of the river. The pipeline follows the McClelland/Stafford Ferry corridor on the north side of the river.<br><br>[Language about corridors is general, but included here for reference. RMP goes forward with specifics about each corridor.] | No change proposed. |
| Avoidance areas for ROWs include the scenic sections of the UMNWSR, the Bodmer Landscapes, the Cow Creek ACEC, cultural/historic sites, riparian and wetland areas, areas containing unique geologic formations, areas considered unsuitable due to erosion and slope, and sage-grouse seasonal habitat where impacts could not be mitigated or effectively controlled. | Potential change under Alternatives 3, 4, 5, and 6. |
| Applications for commercial wind energy systems, solar energy systems and communication sites will not be considered. | No change proposed. |

| UMRBNM Revision | Potential Change in 2023 Plan |
|---|---|
| ***Management Decisions: Fluid Mineral Resources*** | |
| *The BLM's goal is to provide reasonable oil and gas exploration and development on existing leased land without diminishing the objects of the Monument.*<br>The Proclamation does not allow new oil and gas leases in the Monument. The 43 federal oil and gas leases in the Monument are considered to have valid existing rights based upon the Proclamation, wherein it states "The establishment of this monument is subject to valid existing rights. The Secretary of Interior shall manage development on existing oil and gas leases within the monument, subject to valid existing rights, so as not to create any new impacts that would interfere with the proper care and management of the objects protected by this proclamation." The existing leases are also in compliance with their lease terms and conditions. | No change proposed. |
| [RMP includes language about managing O&G leases in general with consideration for the objects of the monument: Through the environmental review process, the BLM will determine the potential impacts of oil and gas operations and mitigation measures to avoid interference with the proper care and management of the objects protected by the Monument. If the analysis and documentation indicate that a proposal may have impacts that are not in conformance with the Proclamation, regulation, BMPs or existing resource management plans, the BLM will work with the applicant to find alternatives or modifications to the proposal that will minimize such impacts through special permit conditions, consistent with the applicant's rights under applicable laws, regulations and stipulations.<br>See the RMP for specific language.] | No change proposed. |

| UMRBNM Revision | Potential Change in 2023 Plan |
|---|---|
| **Conditions of Approval**<br>In addition to the oil and gas lease stipulations (Appendix H), reasonable conditions of approval, under BLM's authority to protect the objects in the Monument, will be applied to APDs. The conditions of approval will apply to all the oil and gas lease acreage (42,805 acres) in the Monument. The conditions of approval will be applied to the APD after an onsite evaluation indicates the presence of the specific resource and after considering the waivers, exceptions and modifications listed in Appendix H. The current APD review process will be utilized, which includes a 30-day posting period for public review of the proposal. The current stipulations (Form 3109-1) will apply to the portions of five of the 12 West HiLine leases that are outside the Monument (2,454 acres). Seasonal or distance restrictions will be placed on oil and gas activities to protect sage-grouse nesting areas and winter habitat, active ferruginous hawk nests, big game winter range, and bighorn sheep distribution and bighorn sheep lambing areas. | No change proposed. |
| *Greater Sage-Grouse Nesting Zone* – Surface-disturbing or disruptive activities will be prohibited from March 1 to June 15 in sage-grouse nesting habitat within 2 miles of a lek. Travel on identified designated roads may include these timing restrictions or limited site visits.<br><br>*Greater Sage-Grouse Winter Habitat* – Surface-disturbing or disruptive activities will be prohibited from December 1 to March 31 within winter habitat for sage-grouse. This condition will not apply to the operation and maintenance of production facilities. Travel on identified designated roads may include these timing restrictions or limited site visits.<br><br>*Greater Sage-Grouse Leks* – Surface-disturbing or disruptive activities will be prohibited within 1/4 mile of active sage-grouse leks. | Potential change under Alternatives 3, 4, 5, and 6. |
| Travel on identified designated roads will be restricted to the minimal vehicle size and type needed for the job. Due to resource issues, timing restrictions may be applied to site visits. For construction and heavy trucks related to production, equipment that exceeds 49dB will be restricted from being within 2 miles of sage-grouse leks between 4:00 a.m. and 8:00 a.m. and from 7:00 p.m. to 10:00 p.m. between March 1 and June 15. | No change proposed. |

| UMRBNM Revision | Potential Change in 2023 Plan |
|---|---|
| ***Management Decisions: Livestock Grazing*** | |
| Grazing permittees will avoid the placement of salt or mineral supplements near leks during the breeding season (March 1 to June 15). The placement of salt or mineral supplements by other entities will not be allowed. Supplemental winter feeding will not be allowed on sage-grouse winter habitat and around leks.<br><br>Concentrations of livestock near leks or winter habitat can disturb or displace sage-grouse. Therefore, concentrations of livestock on leks or other key sage-grouse habitats could be avoided by using conservative stocking levels*, locating salt or other supplements away from leks or winter habitat, adjusting grazing seasons and locating water facilities where they would not jeopardize habitat.<br><br>***Conservative Stocking Level**<br>Conservative stocking level is a stocking rate that will result in a moderate utilization level (or less) by livestock at the end of the grazing period for the year. A conservative stocking level will be established based on resource management goals including maintaining healthy vegetation; acceptable livestock performance; expected normal weather; and annual plant production consistent with the Standards for Rangeland Health and Guidelines for Livestock Grazing Management. | Potential change under Alternatives 3, 4, 5, and 6. |

## Table 2. UMRBNM Habitat Objectives for GRSG

| Attribute | Indicator | Desired Condition | Reference |
|---|---|---|---|
| **BREEDING, NESTING, AND EARLY BROOD REARING (Seasonal Use Period: March 1 to June 30)** | | | |
| Lek Security | Proximity of trees | Trees or other tall structures are not within line of sight of lek and absent or uncommon within 3 kilometers (km) (1.9 miles) of the lek. | Connelly et al. 2000 |
| | Collision Risks | Fences and other structures that pose a high collision risk are absent or mitigated with visual markers. | Connelly et al. 2000. Stevens 2011 |
| | Proximity of sagebrush to leks | Adjacent protective sagebrush cover within 100 meters (m; 328 feet [ft.]) of an active lek. | Stiver et al. 2015 |
| Cover | Sagebrush cover | 10-25% | Berkeley et al. 2013<br>Connelly et al. 2000<br>Doherty et al. 2010<br>Lane 2005<br>Hagen et al. 2007<br>Sant et al. 2014 |
| | Sagebrush height | 40-80 centimeters (cm) (15.7-31.5 inches) individual sagebrush available within stand (for nesting) with a variety of heights (including those <40 cm [<15.7 inches]). | Connelly et al. 2000<br>Lane 2005 |
| | Predominant sagebrush shape | Spreading | Stiver et al. 2015 |
| | Perennial grass cover (such as bluebunch wheatgrass, green needlegrass and western wheatgrass) | ≥15% | Connelly et al. 2000<br>Lane 2005<br>Sant et al. 2014 |
| | Perennial grass and forb height (includes residual grasses) | ≥18 cm (≥7.1 inches) | Berkeley et al. 2013<br>Connelly et al. 2000<br>Doherty et al. 2014<br>Hagen et al. 2007<br>Taylor et al. 2012 |
| | Perennial forb cover | ≥10% | Connelly et al. 2000<br>Sant et al. 2014 |
| **LATE BROOD-REARING/SUMMER (Seasonal Use Period: July 1 to October 31)** | | | |
| Cover | Sagebrush cover | 5-25% | Connelly et al. 2000<br>Lane 2005<br>Hagen et al. 2007<br>Sant et al. 2014 |
| | Sagebrush height | 40-80 cm (15.7-31.5 inches) individual sagebrush available within stand (for nesting) with a variety of heights (including those <40 cm [<15.7 inches]). | Connelly et al. 2000<br>Lane 2005 |
| | Perennial grass and forb cover | ≥25% | Connelly et al. 2000<br>Hagen et al. 2007 Sant et al. 2014 |
| | Riparian areas/mesic meadows | 80% or more of PHMA in Proper Functioning Condition (PFC) or higher. | Prichard et al. 1999<br>Schroeder et al. 1999<br>USDI BLM 1997 |
| | Upland and riparian perennial forb availability | Preferred forbs are common with several preferred species present | Connelly et al. 2000<br>Stiver et al. 2015 |

| Attribute | Indicator | Desired Condition | Reference |
|---|---|---|---|
| WINTER (Seasonal Use Period: November 1 to February 28) | | | |
| Cover and Food | Sagebrush cover | ≥10% | Wallestad 1975<br>Connelly et al. 2000<br>Sant et al. 2014 |
| | Sagebrush height | ≥25cm (≥9.8 inches) | Connelly et al. 2000. |

### 2.9.2 Relevant Appendices

The following table shows which appendices from the 2008 plan have management direction that may change through this RMP amendment. The appendices can be found on the Upper Missouri River Breaks National Monument RMP ePlanning website.

| ARMPA Appendix Name | Potential for Change in 2023 Plan |
|---|---|
| A: Federal and Montana Ambient Air Quality Standards | No |
| B: Standards for Rangeland Health and Guidelines for Livestock Grazing Management | No |
| C: Best Management Practices | Yes |
| D: Cultural Resource Use Categories | No |
| E: Watershed Planning Process | No |
| F: Grazing Allotments | No |
| G: Visitor Use Standards and Indicators | No |
| H: Oil and Gas | Yes |
| I: Wildlife Mitigation Noise Levels | No |

# Appendix 2.10

# Montana and Dakotas Alternative 1 and 2 Oil and Gas Lease Stipulations

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## 2.10 MONTANA AND DAKOTAS OIL AND GAS LEASE STIPULATIONS (ALTERNATIVES 1 AND 2)

The table below presents the oil and gas lease stipulations for Montana and the Dakotas that apply to GRSG, including their ID number, stipulation text, and office in which the stipulation applies.

| ID # | Stipulation | Office |
|---|---|---|
| **LN 14-11** | **GREATER SAGE-GROUSE HABITAT**<br>The lease may, in part or in total, contain important greater sage grouse habitats as identified by the BLM, either currently or prospectively. The operator may be required to implement specific measures to reduce impacts of oil and gas operations on the greater sage grouse populations and habitat quality. Such measures shall be developed during the application for permit to drill on-site and environmental review process and will be consistent with the lease rights granted. | All |
| **LN 14-37** | **GREATER SAGE-GROUSE HABITAT CONSERVATION**<br>The lessee/operator is given notice that prior to project-specific approval, the authorized officer may consider compensatory mitigation measures proffered by a project proponent, or compensatory mitigation requested or required by a state plan, program, or authorization. Any state required mitigation may be incorporated as a proposed design feature for a proposed project (Instructional Memorandum No. 2019-018).<br>For projects in Montana, lessee/operators may be required to demonstrate they have submitted their project to the Montana Sage-Grouse Habitat Conservation Program for review, and have incorporated any State program requirements into their project proposal in any designated sage-grouse habitat. The objectives of these requirements are to avoid, minimize, or compensate for unavoidable impacts associated with oil and gas development in order to provide a net conservation gain, which is a benefit or gain above baseline conditions when the development occurs within Greater Sage-Grouse habitat as specified in the Record of Decision for the Field Office's Approved Resource Management Plan (Sept, 2015). Site-specific GRSG habitat conservation, mitigation, or compensation requirements would be identified during the BLM environmental review process and would be developed into the project proposal or as terms and conditions of the subsequent approval. | Billings HiLine<br>Miles City<br>South Dakota<br>North Dakota |
| **LN 14-44** | **GREATER SAGE-GROUSE**<br>The lease may in part, or in total contain important Greater Sage-Grouse habitats as identified by the BLM, either currently or prospectively. The operator may be required to implement specific measures to reduce effects of oil and gas operations on the Greater Sage-Grouse populations and habitat quality. Such measures shall be developed during the application for permit to drill on-site and environmental review process and will be consistent with the lease rights granted. | Lewistown |
| **CSU 12-30** | **SAGE-GROUSE GENERAL HABITAT MANAGEMENT AREAS**<br>Surface occupancy and use within 2 miles of the perimeter of a lek active within the past 5 years may be restricted or prohibited. Prior to such activities, a plan to mitigate impacts to breeding or nesting sage- grouse; or breeding, nesting, or brood rearing habitat will be prepared by the proponent and implemented upon approval by the AO. | Miles City |
| **CSU 12-31** | **SAGE-GROUSE HABITAT – CEDAR CREEK RESTORATION HABITAT MANAGEMENT AREA**<br>Surface occupancy and use would be allowed with design features to minimize disturbance to sage- grouse habitat. | Miles City |

| ID # | Stipulation | Office |
|---|---|---|
| **CSU 12-40** | **GREATER SAGE-GROUSE GENERAL HABITAT**<br>Surface use prohibited within 2 miles of a lek. Surface disturbing and disruptive activities within 2 miles of a lek will be avoided unless the project proponent can clearly demonstrate that the impacts can be adequately mitigated and conservation actions or needed design features are included and the goals of this plan not compromised. | South Dakota |
| **CSU 12-41** | **GREATER SAGE-GROUSE GENERAL HABITAT MANAGEMENT AREAS (GHMAs) – UNDERGROUND UTILITY (POWER AND TRANSMISSION) LINES**<br>All new utility and power lines that can be safely buried will be buried within 2 miles of sage-grouse leks and within sage-grouse winter range.<br>When burial of power lines is not possible, above ground lines will be located and designed to minimize impacts of predation, collision, and other associated stressors to sage-grouse.<br>Existing overhead lines within 2 miles of leks and within sage-grouse winter range will be evaluated for threats to sage-grouse and if necessary, modified to reduce the threat. If modification will not likely be effective, the overhead line may be relocated. Any requirements for modification or relocation of existing overhead lines will be subject to valid existing rights. | South Dakota |

| ID # | Stipulation | Office |
|---|---|---|
| **CSU 12-46** | **GREATER SAGE-GROUSE GENERAL HABITAT MANAGEMENT AREA (GHMA)**<br>All identified Greater Sage-Grouse habitat within GHMA is subject to the following operating constraints:<br>Maintain Greater Sage-Grouse habitat to promote movement and genetic diversity of Greater Sage- Grouse populations<br>To minimize the impacts of surface disturbing/disruptive activities and ensure maintenance of habitat for sustainable populations of Greater Sage-Grouse within GHMA, surface disturbing and disruptive activities are subject to the following requirements.<br>a) Surface disturbing/disruptive activities will prevent or minimize disturbance to Greater Sage-Grouse or their habitat. Except as identified above or during emergency situations, activities will not compromise the habitat.<br>b) Continuous noise (related to long-term operations and/or activities) will be no greater than 49 decibels at 1/4 miles from the perimeter of the lek.<br>c) Temporary noise (related to installation, maintenance, one-time use, emergency operations, etc.) exceeding 49 decibels at 1/4 miles from the perimeter of a lek or surface disturbing/disruptive activities may be allowed, but only from 10 a.m. to 4 p.m. between March 15 and May15.<br>d) Manage water developments to reduce the spread of West Nile virus within sage-grouse habitat areas.<br>e) Site and/or minimize linear ROW to reduce disturbance to sagebrush habitats.<br>f) Maximize placement of new utility developments (power lines, pipelines, etc.) and transportation routes in existing utility or transportation corridors.<br>g) Power lines will be buried, eliminated, designed, or sited in a manner which does not impact sage- grouse.<br>h) Placement of other high profile structures, exceeding 10 feet in height, will be eliminated, designed, or sited in a manner which does not impact sage-grouse.<br>i) Remote monitoring of production facilities must be utilized, and all permit applications must contain a plan to reduce the frequency of vehicle use.<br>J) Maximize the area of interim reclamation on long-term access roads and well pads including reshaping, topsoiling and revegetating cut and fill slopes.<br>k) Restore disturbed areas at final reclamation to pre-disturbance conditions or desired plant community.<br>l) Permanent (longer than 2 months) structures which create movement must be designed or sited to minimize impacts to sage-grouse.<br>m) Consider use of off-site mitigation, (e.g. creation of sagebrush habitat, purchase conservation easements, or buying down grazing) with proponent dollars to offset habitat losses.<br>n) Consider creation of a "Mitigation Trust Account" when impacts cannot be avoided, minimized, or effectively mitigated through other means. If approved by the BLM, the proponent may contribute funding to maintain habitat function based on the estimated cost of habitat treatments or other mitigation needed to maintain the functions of impacted habitats. Off-site mitigation should only be considered when no feasible options are available to adequately mitigate within and immediately adjacent to the impacted site, or when the off- site location will provide more effective mitigation of the impact than can be achieved on-site | North Dakota |

| ID # | Stipulation | Office |
|---|---|---|
| **CSU 12-66** | **CRUCIAL WINTER RANGE – BIG GAME AND/OR SAGE-GROUSE**<br>Prior to surface-disturbing or disruptive activities a plan to maintain functionality of crucial winter range for big game and/or Greater Sage-Grouse will be prepared by the proponent and implemented upon approval by the authorized officer. Within crucial winter range surface-disturbing or disruptive activities will be restricted or prohibited within 6/10 of a mile from any existing surface-disturbing or disruptive activity. The plan shall address how short-term and long-term direct and indirect effects to crucial winter range will be mitigated based on current science and research (Appendix E.5). | HiLine |
| **CSU 12-67** | **GREATER SAGE-GROUSE NESTING HABITAT (GENERAL HABITAT MANAGEMENT AREAS)**<br>Within Greater Sage-Grouse general habitat surface-disturbing or disruptive activities may be restricted or prohibited within 2 miles of Greater Sage-Grouse leks. Prior to surface-disturbing or disruptive activities a plan to maintain functionality of Greater Sage-Grouse habitat will be prepared by the proponent and implemented upon approval by the authorized officer. This plan shall address how short- term and long-term direct and indirect effects to nesting and brood-rearing areas will be mitigated based on current science and research (Appendix E.5). | HiLine |
| **CSU 12-69** | **GREATER SAGE-GROUSE GENERAL HABITAT MANAGEMENT AREAS (GHMA)**<br>In General Habitat Management Areas (GHMA), parcels would be offered for lease subject to Controlled Surface Use restrictions (including RDFs). Activities will be avoided within the following distances from a sage-grouse lek:<br>• linear features (roads) within 3.1 miles of leks.<br>• infrastructure related to energy development within 3.1 miles of leks.<br>• tall structures (e.g., communication or transmission towers, transmission lines) within 2 miles of leks.<br>• low structures (e.g., fences, rangeland structures) within 1.2 miles of leks.<br>• surface disturbance (continuing human activities that alter or remove the natural vegetation) within 3.1 miles of leks.<br>• noise and related disruptive activities including those that do not result in habitat loss (e.g., motorized recreational events) at least 0.25 miles from leks. | Dillon |
| **CSU 12-73** | **GREATER SAGE-GROUSE GENERAL HABITAT MANAGEMENT AREAS (GHMAs)**<br>Within Greater Sage-Grouse general habitat surface-disturbing or disruptive activities may be restricted or prohibited within 2 miles of Greater Sage-Grouse leks. Prior to surface-disturbing or disruptive activities, a plan to maintain functionality of Greater Sage-Grouse habitat will be prepared by the proponent and implemented upon approval by the authorized officer. This plan shall address how short-term and long-term direct and indirect effects to nesting and brood-rearing areas will be mitigated based on current science and research. | Lewistown |
| **NSO 11-4** | **GROUSE LEKS**<br>No surface occupancy or use is allowed within one-quarter mile of grouse leks. | Butte Dillon |
| **NSO 11-35** | **SAGE GROUSE STRUTTING GROUNDS**<br>No surface occupancy or use is allowed within one-quarter mile of active sage grouse strutting grounds. | North Dakota |

| ID # | Stipulation | Office |
|---|---|---|
| **NSO 11-79** | **SAGE-GROUSE HABITAT – PRIORITY ARES, WEST DECKER RESTORATION AREA, SOUTH CARTER RESTORATION AREA**<br>Surface occupancy and use is prohibited within sage-grouse priority areas, West Decker Restoration area, and South Carter Restoration Area. | Miles City |
| **NSO 11-80** | **SAGE-GROUSE HABITAT – GENERAL HABITAT MANAGEMENT AREA**<br>Surface occupancy and use is prohibited within 6/10 mile of the perimeter of sage-grouse leks. | Miles City |
| **NSO 11-96** | **GREATER SAGE-GROUSE GENERAL HABITAT LEKS**<br>No surface occupancy or use within 6/10 mile from leks. | South Dakota |
| **NSO 11-97** | **GREATER SAGE-GROUSE CRUCIAL WINTER RANGE**<br>Sage-grouse crucial winter range will be managed as a No Surface Occupancy for oil and gas development and exploration. | South Dakota |
| **NSO 11-98** | **GREATER SAGE-GROUSE PRIORITY HABITAT MANAGEMENT AREAS (PHMAs)**<br>Greater Sage-Grouse PHMAs will be managed as No Surface Occupancy and Use (127,735 surface and 412,822 oil and gas subsurface mineral acres.) These areas will be open to oil and gas leasing with no surface occupancy stipulation. All sage-grouse habitat that is not part of PHMAs will be managed as GHMA as noted in Figure 1-2. | South Dakota |
| **NSO 11-99** | **GREATER SAGE-GROUSE WINTER RANGE IN PRIORITY HABITAT MANAGEMENT AREAS (PHMAs)**<br>Sage-grouse crucial winter range will be managed as a No Surface Occupancy for oil and gas development and exploration. | South Dakota |
| **NSO 11-111** | **GREATER SAGE-GROUSE PRIORITY HABITAT MANAGEMENT AREA (PHMA)**<br>Surface occupancy and use is prohibited within Greater Sage-Grouse PHMA. | North Dakota |
| **NSO 11-127** | **GREATER SAGE-GROUSE PRIORITY HABITAT MANAGEMENT AREAS (PHMAs)**<br>To protect Greater Sage-grouse, a priority species for management, surface occupancy and use is prohibited for oil and gas exploration and development within Greater Sage-grouse Priority Habitat Management Areas (PHMAs). | Billings |
| **NSO 11-128** | **GREATER SAGE-GROUSE GENERAL HABITAT MANAGEMENT AREAS**<br>To protect general habitat areas for Greater Sage-grouse breeding activities, surface occupancy and use is prohibited for oil and gas exploration and development within 0.6 mile of the perimeter of Greater Sage-grouse leks. | Billings |
| **NSO 11-129** | **GREATER SAGE-GROUSE RESTORATION AREAS**<br>To protect restoration areas for Greater Sage-grouse breeding activities, surface occupancy and use is prohibited for oil and gas exploration and development within 0.6 mile of the perimeter of Greater Sage- grouse leks. | Billings |
| **NSO 11-136** | **CRUCIAL WINTER RANGE**<br>Surface occupancy and use is prohibited for oil and gas exploration and development in crucial winter range for antelope, elk, moose, bighorn sheep, mule deer, white-tailed deer, and Greater Sage-grouse. | Billings |
| **NSO 11-141** | **SAGEBRUSH FOCAL AREA**<br>Surface occupancy and use is prohibited within the Sagebrush Focal Area. | HiLine |
| **NSO 11-151** | **GREATER SAGE-GROUSE LEKS (GENERAL HABITAT AREAS)**<br>Surface occupancy and use is prohibited within 0.6 miles of Greater Sage-Grouse leks. This stipulation does not apply within the boundaries of the Greater Sage-Grouse Priority Habitat Management Area. | HiLine |

| ID # | Stipulation | Office |
|---|---|---|
| **NSO 11-152** | **GREATER SAGE-GROUSE PRIORITY HABITAT MANAGEMENT AREAS (PHMA)**<br>Surface occupancy and use is prohibited within Greater Sage-Grouse Priority Habitat Management Area and the Grassland Bird/Greater Sage-Grouse Priority Habitat Management Area. | HiLine |
| **NSO 11-159** | **GREATER SAGE-GROUSE PRIORITY HABITAT MANAGEMENT AREAS (PHMA)**<br>Priority Habitat Management Areas (PHMA) outside of Sagebrush Focal Areas would be open to mineral leasing and development subject to NSO with a limited **Exception**. | Dillon |
| **NSO 11-171** | **CRUCIAL WINTER RANGE**<br>Surface occupancy and use is prohibited in crucial winter range for the following BLM priority species for management:<br>• bighorn sheep<br>• elk<br>• greater sage-grouse<br>• moose<br>• mule deer<br>• pronghorn<br>• whitetail deer | Lewistown |
| **NSO 11-181** | **SAGEBRUSH FOCAL AREA**<br>Surface occupancy and use is prohibited within the Sagebrush Focal Area (SFA) | Lewistown |
| **NSO 11-182** | **GREATER SAGE-GROUSE PRIORITY HABITAT MANAGEMENT AREAS (PHMAs)**<br>To protect greater sage-grouse, a priority species for management, surface occupancy and use is prohibited for oil and gas exploration and development within greater sage-grouse Priority Habitat Management Areas (PHMAs). | Lewistown |
| **NSO 11-183** | **GREATER SAGE-GROUSE LEKS IN GENERAL HABITAT MANAGEMENT AREAS (GHMAs)**<br>Surface occupancy and use is prohibited within 0.6 miles of the perimeter of greater sage-grouse leks in general habitat management areas. | Lewistown |
| **TL 13-6** | **BROOD-BEARING HABITAT**<br>No surface use is allowed in nesting and early brood-rearing habitat (defined as within three miles of Leks) during the following time period:<br>March 1 through June 30 | Dillon |
| **TL 13-14** | **SAGE GROUSE WINTER AND SPRING RANGE**<br>No surface use is allowed from December 1 through May 15 within winter and spring range for Sage Grouse. This stipulation does not apply to operation and maintenance of production facilities. | Butte Dillon |
| **TL 13-17** | **STRUTTING GROUNDS**<br>No surface use is allowed within two miles of active strutting grounds during the following time period: March 1 to June 15. This stipulation does not apply to the operation and maintenance of production facilities. | North Dakota |
| **TL 13-30** | **EARLY BROOD REARING HABITAT**<br>No surface use is allowed from March 1 through June 30 in nesting and early brood rearing habitat (defined as within three miles of Leks). This stipulation does not apply to operation and maintenance of production facilities unless the findings of analysis demonstrate the continued need for such mitigation and that less stringent project- specific mitigation measures would be insufficient. | Butte |

| ID # | Stipulation | Office |
|---|---|---|
| **TL 13-40** | **SAGE-GROUSE NEST AREAS (RESTORATION AREAS AND GENERAL HABITAT MANAGEMENT AREAS)**<br>Surface use is prohibited from March 1 through June 30 within 3 miles of sage grouse leks. This stipulation does not apply to operation and maintenance of production facilities. | Billings |
| **TL 13-43** | **GREATER SAGE-GROUSE WINTER RANGE**<br>Surface occupancy and use is prohibited from December 1 through March 31 in Greater Sage-Grouse winter range. | HiLine |
| **TL 13-48** | **WINTER RANGE – BIG GAME AND GREATER SAGE-GROUSE**<br>Surface occupancy and use is prohibited from December 1 through May 15 in big game winter range. | HiLine |

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# Appendix 2.11
# North Dakota RMP Amendment

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## 2.11 NORTH DAKOTA RMP AMENDMENT

This appendix presents the GRSG approved RMP amendment language from the 2015 record of decision for the North Dakota RMP Amendment. The North Dakota RMP was not amended in 2019. The table below notes which goals, objectives, appendices, and management decisions/actions have a potential to change as a result of the current planning effort and if so, under which alternatives changes are being considered. Note that any references to tables and appendices are to those applicable 2015 appendices that are listed in **Section 2.11.2** of this appendix.

### 2.11.1 Existing GRSG RMP Management – North Dakota RMP Amendment

**Table 1. Summary of Goals, Objectives, and Management Actions in North Dakota 2015 ARMP**

| North Dakota RMP Amendment | Potential Change in 2023 Plan |
|---|---|
| ***Management Decisions: Riparian Areas and Wetlands*** | |
| Management Direction LG-1.12: Where riparian and wetland areas are already meeting standards, they will be maintained in that condition or better. Where a site's capability is less than proper functioning condition (PFC), BLM will manage to achieve or move towards capability.<br>• Within PHMA and GHMA, manage wet meadows to maintain a component of perennial forbs with diverse species richness relative to site potential (e.g., reference state) to facilitate brood rearing. | Potential change under Alternatives 3, 4, 5, and 6. |
| Management Direction LG-1.13: In PHMA, where riparian areas and wet meadows meet PFC, strive to move towards GRSG habitat objectives within capabilities of the reference state vegetation relative to the ecological site descriptions.<br>• Example: Within PHMA, reduce where necessary hot season grazing on riparian and meadow complexes to promote recovery or maintenance of appropriate vegetation and water quality. Utilize fencing/herding techniques, seasonal use, or livestock distribution changes where necessary to reduce pressure on riparian or wet meadow vegetation used by GRSG in the hot season (summer). | Potential change under Alternatives 3, 4, 5, and 6. |
| Management Direction LG-1.14: Authorize new water development for diversion from spring or seep source only when PHMA will be maintained or benefit from the development. This includes developing new water sources for livestock as part of an AMP/Conservation Plan to improve GRSG habitat. | Potential change under Alternatives 3, 4, 5, and 6. |
| Management Direction LG-1.15: Analyze springs, seeps and associated pipelines at time of grazing lease renewal to determine if modifications are necessary to maintain the continuity of the predevelopment riparian area within PHMA. Make modifications where necessary, considering impacts on other water uses when such considerations are neutral or beneficial to GRSG. | Potential change under Alternatives 3, 4, 5, and 6. |

| North Dakota RMP Amendment | Potential Change in 2023 Plan |
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| ***Management Decisions: Vegetation Communities*** | |
| Objective VEG-1.1: In all PHMA, the desired condition is to maintain a minimum of 70% of lands capable of producing sagebrush with 10 to 30% sagebrush canopy cover. The attributes necessary to sustain these habitats are described in Interpreting Indicators of Rangeland Health (BLM Tech Ref 1734-6). | Potential change under Alternatives 3, 4, 5, and 6. |
| Management Direction VEG-1.1: Remove conifers encroaching into sagebrush habitats. Prioritize treatments closest to occupied GRSG habitats and near occupied leks, and where juniper encroachment is phase 1 or phase 2. Use of site-specific analysis and principles like those included in RMRS-GTR-326: Using resistance and resilience concepts to reduce impacts of invasive annual grasses and altered fire regimes on the sagebrush ecosystem and GRSG: A strategic multi-scale approach (Chambers et al. 2014) and other ongoing modeling efforts to address conifer encroachment will help refine the location for specific priority areas to be treated. | Potential change under Alternatives 3, 4, 5, and 6. |
| Management Direction VEG-1.8: Make re-establishment of sagebrush cover and desirable understory plants (relative to ecological site potential) a high priority for restoration efforts in PHMA. Prioritize areas for juniper removal to benefit GRSG habitat. | No change proposed. |
| Management Direction VEG-1.3: Include GRSG habitat parameters as defined by State of North Dakota Sage-Grouse conservation plans and appropriate local information in habitat restoration objectives. Make meeting these objectives within PHMA the highest restoration priority, along with other priority species habitat. | No change proposed. |
| Management Direction VEG-1.7: In PHMA, restore native (or desirable) plants and create landscape patterns which most benefit GRSG, as well as other priority species. | No change proposed. |
| Management Direction VEG-1.4: In PHMA, require use of native seeds for restoration based on availability, adaptation (ecological site potential), and probability of success. Where probability of success or adapted seed availability is low, non-native seeds may be used as long as they support GRSG habitat objectives. | No change proposed. |
| Management Direction VEG-1.5: Design post restoration management to ensure long-term persistence in PHMA. This could include changes in livestock grazing management, travel management, etc., to achieve and maintain the desired condition of the restoration effort that benefits GRSG. | No change proposed. |
| Management Direction VEG-1.6: In PHMA, consider potential changes in climate when proposing restoration seedings when using native plants. Consider collection from the warmer component of the species current range when selecting native species. | No change proposed. |

| North Dakota RMP Amendment | Potential Change in 2023 Plan |
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| Management Direction VEG-1.9: In PHMA fire prone areas, where sagebrush seed is required for GRSG habitat restoration, consider establishing seed harvest areas that are managed for seed production and are a priority for protection from outside disturbances. | No change proposed. |
| ***Management Decisions: Terrestrial and Aquatic Wildlife Resources*** | |
| Goal SSS-1: Maintain and/or increase GRSG abundance and distribution by conserving, enhancing, or restoring the sagebrush ecosystem upon which populations depend, in cooperation with other conservation partners. | Potential change under Alternatives 3, 4, 5, and 6. |
| Objective SSS-1.2: Habitat Delineation: Delineate PHMA to encompass the 100% Breeding Bird Density map: 32,900 BLM surface acres (7% of total PHMA acres). Since mapping 75% of breeding bird density map misses the majority of GRSG habitat in North Dakota, 100% was used. See Map 2-1. | Potential change under Alternatives 3, 4, 5, and 6. |
| Objective SSS-1.3: Habitat Delineation: Delineate GHMA to encompass the remainder of the habitat: 80 BLM surface acres. See Map 2-1. | Potential change under Alternatives 3, 4, 5, and 6. |
| ***Management Decisions: Habitat Objectives*** | |
| **[Original language updated through plan maintenance action in 2018]**<br><br>The habitat objectives for GRSG (Table 2.3-2) is a list of indicators, characteristics, and values that describe GRSG seasonal habitat use areas. The BLM used indicator values derived from a synthesis of local and regional GRSG habitat research and data to describe the typical vegetation communities that sage-grouse select. While the habitat objectives are not attainable on every site or every acre within designated GRSG habitat management areas, the values reflect a range of habitat conditions that generally lead to greater survival of individuals within a population. When permitting land use activities, BLM should consider the ecological site potential within designated habitat management areas to validate the habitat conditions achievable for a specific site.<br><br>The seasonal habitat descriptions in Table 2.3-2 vary across the range of sage-grouse, within a subregion, and between sites. They are not land health standards but are quantitative measures that inform the Special Status Species Habitat Land Health Standard for sage-grouse. These measurable values reflect ecological potential, and may be adjusted based on local factors influencing sage-grouse habitat selection. Local data or recent science may indicate that sage-grouse select for vegetation structure and composition in seasonal habitats not characterized by the values in the habitat objectives table. In these cases, it may be appropriate to adjust the values. Habitat objectives should be evaluated in the context of annual variability in ecological conditions and should not be used singly to determine habitat suitability for sage-grouse. They may be used to demonstrate trends over time, during plan | Potential change under Alternatives 3, 4, 5, and 6. |

| North Dakota RMP Amendment | Potential Change in 2023 Plan |
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| evaluations for effectiveness of sage-grouse conservation, or when identify limiting habitat characteristics for a given area.<br><br>The indicators, characteristics, values and desired seasonal habitat conditions in the GRSG Plan Habitat Objectives Table are meant to inform the wildlife habitat component of the Land Health Standards evaluation process (LHS, 43 CFR 4180.2), but do not replace rangeland health assessments. Results from the LHS evaluation should be used to support BLM in land use authorization processes and during development of objectives for management actions such as vegetation treatments. BLM land use authorizations will contain terms and conditions regarding the actions needed to achieve or make progress toward achieving habitat objectives and land health standards. The Habitat Objectives Tables are to be used:<br>• To assess habitat suitability for sage-grouse following the BLM policy on sage-grouse habitat assessments<br>• To evaluate land use plan effectiveness for sage-grouse conservation, and<br>• As a basis to develop measurable project objectives for actions in BLM-designated GRSG Habitat Management areas when considered alongside land health standards, ecological potential and local information.<br><br>References: U.S. Department of the Interior, Bureau of Land Management. 2001. Rangeland health standards handbook H-4180-1. https://www.blm.gov/sites/blm.gov/files/uploads/Media_Library_BLM_Policy_h4180-1.pdf | |
| ***Management Decisions: Disturbance*** | |
| Objective SSS-1.1: Protect PHMA from anthropogenic disturbances that will reduce distribution or abundance of GRSG. Manage PHMA so that discrete anthropogenic disturbances cover less than 3% of the total GRSG habitat. | Potential change under Alternatives 3, 4, 5, and 6. |
| Management Direction SSS-1.1: Protect PHMA from anthropogenic disturbances that will reduce distribution or abundance of GRSG. See Appendix E, Greater Sage-Grouse Disturbance Caps, of the 2015 Greater Sage-Grouse Approved RMPA/ROD (BLM 2015a). In undertaking BLM management directions, and consistent with valid and existing rights and applicable law in authorizing third-party actions, the BLM will apply the lek buffer-distances identified in the US Geological Survey Report Conservation Buffer Distance Estimates for Greater Sage-Grouse—A Review (Open File Report 2014-1239) in accordance with Appendix B, Applying Lek Buffer Distances When Approving Actions, of the 2015 Greater Sage-Grouse Approved RMPA/ROD (BLM 2015a). | Potential change under Alternatives 3, 4, 5, and 6. |

| North Dakota RMP Amendment | Potential Change in 2023 Plan |
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| Direction SSS-1.2: If the 3% anthropogenic disturbance cap is exceeded on lands (regardless of land ownership) within GRSG PHMA in any given BSU (see Figure 2-2, North Dakota and South Dakota GRSG Biologically Significant Unit and Priority Habitat Management Areas [Appendix A of the 2015 Greater Sage-Grouse Approved RMPA/ROD; BLM 2015a]), then no further discrete anthropogenic disturbances (subject to applicable laws and regulations, such as the 1872 hard rock mining law, valid existing rights, etc.) will be permitted by BLM within GRSG PHMA in any given BSU until the disturbance has been reduced to less than the cap. (BSU for this Approved RMPA is the summary of all the PHMA within a GRSG population as delineated in the COT report.) | Potential change under Alternatives 3, 4, 5, and 6. |
| Management Direction SSS-1.4: Subject to applicable laws and regulations and valid existing rights, if the average density of one energy and mining facility per 640 acres (the density cap) is exceeded on all lands (regardless of land ownership) in the PHMA within a proposed project analysis area, then no further disturbance from energy or mining facilities will be permitted by BLM: (1) until disturbance in the proposed project analysis area has been reduced to maintain the limit under the cap; or (2) unless the energy or mining facility is co-located into an existing disturbed area. | Potential change under Alternatives 3, 4, 5, and 6. |
| Management Direction SSS-1.5: Implement Regional Mitigation Strategy (Appendix F, Regional Mitigation Strategy, of the 2015 Greater Sage-Grouse Approved RMPA/ROD [BLM 2015a]). | Potential change under Alternatives 3, 4, and 5. |
| ***Management Decisions: Wildland Fire Ecology and Management*** | |
| Management Direction FIRE-1.7: Follow the most current BMPs/RDFs for fire and fuels (Appendix C, Required Design Features, of the 2015 Greater Sage-Grouse Approved RMPA/ROD [BLM 2015a]). | Potential change under Alternatives 3, 4, 5, and 6. |
| Management Direction FIRE-1.1: In PHMA, design and implement fuels treatments with an emphasis on protecting existing sagebrush ecosystems.<br>• Do not reduce sagebrush canopy cover to less than 15% unless a fuels management objective requires additional reduction in sagebrush cover to meet strategic protection of PHMA and conserve habitat quality for the species.<br><br>Closely evaluate the benefits of the fuel break against the additional loss of sagebrush cover in future NEPA documents.<br>• Apply appropriate seasonal restrictions for implementing fuels management treatments according to the type of seasonal habitats present in a priority area.<br>• If prescribed fire is used in GRSG habitat, the NEPA analysis for the Burn Plan will address:<br>– why alternative techniques were not selected as a viable options; | Potential change under Alternatives 3, 4, 5, and 6. |

| North Dakota RMP Amendment | Potential Change in 2023 Plan |
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| – how GRSG goals and objectives will be met by its use;<br>– how the COT report objectives will be addressed and met;<br>– a risk assessment to address how potential threats to GRSG habitat will be minimized.<br>• Prescribed fire as a vegetation or fuels treatment shall only be considered after the NEPA analysis for the Burn Plan has addressed the four bullets outlined above. Prescribed fire can be used to meet specific fuels objectives that will protect GRSG habitat in PHMA (e.g., creation of fuel breaks that will disrupt the fuel continuity across the landscape in stands where annual invasive grasses are a minor component in the understory, burning slash piles from conifer reduction treatments, used as a component with other treatment methods to combat annual grasses and restore native plant communities).<br>• Prescribed fire in known winter range shall only be considered after the NEPA analysis for the Burn Plan has addressed the four bullets outlined above. Any prescribed fire in winter habitat will need to be designed to strategically reduce wildfire risk around and/or in the winter range and designed to protect winter range habitat quality.<br>• Monitor and control invasive vegetation post-treatment.<br>• Rest treated areas from grazing for two full growing seasons unless vegetation recovery dictates otherwise.<br>• Require use of native seeds for fuels management treatment based on availability, adaptation (site potential), and probability of success. Where probability of success or native seed availability is low, non-native seeds may be used as long as they meet GRSG habitat objectives.<br>• Design post fuels management projects to ensure long-term persistence of seeded or pre-treatment native plants. This may require temporary or long-term changes in livestock grazing management, travel management, or other activities to achieve and maintain the desired condition of the fuels management project. | *(See above.)* |
| Management Direction FIRE-1.5: The protection of human life is the single, overriding priority. Setting priorities among protecting human communities and community infrastructure, other property and improvements, and natural and cultural resources will be done based on the values to be protected, human health and safety, and the costs of protection. In PHMA, prioritize suppression, immediately after life and property, to conserve the habitat. See Appendix H of the 2015 Greater Sage-Grouse Approved RMPA/ROD (BLM 2015a), which will be completed to help further refine fire management actions once this plan is completed. | No change proposed. |

| North Dakota RMP Amendment | Potential Change in 2023 Plan |
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| Included in MA above. Also:<br><br>Management Direction FIRE-1.4: If prescribed fire is used, the Burn Plan will clearly indicate how COT objectives will be addressed and met, and why alternative techniques are not applicable. A fire risk assessment will be completed for implementation of prescribed fire used to meet the GRSG goals and objectives in PHMA (see Appendix H, GRSG Wildfire and Invasive Species Habitat Assessment, of the 2015 Greater Sage-Grouse Approved RMPA/ROD [BLM 2015a]). | Potential change under Alternatives 3, 4, 5, and 6. |
| Management Direction FIRE-1.2: Design fuels management projects in PHMA to strategically and effectively reduce wildfire threats in the greatest area. | Potential change under Alternatives 3, 4, 5, and 6. |
| Management Direction FIRE-1.3: In PHMA, during fuels management project design, consider the utility of using livestock to strategically reduce fine fuels, and implement grazing management that will accomplish this objective. Consult with ecologists to minimize impacts on native perennial grasses. | No change proposed. |
| Management Direction FIRE-1.8: In PHMA, prioritize native seed allocation for use in GRSG habitat in years when preferred native seed is in short supply. This may require reallocation of native seed from emergency stabilization and rehabilitation (ES&R) projects outside of PHMA to those inside it. Use of native plant seeds for ES&R seedings is required based on availability, adaptation (site potential), and probability of success. Where probability of success or native seed availability is low, non-native seeds may be used as long as they meet GRSG habitat conservation objectives. Re-establishment of appropriate sagebrush species/subspecies and important understory plants, relative to site potential, shall be the highest priority for rehabilitation efforts. | No change proposed. |
| Management Direction FIRE-1.9: In PHMA, design post ES&R management to ensure long-term persistence of seeded or pre-burn native plants. This may require temporary or long-term changes in livestock grazing, and travel management, etc., to achieve and maintain the desired condition of ES&R projects to benefit GRSG. | No change proposed. |
| Management Direction FIRE-1.10: In PHMA, consider potential changes in climate when proposing post-fire seedings using native plants. Consider seed collections from the warmer component within a species' current range for selection of native seed. | No change proposed. |
| Management Direction FIRE-1.6: In GHMA, prioritize suppression where wildfires threaten PHMA. | No change proposed. |

| North Dakota RMP Amendment | Potential Change in 2023 Plan |
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| ***Management Decisions: Lands and Realty*** | |
| Management Direction LR-1.11: Lands classified as PHMA and GHMA for GRSG will be retained in federal management unless: (1) the BLM can demonstrate that disposal of the lands will provide a net conservation gain to GRSG or (2) the BLM can demonstrate that the disposal of the lands will have no direct or indirect adverse impact on conservation of GRSG. See Figure 2-11, North Dakota Land Tenure (Appendix A of the 2015 Greater Sage-Grouse Approved RMPA/ROD [BLM 2015a]). | No change proposed. |
| Management Direction LR-1.12: PHMA will be a priority in consideration of land acquisitions. Consider GRSG for all land tenure actions. | No change proposed. |
| Management Direction LR-1.1: PHMA will be managed as ROW avoidance area for major ROWs (high-voltage transmission lines (100 kilovolt [kV] and over) and large pipelines (24 inches in width and over)). See Figure 2-10a, North Dakota Major Rights-of-Way (Appendix A of the 2015 Greater Sage-Grouse Approved RMPA/ROD [BLM 2015a]).<br>• Where new ROWs are required, co-locate new ROW within existing ROWs or where it best minimizes impacts on GRSG and GRSG habitat. | Potential change under Alternatives 3, 4, 5, and 6. |
| Management Direction LR-1.2: PHMA will be managed as ROW avoidance area for minor ROWs (including communication sites and towers). See Figure 2-10b, North Dakota Minor Rights-of-Way (Appendix A of the 2015 Greater Sage-Grouse Approved RMPA/ROD [BLM 2015a]). | Potential change under Alternatives 3, 4, 5, and 6. |
| Management Direction LR-1.6: GHMA will be managed as ROW avoidance area for high-voltage transmission lines (100kV and over) and large pipelines (24 inches in width and over). | Potential change under Alternatives 3, 4, 5, and 6. |
| Management Direction LR-1.7: Minor ROWs will be allowed in GHMA with appropriate mitigation and conservation measures identified within the terms of the authorization to minimize surface disturbing and disruptive activities. | Potential change under Alternatives 3, 4, 5, and 6. |
| Management Direction LR-1.9: Where new ROWs are necessary in GHMA, co-locate new ROWs within existing ROWs where possible. | No change proposed. |
| Management Direction LR-1.3: Make PHMA exclusion area for new ROW wind and solar energy authorizations. See Figure 2-8, North Dakota Wind, and Figure 2-9, North Dakota Solar (Appendix A of the 2015 Greater Sage-Grouse Approved RMPA/ROD [BLM 2015a]). | Potential change under Alternatives 3, 4, 5, and 6. |
| Land Use Authorizations - Allocation: Manage the following areas as ROW exclusion (Map 2-4):<br>• Greater Sage-Grouse PHMA (solar and wind; see Greater Sage-Grouse Approved RMP Amendment, September 2015) | Potential change under Alternatives 3, 4, 5, and 6. |

| North Dakota RMP Amendment | Potential Change in 2023 Plan |
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| Management Direction LR-1.8: Make GHMA avoidance area for new wind and solar energy authorizations. See Figure 2-8 and Figure 2-9 (Appendix A of the 2015 Greater Sage-Grouse Approved RMPA/ROD [BLM 2015a]). | Potential change under Alternatives 3, 4, 5, and 6. |
| Management Direction LR-1.10: PHMA will be avoidance areas for leases/land use authorizations, which can be for agricultural, occupancy, or filming. Leases/land use authorizations will be allowed in GHMA with appropriate mitigation and conservation measures identified within the terms of the authorization to minimize surface disturbing and disruptive activities. | Potential change under Alternatives 3, 4, 5, and 6. |
| Management Direction LR-1.4: When addressing ROW authorizations in PHMA identify and evaluate opportunities to remove, bury or modify existing power lines within PHMA. | No change proposed. |
| Management Direction LR-1.5: In PHMA, where existing leases or ROWs have had some level of development (road, fence, well, etc.) and are no longer in use, reclaim the site by removing these features and restoring the habitat. | No change proposed. |
| ***Management Decisions: Fluid Mineral Resources*** | |
| Management Direction MR-1.14: Where the federal government owns the mineral estate in PHMA and GHMA, and the surface is in non-federal ownership, apply the same stipulations, COAs, and/or conservation measures and RDFs applied if the mineral estate is developed on BLM-administered lands in that management area, to the maximum extent permissible under existing authorities, and in coordination with the landowner. | No change proposed. |
| Management Direction MR-1.15: Where the federal government owns the surface and the mineral estate is in non-federal ownership in PHMA and GHMA, apply appropriate surface use COAs, stipulations, and mineral RDFs through ROW grants or other surface management instruments, to the maximum extent permissible under existing authorities, in coordination with the mineral estate owner/lessee. | No change proposed. |
| Management Direction MR-1.3: Allow geophysical exploration within PHMA to obtain exploratory information for areas outside of and adjacent to PHMA. | Potential change under Alternative 3. |
| Management Direction MR-1.4: Allow geophysical operations by existing roads and trails, or helicopter-portable drilling methods, and in accordance with seasonal timing restrictions and/or other restrictions that may apply. | Potential change under Alternative 3. |
| Management Direction R-1.14: In PHMA, do not recommend withdrawal proposals not associated with mineral activity unless the land management is consistent with GRSG conservation measures. (For example, in a proposed withdrawal for a military training range buffer area, manage the buffer area with GRSG conservation measures.) | Potential change under Alternative 3. |

| North Dakota RMP Amendment | Potential Change in 2023 Plan |
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| Objective MR-1.1: Priority will be given to leasing and development of fluid mineral resources, including geothermal, outside of PHMA and GHMA. When analyzing leasing and authorizing development of fluid mineral resources, including geothermal, in PHMA and GHMA, and subject to applicable stipulations for the conservation of GRSG, priority will be given to development in non-habitat areas first and then in the least suitable habitat for GRSG. The implementation of these priorities will be subject to valid existing rights and any applicable law or regulation, including, but not limited to, 30 US Code 226(p) and 43 CFR, Part 3162.3-1(h).<br><br>Where a proposed fluid mineral development project on an existing lease could adversely affect GRSG populations or habitat, the BLM will work with the lessees, operators, or other project proponents to avoid, minimize, and apply compensatory mitigation for adverse impacts to the extent compatible with lessees' rights to drill and produce fluid mineral resources. The BLM will work with the lessee, operator, or project proponent in developing an application for permit to drill for the lease to avoid and minimize impacts on GRSG or its habitat and will ensure that the best information about the GRSG and its habitat informs and helps to guide development of such Federal leases. | Potential change under Alternatives 3, 4, 5, and 6. |
| Management Direction MR-1.1 (part): Open to oil and gas leasing and development; however, surface occupancy and use will be prohibited within PHMA (NSO). Upon expiration or termination of existing leases, apply NSO. See Figure 2-4, North Dakota Fluid Minerals (Oil, Gas, and Geothermal) (Appendix A of the 2015 Greater Sage-Grouse Approved RMPA/ROD [BLM 2015a]). | Potential change under Alternatives 3 and 6. |
| Fluid Mineral Leasing – Allocation: Manage Greater Sage-Grouse PHMA open to fluid mineral leasing subject to NSO stipulations (see Greater Sage-Grouse Approved RMP Amendment, September 2015). | Potential change under Alternatives 3 and 6. |
| Management Direction MR-1.2: In GHMA, surface occupancy and use will be subject to special operating constraints (CSU) (Appendix G, Oil and Gas Stipulations, of the 2015 Greater Sage-Grouse Approved RMPA/ROD [BLM 2015a]). | Potential change under Alternatives 3, 4, 5, and 6. |

| North Dakota RMP Amendment | Potential Change in 2023 Plan |
|---|---|
| Management Direction MR-1.1 (part): No waivers or modifications to a fluid mineral lease no-surface-occupancy stipulation will be granted.<br><br>The BLM Authorized Officer may grant an exception to a fluid mineral lease no-surface-occupancy stipulation only where the proposed action:<br>i. Will not have direct, indirect, or cumulative effects on GRSG or its habitat; or,<br>ii. Is proposed to be undertaken as an alternative to a similar action occurring on a nearby parcel and will provide a clear conservation gain to GRSG.<br><br>Exceptions based on conservation gain (ii) may only be considered in (a) PHMA of mixed ownership where federal minerals underlie less than fifty percent of the total surface, or (b) areas of the public lands where the proposed exception is an alternative to an action occurring on a nearby parcel subject to a valid Federal fluid mineral lease existing as of the date of this RMPA. Exceptions based on conservation gain must also include measures, such as enforceable institutional controls and buffers, sufficient to allow the BLM to conclude that such benefits will endure for the duration of the proposed action's impacts.<br><br>Any exceptions to this lease stipulation may be approved by the BLM Authorized Officer only with the concurrence of the State Director. The BLM Authorized Officer may not grant an exception unless the applicable state wildlife agency, the USFWS, and the BLM unanimously find that the proposed action satisfies (i) or (ii). Such finding shall initially be made by a team of one field biologist or other GRSG expert from each respective agency. In the event the initial finding is not unanimous, the finding may be elevated to the appropriate BLM State Director, USFWS State Ecological Services Director, and state wildlife agency head for final resolution. In the event their finding is not unanimous, the exception will not be granted. Approved exceptions will be made publicly available at least quarterly. | Potential change under Alternatives 3, 4, 5, and 6. |
| Management Direction MR-1.5: During implementation level review and decisions, (e.g., approval of an application for permit to drill and Sundry Notice) and upon completion of the environmental record of review (43 CFR, Part 3162.5), include appropriate documentation of compliance with NEPA. In this process evaluate, among other things: (1) Whether the conservation measure is "reasonable" (43 CFR, Part 3101.1-2) with the valid existing rights; and (2) Whether the action is in conformance with the Approved RMPA. | No change proposed. |

| North Dakota RMP Amendment | Potential Change in 2023 Plan |
|---|---|
| Conservation Measure #1: The following operating constraints will be applied to existing leases as conditions of approval (COAs) in PHMA and GHMA. Exceptions may be granted by the BLM Authorized Officer if an environmental review demonstrates that effects can be mitigated to an acceptable level, habitat for the species is not present in the area, or portions of the area can be occupied without affecting a particular species. Exceptions may also be granted where the short-term effects are mitigated by the long-term benefits.<br><br>The BLM may add additional site-specific restrictions as deemed necessary by further environmental analysis and as developed through coordination with other federal, state, and local regulatory and resource agencies.<br>a. Surface disturbing/disruptive activities will prevent or minimize disturbance to GRSG or their habitat. Except as identified above or during emergency situations, activities will not compromise the functionality of the habitat.<br>b. Manage water developments to reduce the spread of West Nile virus within GRSG habitat areas.<br>c. Site and/or minimize linear ROW to reduce disturbance to sagebrush habitats.<br>d. Maximize placement of new utility developments (power lines, pipelines, etc.) and transportation routes in existing ROWs.<br>e. Power lines will be buried, eliminated, designed or sited in a manner which does not impact GRSG.<br>f. Placement of other high profile structures, exceeding 10 feet in height, will be eliminated, designed or sited in a manner which does not impact GRSG.<br>g. Remote monitoring of production facilities must be utilized and all permit applications must contain a plan to reduce the frequency of vehicle use.<br>h. Maximize the area of interim reclamation on long-term access roads and well pads including reshaping, top-soiling and re-vegetating cut and fill slopes. Utilize native grass species mix which includes sagebrush and forbs.<br>i. Restore disturbed areas at final reclamation to pre-disturbance conditions or desired plant community. Utilize native grass species mix which includes sagebrush and forbs.<br>j. Permanent (longer than 2 months) structures which create movement must be designed or sited to minimize impacts on GRSG.<br>k. As reasonable (43 CFR, Part 3101.1-2), in consideration of valid existing rights, and to achieve a net conservation gain, the BLM will require compensatory mitigation when impacts cannot be adequately avoided and minimized, and residual impacts will result in habitat loss and degradation. | Potential change under Alternatives 3, 4, 5, and 6. |

| North Dakota RMP Amendment | Potential Change in 2023 Plan |
|---|---|
| Compensatory mitigation actions will align with the recommendations in the Regional Mitigation Strategy (see Appendix F of the 2015 Greater Sage-Grouse Approved RMPA/ROD [BLM 2015a]), as appropriate. A priority may be given to compensatory mitigation actions in the same PHMA as is being impacted, unless a greater benefit can be achieved elsewhere. Compensatory mitigation will be considered when no feasible options remain to adequately avoid and minimize impacts within and immediately adjacent to the impacted site.<br><br>Conservation Measure #2: Make applicable RDFs (Appendix C of the 2015 Greater Sage-Grouse Approved RMPA/ROD [BLM 2015a]) mandatory as COA within PHMA. | *(See above.)* |
| ***Management Decisions: Solid Leasable Minerals*** | |
| Management Direction MR-1.12: Close PHMA to nonenergy leasable mineral leasing. See Figure 2-7, North Dakota Nonenergy Leasables (Appendix A of the 2015 Greater Sage-Grouse Approved RMPA/ROD [BLM 2015a]). This includes not permitting any new leases to expand an existing mine. | Potential change under Alternatives 3 and 6. |
| Management Direction MR-1.13: For existing nonenergy leasable mineral leases in PHMA, follow the same RDFs applied to fluid minerals (Appendix C of the 2015 Greater Sage-Grouse Approved RMPA/ROD [BLM 2015a]), when wells are used for solution mining. | No change proposed. |
| Management Direction MR-1.8: In GHMA, apply minimization of surface-disturbing or disrupting activities (including operations and maintenance) where needed to reduce the impacts of human activities on important seasonal GRSG habitats. Apply these measures during activity level planning.<br>• Use additional, effective mitigation to offset impacts as appropriate (determined by local options/needs). | Potential change under Alternatives 3, 4, 5, and 6. |
| Management Direction MR-1.6: At the time an application for a new coal lease or lease modification is submitted to the BLM, the BLM will determine whether the lease application area is "unsuitable" for all or certain coal mining methods pursuant to 43 CFR, Part 3461.5. PHMA is essential habitat for maintaining GRSG for purposes of the suitability criteria set forth at 43 CFR, Part 3461.5(o)(1).<br><br>See Figure 2-13, North Dakota Coal (Appendix A of the 2015 Greater Sage-Grouse Approved RMPA/ROD [BLM 2015a]). | Potential change under Alternatives 3, 4, 5, and 6. |
| Management Direction MR-1.7: Sub-surface mines - Grant no new mining leases unless all surface disturbances (appurtenant facilities) are placed outside of PHMA. | No change proposed. |
| ***Management Decisions: Locatable Materials*** | |
| Management Direction LR-1.13: Not withdrawn from minerals on BLM surface. | Potential change under Alternative 3. |

| North Dakota RMP Amendment | Potential Change in 2023 Plan |
|---|---|
| Management Direction MR-1.9: In PHMA, proposed actions under Plan of Operations and Notices will be analyzed on a case-by-case basis in cooperation with the State of North Dakota, and RDFs (Appendix C of the 2015 Greater Sage-Grouse Approved RMPA/ROD [BLM 2015a]) will be applied to the extent consistent with applicable law. See Figure 2-5, North Dakota Locatable Minerals (Appendix A of the 2015 Greater Sage-Grouse Approved RMPA/ROD [BLM 2015a]).<br><br>Note: Locatable mineral exploration and development under the mining laws are not discretionary actions; however, Notices and Plan of Operation are reviewed to prevent unnecessary or undue degradation to resources. | Potential change under Alternative 3. |
| ***Management Decisions: Mineral Materials*** | |
| Management Direction MR-1.10: Close PHMA to mineral material sales [available to free use permits]. See Figure 2-6, North Dakota Salable Minerals (Mineral Materials) (Appendix A of the 2015 Greater Sage-Grouse Approved RMPA/ROD [BLM 2015a]). | Potential change under Alternatives 3 and 6. |
| Management Direction MR-1.11: In PHMA, restore salable mineral pits no longer in use to meet GRSG habitat conservation objectives.<br><br>Note: Although there are no authorized mineral pits in the planning area, any trespass pits found in the planning area will be subject to restoration. | No change proposed. |
| ***Management Decisions: Recreation*** | |
| Management Direction REC-1.1: Only allow Special Recreation Permits that will have neutral or beneficial effects on PHMA. | No change proposed. |
| Management Direction REC-1.2: In PHMA, do not construct new recreation facilities (e.g., campgrounds, trails, trailheads, and staging areas) unless the development will have a net conservation gain to GRSG habitat (such as concentrating recreation, diverting use away from important areas, etc.), or unless the development is required for visitor health and safety or resource protection. | No change proposed. |
| **Management Decisions: Comprehensive Trails and Travel Management** | |
| Management Direction TTM-1.1: In PHMA and GHMA, limit OHV travel to existing roads, primitive roads, and trails at a minimum, until such time as travel management planning is complete and routes are either designated or closed.<br><br>See Figure 2-12, North Dakota Trails and Travel Management (Appendix A of the 2015 Greater Sage-Grouse Approved RMPA/ROD [BLM 2015a]). | No change proposed. |

| North Dakota RMP Amendment | Potential Change in 2023 Plan |
|---|---|
| Management Direction TTM-1.3: In PHMA and GHMA, complete activity level travel plans within 5 years of the ROD. During activity level planning, where appropriate, designate routes in PHMA and GHMA with current administrative/agency purpose or need to administrative access only. | No change proposed. |
| Management Direction TTM-1.6: In PHMA and GHMA, allow no upgrading of existing routes that will change route category (road, primitive road, or trail) or capacity unless the upgrading will have minimal impact on GRSG habitat, is necessary for motorist safety, or eliminates the need to construct a new road. | No change proposed. |
| Management Direction TTM-1.4: In PHMA, limit route construction to realignments of existing designated routes if that realignment has a minimal impact on GRSG habitat, eliminates the need to construct a new road, or is necessary for motorist safety. Allow new routes/realignments in PHMA and GHMA during site-specific travel planning if it improves GRSG habitat and resource conditions. | No change proposed. |
| Management Direction TTM-1.7: When travel management plans are complete, conduct restoration of roads, primitive roads and trails in PHMA and GHMA. | No change proposed. |
| Management Direction TTM-1.8: When reseeding roads, primitive roads and trails in PHMA and GHMA, use appropriate seed mixes and consider the use of transplanted sagebrush. | No change proposed. |
| Management Direction TTM-1.9: In PHMA and GHMA, temporary closures will be considered in accordance with 43 CFR, subpart 8364 (Closures and Restrictions); 43 CFR, subpart 8351 (Designated National Area); 43 CFR, subpart 6302 (Use of Wilderness Areas, Prohibited Acts, and Penalties); 43 CFR, subpart 8341 (Conditions of Use).<br><br>Temporary closure or restriction orders under these authorities are enacted at the discretion of the BLM Authorized Officer to resolve management conflicts and protect persons, property, and public lands and resources. Where a BLM Authorized Officer determines that OHVs are causing or will cause considerable adverse effects upon soil, vegetation, wildlife, wildlife habitat, cultural resources, historical resources, threatened or endangered species, wilderness suitability, other authorized uses, or other resources, the affected areas shall be immediately closed to the type(s) of vehicle causing the adverse effect until the adverse effects are eliminated and measures implemented to prevent recurrence. (43 CFR, Part 8341.2) A closure or restriction order shall be considered only after other management strategies and alternatives have been explored. The duration of temporary closure or restriction orders shall be limited to 24 months or less; however, certain situations may require longer closures and/or iterative temporary closures. This may include closure of routes or areas. | No change proposed. |

| North Dakota RMP Amendment | Potential Change in 2023 Plan |
|---|---|
| Management Direction TTM-1.2: In PHMA, travel management will evaluate the need for permanent, or seasonal, road or area closures where vehicle use is causing or will cause adverse effects upon habitat. | No change proposed. |
| Management Direction TTM-1.5: In PHMA, use existing routes, or realignments as described above to access valid existing rights that are not yet developed. If valid existing rights cannot be accessed via existing routes, then build any new route constructed to the absolute minimum standard necessary. | No change proposed. |
| ***Management Decisions: Livestock Grazing*** | |
| Management Direction LG-1.3: Within PHMA, incorporate GRSG habitat objectives and management considerations into all BLM grazing allotments through AMP or permit renewals. Develop standards with State of North Dakota and USFWS. | Potential change under Alternatives 3, 4, 5, and 6. |
| Management Direction LG-1.6: In PHMA, conduct land health assessments that include (at a minimum) indicators and measurements of structure/condition/composition of vegetation specific to achieving GRSG habitat objectives. Local objectives will be developed at the field office level in partnership with North Dakota Game and Fish Department and USFWS, and incorporated into AMPs or livestock grazing permits as appropriate incorporating best available science. | Potential change under Alternatives 3, 4, 5, and 6. |
| Management Direction LG-1.8: Develop specific objectives to conserve, enhance or restore PHMA based on ecological site descriptions and assessments (including within wetlands and riparian areas). If an effective grazing system that meets GRSG habitat requirements is not already in place, analyze at least one alternative that conserves, restores or enhances GRSG habitat in the NEPA document prepared for the permit renewal. | Potential change under Alternatives 3, 4, 5, and 6. |
| Management Direction LG-1.5: The BLM will prioritize (1) the review of grazing permits/leases, in particular to determine if modification is necessary prior to renewal, and (2) the processing of grazing permits/leases in PHMA. In setting workload priorities, precedence will be given to existing permits/leases in these areas not meeting Land Health Standards, with focus on those containing riparian areas, including wet meadows. The BLM may use other criteria for prioritization to respond to urgent natural resource concerns (such as fire) and legal obligations.<br><br>The NEPA analysis for renewals and modifications of livestock grazing permits/leases that include lands within PHMA will include specific management thresholds, based on GRSG Habitat Objectives (Table 2-3), Habitat Objectives for GRSG and ecological site potential, and one or more defined responses that will allow the authorizing officer to make adjustments to livestock grazing that have already been subjected to NEPA analysis. | Potential change under Alternatives 3, 4, 5, and 6. |

| North Dakota RMP Amendment | Potential Change in 2023 Plan |
|---|---|
| Part of Management Direction LG-1.5: Allotments within PHMA, focusing on those containing riparian areas, including wet meadows, will be prioritized for field checks to help ensure compliance with the terms and conditions of the grazing permits. Field checks can include monitoring for actual use, utilization, and use supervision. | Potential change under Alternatives 3, 4, 5, and 6. |
| Management Direction LG-1.17: Evaluate the role of existing seedings that are currently composed of primarily introduced perennial grasses in and adjacent to PHMA to determine if they should be restored to sagebrush or habitat of higher quality for GRSG. If these seedings are part of an AMP/Conservation Plan or if they provide value in conserving or enhancing the rest of the PHMA, then no restoration will be necessary. Assess the compatibility of these seedings for GRSG habitat or as a component of a grazing system during the land health assessments. | Potential change under Alternatives 3, 4, 5, and 6. |
| Management Direction LG-1.19: When developing or modifying water developments in PHMA, use applicable RDFs (Appendix C of the 2015 Greater Sage-Grouse Approved RMPA/ROD2 [BLM 2015a]) to mitigate potential impacts from West Nile virus. | Potential change under Alternatives 3, 4, 5, and 6. |
| Management Direction LG-1.20: In PHMA, evaluate existing structural range improvements and location of supplements (salt or protein blocks) during grazing lease renewal process to make sure they conserve, enhance or restore GRSG habitat.<br><br>To reduce outright GRSG strikes and mortality, remove, modify or mark fences in high risk areas within PHMA based on proximity to lek, lek size, and topography. Monitor for, and treat invasive species associated with existing range improvements. | Potential change under Alternatives 3, 4, 5, and 6. |
| Management Direction LG-1.18: In PHMA, design any new structural range improvements and location of supplements (salt or protein blocks) to conserve, enhance, or restore GRSG habitat through an improved grazing management system relative to GRSG objectives. Structural range improvements, in this context, include but are not limited to: cattle guards, fences, exclosures, corrals or other livestock handling structures; pipelines, troughs, storage tanks (including moveable tanks used in livestock water hauling), windmills, ponds/reservoirs, solar panels and spring developments. Potential for invasive species establishment or increase following construction must be considered in the project planning process and monitored and treated post-construction. | Potential change under Alternatives 3, 4, 5, and 6. |
| Management Direction LG-1.16: In PHMA, allow treatments that conserve, enhance or restore GRSG habitat as well as other priority species habitat (this includes treatments that benefit livestock as part of an AMP/Conservation Plan to improve GRSG habitat). | Potential change under Alternatives 3, 4, 5, and 6. |

| North Dakota RMP Amendment | Potential Change in 2023 Plan |
|---|---|
| Management Direction LG-1.9: In PHMA, manage for vegetation composition and structure consistent with GRSG seasonal habitat objectives. ESDs can help determine whether or not the GRSG seasonal habitat objectives are consistent with the ecological site potential within the reference state. GRSG seasonal habitat objectives and ecological site potential within reference states are not always going to be the same. | Potential change under Alternatives 3, 4, 5, and 6. |
| Management Direction LG-1.10: In PHMA, implement management directions (grazing decisions, AMP/Conservation Plan development, or other agreements) to modify grazing management to meet State of North Dakota seasonal GRSG habitat requirements, where allotment evaluations indicate land health assessments are not being met due to livestock. Consider singly, or in combination, changes in:<br>1. Season or timing of use;<br>2. Numbers of livestock (includes temporary non-use or livestock removal);<br>3. Distribution of livestock use;<br>4. Intensity of use; and<br>5. Type of livestock (e.g., cattle, sheep, horses, llamas, alpacas, and goats). | Potential change under Alternatives 3, 4, 5, and 6. |
| Management Direction LG-1.11: During drought periods, prioritize evaluating effects of the drought in PHMA relative to their needs for food and cover. Management will continue to be in accordance with the Montana-Dakotas Drought Policy (see Appendix H, Drought Policy, of the 2015 Greater Sage-Grouse Approved RMPA/ROD [BLM 2015a]). | Potential change under Alternatives 3, 4, 5, and 6. |
| Management Direction LG-1.7: At the time a permittee[3] or lessee voluntarily relinquishes a permit or lease, the BLM will consider whether the public lands where that permitted use was authorized should remain available for livestock grazing or be used for other resource management objectives, such as reserve common allotments or fire breaks. This does not apply to or impact grazing preference transfers, which are addressed in 43 CFR 4110.2-3.<br><br>[3]The North Dakota BLM does not currently have any issued grazing permits, only leases. | Potential change under Alternatives 3, 4, 5, and 6. |
| ND RMP Amendment process:<br>Management Directions Common to All Alternatives for LG includes:<br>• Apply the management decisions to address livestock use in Greater Sage Grouse habitat as described in the North Dakota Field Office Greater Sage-Grouse Approved RMP Amendment (2015). | Potential change under Alternatives 3, 4, 5, and 6. |

**Table 2. North Dakota Habitat Objectives for GRSG**

| Attribute | Indicators | Desired Conditions | Reference |
|---|---|---|---|
| **BREEDING AND NESTING (Seasonal Use Period March 1 - June 15)** | | | |
| Lek Security | Proximity of trees | 0.388 miles avoidance of coniferous habitats | Doherty 2008 |
| | Proximity of sagebrush to leks | Adjacent protective sagebrush cover within 328 feet (ft.) (100 meters [m]) of an occupied lek | Stiver et al. 2015 |
| Cover | Sagebrush cover | ≥5-25% | Herman-Brunson 2007<br>Doherty et al. 2010 |
| | Sagebrush height | 7-30 inches | Swanson 2009<br>Holloran et al. 2005<br>Herman-Brunson 2007 |
| | Predominant sage brush shape | Predominately spreading shape | Stiver et al. 2015 |
| | Perennial grass cover | ≥10% Not Continuous | Doherty et al. 2010<br>Doherty et al. 2011<br>Holloran et al. 2005<br>Hagen et al. 2007 |
| | Perennial grass and forb height | Adequate nest cover based on ecological site potential and seasonal precipitation; 4.4-11.3 inches[1] | Doherty et al. 2014 |
| | Perennial forb cover | ≥5% Not Continuous | Doherty et al. 2010<br>Doherty et al. 2011<br>Hagen et al. 2007<br>Holloran et al. 2005 |
| **BROOD-REARING/SUMMER (Seasonal Use Period June 16-October 31** | | | |
| Cover | Sagebrush cover | ≥5 % | Herman-Brunson 2007<br>Swanson 2009<br>Doherty et al. 2010<br>Doherty et al. 2011<br>Hagen et al. 2007 |
| | Sagebrush height | 7-30 inches | Herman-Brunson 2007<br>Doherty et al. 2011<br>Holloran et al. 2005<br>Schroeder et al. 1999 |
| | Perennial grass and forbs | ≥20% Forbs 6-16% | Doherty et al. 2010<br>Doherty et al. 2011<br>Holloran et al. 2005<br>Herman-Brunson 2007 |
| | Riparian areas/mesic meadows | Proper Functioning Condition | BLM 1997c<br>Prichard et al. 1999<br>Dickard et al. 2015 |
| | Upland and riparian perennial forb availability | Preferred forbs are common with several preferred species present. | Stiver et al. 2015<br>Doherty et al. 2011 |
| **WINTER (Seasonal Use Period November 1-February 28)** | | | |
| Cover and Food | Sagebrush cover above snow | ≥10% | Schroeder et al. 1999<br>Swanson 2009 |
| | Sagebrush height above snow | ≥ 6 inches | Schroeder et al. 1999<br>Doherty et al. 2011<br>Swanson 2009 |

[1]Specific height requirements needed to meet the objective will be set at the time of watershed assessments.

### 2.11.2 Relevant Appendices

The following table shows which appendices from the 2015 plan have management direction that may change through this RMP amendment. The appendices can be found on the North Dakota GRSG ePlanning website.

| ARMPA Appendix Name | Potential for Change in 2023 Plan |
|---|---|
| A: Approved RMP Amendment Maps | Yes |
| B: Applying Lek Buffer Distances When Approving Actions | Yes |
| C: Required Design Features | Yes |
| D: The Greater Sage-Grouse Monitoring Framework | Yes |
| E: Greater Sage-Grouse Disturbance Caps | Yes |
| F: Regional Mitigation Strategy | Yes |
| G: Oil and Gas Stipulations | Yes |
| H: GRSG Wildfire and Invasive Species Habitat Assessment | Yes |

# Appendix 2.12
# Nevada and Northeastern California RMPs

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## 2.12 NEVADA AND NORTHEASTERN CALIFORNIA RMPS

This appendix presents the GRSG approved RMP amendment language from the 2015 and 2019 records of decision for Nevada and northeastern California. Changes between 2015 and 2019 are noted. The table below notes which goals, objectives, appendices, and management decisions/actions have a potential to change as a result of the current planning effort and if so, under which alternatives changes are being considered. Note that any references to tables and appendices are to those applicable 2015 and 2019 appendices that are listed in **Section 2.12.2** of this appendix.

### 2.12.1 Existing GRSG RMP Management – Nevada and Northeastern California

**Table 1. Acres of PHMA, GHMA, and OHMA in the Decision Area for the 2015 ARMPA (as maintained April 2022)**

| Management Agency | PHMA | GHMA | OHMA |
|---|---|---|---|
| BLM Administered Surface | 9,224,903 | 5,770,276 | 4,860,140 |
| BLM Administered Subsurface (Forest Service) | 986,400 | 796,100 | 621,400 |

**Table 2. Acres of PHMA, GHMA, and OHMA in the Decision Area for the 2019 ARMPA**

| Management Agency | PHMA | GHMA | OHMA |
|---|---|---|---|
| BLM Administered Surface | 9,309,700 | 5,720,600 | 5,876,600 |
| BLM Administered Subsurface (Forest Service) | 986,400 | 796,100 | 621,400 |

**Table 3. Acres of GRSG Habitat by County in the Decision Area (BLM-Administered Lands Only)[1] 2015 ARMPA (as maintained April 2022)**

| County Name[2] | ARMPA | | | |
|---|---|---|---|---|
| | PHMA[3] | GHMA | OHMA | TOTAL |
| Churchill | 26,088 | 89,088 | 132,034 | 247,210 |
| Elko | 3,180,610 | 1,152,284 | 1,033,775 | 5,366,669 |
| Eureka | 684,165 | 616,828 | 363,653 | 1,664,646 |
| Humboldt | 1,117,470 | 375,499 | 330,672 | 1,823,641 |
| Lander | 850,521 | 519,097 | 510,744 | 1,880,362 |
| Lassen | 421,208 | 401,137 | 119,000 | 941,345 |
| Lincoln | 101,555 | 312,960 | 317,101 | 731,616 |
| Lyon | - | - | - | - |
| Mineral | - | - | - | - |
| Modoc | 63,329 | 128,512 | 60,714 | 252,555 |
| Nye | 294,933 | 211,246 | 611,652 | 1,117,831 |
| Pershing | 53,556 | 197,279 | 388,614 | 639,449 |
| Plumas | - | 1,592 | 139 | 1,731 |
| Sierra | - | 363 | 90 | 453 |
| Storey | - | - | - | - |
| Washoe | 1,354,870 | 421,652 | 206,703 | 1,983,225 |
| White Pine | 1,073,771 | 1,343,149 | 784,847 | 3,201,767 |
| **Grand Total** | **9,222,076** | **5,770,686** | **4,859,738** | 19,852,500 |

[1] These figures do not include subsurface split-estate acreage. [2]The following counties in the planning area do not contain mapped GRSG habitat: Carson City, Douglas, Esmeralda, and Siskiyou. [3]PHMA acres in the proposed plan include 2,797,400 acres in Elko, Humboldt, and Washoe Counties associated with SFA.

**Table 4. Acres of GRSG Habitat by County in the Decision Area (BLM-Administered Lands Only)[1] 2019 ARMPA (as maintained in December 2015)**

| County Name [2] | ARMPA | | | |
|---|---|---|---|---|
| | PHMA[3] | GHMA | OHMA | TOTAL |
| Churchill | 74,900 | 78,200 | 171,500 | 324,600 |
| Elko | 3,476,900 | 995,600 | 1,000,600 | 5,473,100 |
| Eureka | 635,300 | 531,400 | 371,000 | 1,537,700 |
| Humboldt | 1,294,300 | 661,600 | 715,200 | 2,671,100 |
| Lander | 765,600 | 612,500 | 591,300 | 1,969,400 |
| Lassen | 282,100 | 278,800 | 283,700 | 844,600 |
| Lincoln | 141,000 | 464,000 | 376,400 | 981,400 |
| Lyon | — | 600 | 1,400 | 2,000 |
| Mineral | — | — | 5,800 | 5,800 |
| Modoc | 56,900 | 93,400 | 64,800 | 215,100 |
| Nye | 310,900 | 266,800 | 770,700 | 1,348,400 |
| Pershing | 62,200 | 168,800 | 502,200 | 733,200 |
| Plumas | — | — | 1,800 | 1,800 |
| Sierra | — | 300 | 200 | 500 |
| Storey | — | 300 | 700 | 1,000 |
| Washoe | 1,214,500 | 466,500 | 305,700 | 1,986,700 |
| White Pine | 994,800 | 1,101,800 | 713,600 | 2,810,200 |
| **Grand Total** | 9,309,400 | 5,720,600 | 5,876,600 | 20,906,600 |

[1] These figures do not include subsurface split-estate acreage.

[2]The following counties in the planning area do not contain mapped GRSG habitat: Carson City, Douglas, Esmeralda, and Siskiyou.

[3]PHMA acres in the proposed plan include 2,797,400 acres in Elko, Humboldt, and Washoe Counties associated with SFA.

**Table 5. Acres of GRSG Habitat by BLM District/Field Office in the Decision Area (BLM-Administered Lands Only)[1]**
**2015 ARMPA (as maintained in April 2022)**

| BLM Office | ARMPA | | | |
|---|---|---|---|---|
| | PHMA[2] | GHMA | OHMA | TOTAL |
| Alturas Field Office[3] | 9,281 | 245,918 | 90,382 | 345,581 |
| Battle Mountain District Office | 1,615,544 | 1,014,920 | 985,607 | 3,616,071 |
| Carson City District Office | 124,472 | 225,221 | 189,897 | 539,590 |
| Eagle Lake Field Office | 519,561 | 232,403 | 129,917 | 881,881 |
| Elko District Office | 3,374,094 | 1,371,114 | 1,194,698 | 5,939,906 |
| Ely District Office | 1,199,077 | 1,770,898 | 1,442,200 | 4,412,175 |
| Jarbidge Field Office[4] | 31,802 | 11,556 | 498 | 43,856 |
| Bruneau Field Office[4] | 7,173 | 627 | 106 | 7,906 |
| Surprise Field Office[3] | 918,711 | 189,376 | 57,767 | 1,165,854 |
| Winnemucca District Office | 1,466,520 | 770,486 | 721,262 | 2,958,268 |
| **Total Acres** | **9,266,235** | **5,832,519** | **4,812,334** | **19,911,088** |

[1]These figures do not include subsurface split-estate acreage.
[2]Includes 2,797,400 acres of SFA in the Surprise Field Office, Winnemucca District Office, and Elko District Office.
[3]The Alturas Field Office has been combined with the Surprise Field Office and renamed the Applegate Field Office.
[4]Only that part of the Idaho BLM Jarbidge and Bruneau Field Offices that falls in the Nevada state line.

**Table 6. Acres of GRSG Habitat by BLM District/Field Office in the Decision Area (BLM-Administered Lands Only)[1]**
**2019 ARMPA**

| BLM Office | 2019 ARMPA | | | |
|---|---|---|---|---|
| | PHMA[2] | GHMA | OHMA | TOTAL |
| Alturas Field Office3 | 12,200 | 127,700 | 178,000 | 317,900 |
| Battle Mountain District Office | 1,549,600 | 1,014,300 | 1,163,600 | 3,727,500 |
| Carson City District Office | 115,000 | 231,100 | 309,400 | 655,500 |
| Eagle Lake Field Office | 474,300 | 242,800 | 147,700 | 864,800 |
| Elko District Office | 3,586,900 | 1,203,600 | 1,152,500 | 5,943,000 |
| Ely District Office | 1,176,000 | 1,741,800 | 1,486,200 | 4,404,000 |
| Jarbidge Field Office4 | 32,700 | 10,000 | 900 | 43,600 |
| Bruneau Field Office4 | 7,700 | 0 | 300 | 8,000 |
| Surprise Field Office | 862,500 | 215,400 | 100,400 | 1,178,300 |
| Winnemucca District Office | 1,492,800 | 933,900 | 1,337,600 | 3,764,300 |
| **Total Acres** | **9,309,700** | **5,720,600** | **5,876,600** | **20,906,900** |

[1]These figures do not include subsurface split-estate acreage.
[2]Includes 2,797,400 acres of SFA in the Surprise Field Office, Winnemucca District Office, and Elko District Office.
[3]The Alturas Field Office has recently been renamed the Applegate Field Office.
[4]Only that part of the Idaho BLM Jarbidge and Bruneau Field Offices that falls in the Nevada state line.

**Table 7** is a summary of the allocation decisions presented for each GRSG habitat management area.

**Table 7. Summary of Allocation Decisions by GRSG Habitat Management Areas 2015 ARMPA (as maintained in April 2022)**

| Resource | PHMA | GHMA | OHMA |
|---|---|---|---|
| Land tenure | Retain | Retain | Retain/dispose |
| Solar | Exclusion | Exclusion | Open |
| Wind | Exclusion | Avoidance | Open |
| Major ROWs | Avoidance | Avoidance | Open |
| Minor ROWs | Avoidance | Open | Open |
| Oil and gas | Open with major stipulations | Open with minor stipulations | Open with standard stipulations |
| Geothermal | Open with major stipulations | Open with minor stipulations | Open with standard stipulations |
| Nonenergy leasable | Closed | Open | Open |
| Salable minerals | Closed | Open | Open |
| Locatable minerals | SFA = recommend withdrawal<br>Other PHMA = open | Open | Open |
| Travel management | Limited | Limited | Open |
| Livestock grazing | Open | Open | Open |

**Table 8** is a summary of the allocation decisions presented for each GRSG Habitat Management Area (HMA) which includes Priority, General and Other HMA (PHMA; GHMA; OHMA). Also see **MD SSS 5** for Allocation Exception Criteria.

**Table 8. Summary of Allocation Decisions by GRSG Habitat Management Areas 2019 ARMPA**

| Resource | PHMA | GHMA | OHMA |
|---|---|---|---|
| Land tenure | Retain | Retain | Retain/dispose |
| Solar | Exclusion | Exclusion | Exclusion |
| Wind | Exclusion | Avoidance | Open |
| Major ROWs | Avoidance | Avoidance | Open |
| Minor ROWs | Avoidance | Open | Open |
| Oil and gas | Open with major stipulations | Open with moderate stipulations | Open with standard stipulations |
| Geothermal | Open with major stipulations | Open with moderate stipulations | Open with standard stipulations |
| Nonenergy leasables | Closed | Open | Open |
| Salable minerals | Closed | Open | Open |
| Locatable minerals | Open | Open | Open |
| Travel management | Limited | Limited | Open |
| Livestock grazing | Available | Available | Available |

*Site specific projects may qualify for an exception to these allocations decisions if they meet one of the criteria for allocation exceptions found in **MD SSS 5**.

**Table 9. Habitat Objectives for Greater Sage-Grouse 2015 ARMPA (as maintained in April 2022)**

| Attribute | Indicators | Desired Condition (Habitat Objectives) | Reference |
|---|---|---|---|
| **GENERAL/LANDSCAPE-LEVEL[1]** | | | |
| All life stages | Rangeland health assessments | Meeting all standards[2] | |
| Cover (nesting) | Seasonal habitat needed | >65% of the landscape in sagebrush cover | Aldridge and Boyce 2007 |
| | Annual grasses | <%5 | Blomberg et al. 2012 |
| Security (nesting) | Conifer encroachment | <3% phase I (>0 to <25% cover)<br>No phase II (25 to 50% cover)<br>No phase III (>50% cover) | Casazza et al. 2011<br>Coates et al. 2016 |
| Cover and food (winter) | Conifer encroachment | <5% phase I (>0 to <25% cover)<br>No phase II (25 to 50% cover)<br>No phase III (>50%) | Coates et al. 2016 |
| | Sagebrush extent | >85% sagebrush land cover | Doherty et al. 2008 |
| **LEK (Seasonal Use Period: March 1 to May 15)[1]** | | | |
| Cover | Availability of sagebrush cover | Adjacent sagebrush provides escape cover | Blomberg et al. 2012<br>Connelly et al. 2000<br>Stiver et al. 2015 |
| Security[3] | Pinyon or juniper cover | <2% landscape cover within .6 mile of leks | Connelly et al. 2000 (modified)<br>Stiver et al. 2015; Baruch-Mordo et al. 2013<br>Coates et al. 2017a |
| | Proximity of Linear Features | >3.1 miles | Manier et al. 2014 |
| | Proximity of Surface Disturbance | >3.1 miles | Manier et al. 2014 |
| | Proximity of Tall Structures | >2 miles | Coates et al. 2013<br>Manier et al. 2014 |
| | Proximity of Low Structures | >1.2 miles | Manier et al. 2014 |

| Attribute | Indicators | Desired Condition (Habitat Objectives) | Reference |
|---|---|---|---|
| **NESTING (Seasonal Use Period: April 1 to June 30)[1]** | | | |
| Cover[6] | Sagebrush cover | Arid[8]: ≥20%<br>Mesic[8]: ≥20% | Kolada et al. 2009a, 2009b<br>Coates et al. 2017 |
| | Residual and live perennial grass cover (such as native bunchgrasses) | Arid[8]: ≥7% if shrub cover is >20%[5]<br>Mesic[8]: ≥13% if shrub cover is >20%[5] | Coates et al. 2013; 2017<br>Coates and Delehanty 2010<br>Kolada et al. 2009a, 2009b |
| | Annual grass cover | Arid[8]: <3%<br>Mesic[8]: <3% | Coates et al. 2017 |
| | Total shrub cover | Arid[8]: >28%<br>Mesic[8]: >26% | Coates and Delehanty 2010<br>Kolada et al. 2009a<br>Coates et al. 2017 |
| | Perennial grass height (includes residual grasses) | Arid[8]: 12cm<br>Mesic[8]: 18cm | Connelly et al. 2000, 2003<br>Hagen et al. 2007; Stiver et. al. 2015<br>Coates et al. 2017 |
| Security[2] | Proximity of tall structures[4] (3 feet [1 meter] above shrub height) | Use Manier et al. 2014, Conservation Buffer Distance Estimates for GRSG-A Review; preference is 3 miles | Coates et al. 2013<br>Gibson et al. 2013<br>Manier et al. 2014 |
| | Pinyon or juniper cover | <3% within 800 meters | Severson et al. 2017 |
| **BROOD-REARING/SUMMER (Seasonal Use Period: May 15 to September 15; Early: May 15 to June 15; Late: June 15 to September 15)[1]** | | | |
| ***UPLAND HABITATS*** | | | |
| Cover[6] | Sagebrush cover | Arid[8]: ≥20%<br>Mesic[8]: ≥15% | Connelly et al. 2000<br>Coates et al. 2017 |
| | Perennial grass and forb cover | Arid[8]: >19%<br>Mesic[8]: >25% | Connelly et al. 2000<br>Hagen et al. 2007<br>Coates et al. 2017 |
| | Deep rooted perennial bunchgrass (within 522 feet [200 meters] of riparian areas and wet meadows) | Arid[8]: 12cm[7]<br>Mesic[8]: 14cm[7] | Hagen et al. 2007<br>Casazza et al. 2011<br>Coates et al. 2017 |
| Cover and food[6] | Perennial forb cover | Arid[8]: >5%<br>Mesic[8]: >9% | Casazza et al. 2011<br>Lockyer et al. 2015<br>Coates et al. 2017 |
| ***RIPARIAN/MEADOW HABITATS***[1] | | | |
| Cover and food[6] | Riparian areas/meadows | PFC | Dickard et al. 2014<br>Prichard et al. 1998, 1999<br>Stiver et al. 2015 |
| Security[6] | Upland and riparian perennial forb availability and understory species richness | Preferred forbs are common with several species present and high species richness (all plants) | Stiver et al. 2015 |
| | Riparian area/meadow interspersion with adjacent sagebrush | Has adjacent sagebrush cover within 200 meters | Casazza et al. 2011<br>Stiver et al. 2015 |

| Attribute | Indicators | Desired Condition (Habitat Objectives) | Reference |
|---|---|---|---|
| **WINTER (Seasonal Use Period: November 1 to February 28)[1]** | | | |
| Cover and Food | Sagebrush cover | ≥10% | Connelly et al. 2000<br>Stiver et al. 2015 |
| | Sagebrush height | > 25cm above snow depth | Connelly et al. 2000<br>Stiver et al. 2015 |

[1]Any one single habitat indicator does not define whether the habitat objective is or is not met. Instead, the preponderance of evidence from all indicators within that seasonal habitat period must be considered when assessing GRSG habitat objectives.
[2] Upland standards are based on indicators for cover, including litter, live vegetation, and rock, appropriate to the ecological potential of the site.
[3] Applicable to Phase I and Phase II pinyon and/or juniper.
[4]Does not include fences.
[5]In addition, if upland rangeland health standards are being met.
[6] Ecological site potential to meet habitat objectives should be considered when determining if objectives are feasible for the site. See discussion below Table 2-2.
[7]In drought years, 4-inch perennial bunchgrass height with greater than 20 percent measurements exceeding 5 inches in dry years.
[8] Arid is defined as areas that received >35.0 cm of average annual precipitation.
Mesic is defined as areas that received ≤35.0 cm of average annual precipitation.

**Table 9** will be implemented following this guidance: The habitat objectives are desired habitat conditions that are broad goals based on GRSG habitat selection that may not be achievable in all areas. The ability of a site to achieve habitat objectives shall be based on the ecological site potential and BLM should use high quality local or site-specific information, such as ecological site descriptions and state-and-transition models, if available, to determine if objectives are achievable. Attempting to manage sites, particularly large landscapes, to meet the vegetation objectives may not always be ecologically possible or may result in an unwanted site transition. In some cases, suitable habitat may only be found as small inclusions within the landscape, which could meet the habitat objectives.

**Table 9** includes a list of indicators, characteristics, and values that describe GRSG seasonal habitat use areas. The BLM used indicator values derived from a synthesis of local and regional GRSG habitat research and data to describe the typical vegetation communities that GRSG select. While the habitat objectives are not attainable on every site or every acre within GRSG HMAs, the values reflect a range of habitat conditions that generally lead to greater survival of individuals within a population. When permitting land use activities, BLM shall consider the ecological site potential within GRSG HMAs to validate the habitat conditions achievable for a specific site. The seasonal habitat descriptions in **Table 9** vary across the range of GRSG, within a subregion, and between sites. They are not land health standards but are quantitative measures that inform the Special Status Species Habitat Land Health Standard for GRSG. These measurable values reflect ecological potential and may be adjusted based on local factors influencing GRSG local data or if new science indicates that GRSG select for vegetation structure and composition in seasonal habitats not characterized by the values in **Table 9**. In these cases, it may be appropriate to adjust the values. Habitat objectives shall be evaluated in the context of annual variability in ecological conditions and shall not be used singly to determine habitat suitability for GRSG. They may be used to demonstrate trends over time, during plan evaluations for effectiveness of GRSG conservation, or when identifying limiting habitat characteristics for a given area.

The indicators, characteristics, values and desired seasonal habitat conditions in **Table 9** are to be incorporated into the Sage-Grouse Habitat Assessment Framework (Stiver et al. 2015; HAF) Site-Scale forms (4th Order) and are meant to inform the wildlife habitat component of the Land Health Standards (LHS) evaluation process (LHS, 43 CFR 4180.2), but do not replace rangeland health assessments. Results from the

LHS evaluation shall be used to support BLM in land use authorization processes and during development of objectives for management actions such as vegetation treatments. BLM land use authorizations will contain terms and conditions regarding the actions needed to achieve or make progress toward achieving habitat objectives and LHS.

**Table 9** will be periodically revised to incorporate the best available science in coordination with the SETT, USFWS, NDOW, CDFW, USGS and other partners. The team will periodically review and incorporate the best available science and will recommend adjustments based on locally derived data. As **Table 9** is updated, adjustments will be made by the BLM through plan maintenance or amendment, as appropriate.

## Table 10. Habitat Objectives for Greater Sage-Grouse 2019 ARMPA

| Attribute | Indicators | Desired Condition (Habitat Objectives) | Reference |
|---|---|---|---|
| **GENERAL/LANDSCAPE-LEVEL[1]** | | | |
| All life stages | Rangeland health assessments | Meeting all standards[2] | |
| Cover (nesting) | Seasonal habitat needed | >65% of the landscape in sagebrush cover | Aldridge and Boyce 2007 |
| | Annual grasses | <%5 | Blomberg et al. 2012 |
| Security (nesting) | Conifer encroachment | <3% phase I (>0 to <25% cover)<br>No phase II (25 to 50% cover)<br>No phase III (>50% cover) | Casazza et al. 2011<br>USGS (in prep A) |
| Cover and food (winter) | Conifer encroachment | <5% phase I (>0 to <25% cover)<br>No phase II (25 to 50% cover)<br>No phase III (>50%) | USGS (in prep A)<br>USGS (in prep B) |
| | Sagebrush extent | >85% sagebrush land cover | USGS (in prep A)<br>Doherty et al. 2008 |
| **LEK (Seasonal Use Period: March 1 to May 15)[1]** | | | |
| Cover | Availability of sagebrush cover | Has adjacent sagebrush cover | Blomberg et al. 2012<br>Connelly et al. 2000<br>Stiver et al. 2015 (in press) HAF |
| Security[3] | Pinyon or juniper cover | <3% landscape cover within .6 mile of leks | Connelly et al. 2000 (modified)<br>Stiver et al. 2015 (in press) HAF<br>Baruch-Mordo et al. 2013 Coates et al. 2013 Manier et al. 2014 |
| | Proximity of tall structures[4] | Use Manier et al. 2014-Conservation Buffer Distance Estimates for GRSG-A Review; preference is 3 miles | |
| **NESTING (Seasonal Use Period: April 1 to June 30)[1]** | | | |
| Cover | Sagebrush cover | ≥20% | Kolada et al. 2009a, 2009b |
| | Residual and live perennial grass cover (such as native bunchgrasses) | ≥10% if shrub cover is <25%[5] | Coates et al. 2013<br>Coates and Delehanty 2010<br>Kolada et al. 2009a, 2009b |
| | Annual grass cover | <5% | Lockyer et al. (in press) |
| | Total shrub cover | ≥30% | Coates and Delehanty 2010<br>Kolada et al. 2009a Lockyer et al. (in press) |
| | Perennial grass height (includes residual grasses) | Provide overhead and lateral concealment from predators | Connelly et al. 2000, 2003<br>Hagen et al. 2007; Stiver et. al. 2015 (in press) HAF |
| Security[2] | Proximity of tall structures[4] (3 feet [1 meter] above shrub) | Use Manier et al. 2014, Conservation Buffer Distance Estimates for GRSG-A Review; preference is 3 miles | Coates et al. 2013<br>Gibson et al. 2013 Manier et al. 2014 |

| Attribute | Indicators | Desired Condition (Habitat Objectives) | Reference |
|---|---|---|---|
| **BROOD-REARING/SUMMER (Seasonal Use Period: May 15 to September 15; Early: May 15 to June 15; Late: June 15 to September 15)[1]** | | | |
| ***UPLAND HABITATS*** | | | |
| Cover | Sagebrush cover | 10 to 25% | Connelly et al. 2000 |
| | Perennial grass cover and forbs | >15% combined perennial grass and forb cover | Connelly et al. 2000<br>Hagen et al. 2007 |
| | Deep rooted perennial bunchgrass (within 522 feet [200 meters] of riparian areas and wet meadows) | 7 inches[6, 7] | Hagen et al. 2007<br>Casazza et al. 2011 |
| Cover and food | Perennial forb cover | ≥5% arid<br>≥15% mesic | Casazza et al. 2011<br>Lockyer et al. (in press) |
| ***RIPARIAN/MEADOW HABITATS*** | | | |
| Cover and food | Riparian areas/meadows | PFC | Dickard et al. 2014<br>Prichard et al. 1998, 1999 Stiver et al. 2015 (in press) HAF |
| Security | Upland and riparian perennial forb availability and understory species richness | Preferred forbs are<br>common with several species present[6]<br>High species richness (all plants) | Stiver et al. 2015 (in press)<br>HAF |
| | Riparian area/meadow interspersion with adjacent sagebrush | Has adjacent sagebrush cover | Casazza et al. 2011<br>Stiver et al. 2015 (in press) HAF |
| **WINTER (Seasonal Use Period: November 1 to February 28)[1]** | | | |
| Cover and Food | Sagebrush cover | ≥10% above snow depth | Connelly et al. 2000<br>USGS (in prep C) |
| | Sagebrush height | >9.8 inches above snow depth | Connelly et al. 2000<br>USGS (in prep C) |

[1]Any one single habitat indicator does not define whether the habitat objective is or is not met. Instead, the preponderance of evidence from all indicators within that seasonal habitat period must be considered when assessing sage-grouse habitat objectives.
[2] Upland standards are based on indicators for cover, including litter, live vegetation, and rock, appropriate to the ecological potential of the site.
[3] Applicable to Phase I and Phase II pinyon and/or juniper.
[4]Does not include fences.
[5]In addition, if upland rangeland health standards are being met.
[6] Relative to ecological site potential.
[7]In drought years, 4-inch perennial bunchgrass height with greater than 20 percent measurements exceeding 5 inches in dry years.

**Table 10** will be periodically revised to incorporate the best available science in coordination with the SETT, USFWS, NDOW, CDFW, USFS, USGS, University of Nevada, Reno, University of California, and appropriate local agencies, and the BLM. The team will periodically review and incorporate the best available science and will recommend adjustments based on locally derived data. As **Table 10** is updated, adjustments will be made by the BLM through plan maintenance or amendment, as appropriate.

**Table 10** will be implemented following this guidance: The habitat objectives are desired habitat conditions that are broad goals based on GRSG habitat selection that may not be achievable in all areas. The ability of

a site to achieve the objectives shall be based on site potential, ecological site descriptions, state-and-transition models, etc.

**Table 10** includes a list of indicators, characteristics, and values that describe GRSG seasonal habitat use areas. The BLM used indicator values derived from a synthesis of local and regional GRSG habitat research and data to describe the typical vegetation communities that GRSG select. While the habitat objectives are not attainable on every site or every acre within GRSG HMAs, the values reflect a range of habitat conditions that generally lead to greater survival of individuals within a population. When permitting land use activities, BLM shall consider the ecological site potential within GRSG HMAs to validate the habitat conditions achievable for a specific site. a list of indicators, characteristics, and values that describe GRSG seasonal habitat use areas. The BLM used indicator values derived from a synthesis of local and regional GRSG habitat research and data to describe the typical vegetation communities that GRSG select. While the habitat objectives are not attainable on every site or every acre within GRSG HMAs, the values reflect a range of habitat conditions that generally lead to greater survival of individuals within a population. When permitting land use activities, BLM shall consider the ecological site potential within GRSG HMAs to validate the habitat conditions achievable for a specific site.

The seasonal habitat descriptions in **Table 10** vary across the range of GRSG, within a subregion, and between sites. They are not land health standards but are quantitative measures that inform the Special Status Species Habitat Land Health Standard for GRSG. These measurable values reflect ecological potential and may be adjusted based on local factors influencing GRSG local data or if new science indicates that GRSG select for vegetation structure and composition in seasonal habitats not characterized by the values in **Table 10**. In these cases, it may be appropriate to adjust the values. Habitat objectives shall be evaluated in the context of annual variability in ecological conditions and shall not be used singly to determine habitat suitability for GRSG. They may be used to demonstrate trends over time, during plan evaluations for effectiveness of GRSG conservation, or when identifying limiting habitat characteristics for a given area.

The indicators, characteristics, values and desired seasonal habitat conditions in **Table 10** are to be incorporated into the Sage-Grouse Habitat Assessment Framework (Stiver et al. 2015; HAF) Site-Scale forms (4th Order) and are meant to inform the wildlife habitat component of the Land Health Standards (LHS) evaluation process (LHS, 43 CFR 4180.2), but do not replace rangeland health assessments. Results from the LHS evaluation shall be used to support BLM in land use authorization processes and during development of objectives for management actions such as vegetation treatments. BLM land use authorizations will contain terms and conditions regarding the actions needed to achieve or make progress toward achieving habitat objectives and LHS.

**Table 11. Changes in Management from the 2015 ARMPA to the 2019 ARMPA Goals, Objectives, and Management Decisions**

| 2015 GRSG ARMPA (as maintained) | 2019 GRSG ARMPA (as maintained) | Potential for Change in 2023 Plan |
|---|---|---|
| ***SPECIAL STATUS SPECIES (SSS)*** | ***SPECIAL STATUS SPECIES (SSS)*** | — |
| **GOAL:** | **GOAL:** | — |
| **Goal SSS 1:** Conserve, enhance, and restore the sagebrush ecosystem upon which GRSG populations depend in an effort to maintain and/or increase their abundance and distribution, in cooperation with other conservation partners. | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |
| **Objectives** | — | — |
| **Objective SSS 1:** Manage land resource uses to meet GRSG habitat objectives, as described in Table 2-2. The habitat objectives will be used to evaluate management actions that are proposed in GRSG habitat. Managing for habitat objectives will ensure that habitat conditions are maintained if they are currently meeting objectives or if habitat conditions move toward these objectives in the event that current conditions do not meet these objectives. | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |
| **Objective SSS 2:** Maintain or improve connectivity between, to, and in PHMAs and GHMAs to promote movement and genetic diversity for GRSG population persistence and expansion. | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |
| **Objective SSS 3:** Identify and implement GRSG conservation actions that can augment, enhance, or integrate program conservation measures established in agency and state land use and policy plans, to the extent consistent with applicable law. | No changes made. | No change proposed. |

| 2015 GRSG ARMPA (as maintained) | 2019 GRSG ARMPA (as maintained) | Potential for Change in 2023 Plan |
|---|---|---|
| **Objective SSS 4:** In PHMAs and GHMAs, apply the concept of "avoid, minimize, and compensatory mitigation" for all human disturbance in areas not already excluded or closed, so as to avoid adverse effects on GRSG and its habitat. The first priority will be to avoid new disturbance; where this is not feasible, the second priority will be to minimize and mitigate any new disturbance (Appendices F and I). | **Objective SSS 4:** When authorizing third-party actions in designated GRSG HMAs, the BLM will apply avoidance and minimization measures to reduce impacts, while seeking to achieve the planning-level goals and objectives for GRSG and its habitat, consistent with valid existing rights and applicable law. Management will be consistent with the GRSG goals and objectives, and in conformance with BLM Manual 6840, Special Status Species Management. Specifically, the BLM will authorize uses of the public lands that are consistent with the policy in BLM Manual 6840 and therefore "minimize or eliminate threats affecting the status of [GRSG]" or "improve the condition of [GRSG] habitat." | Potential change under Alternatives 3, 4, 5, and 6. |
| **Management Decisions (MD):** | **Management Decisions (MD):** | — |
| **MD SSS 1:** In PHMAs and GHMAs, work with the proponent/applicant, whether in accordance with a valid existing right or not, and use the following screening criteria to avoid effects of the proposed human activity on GRSG habitat[l]<br>A. First priority—locate project/activity outside PHMAs and GHMAs<br>B. Second priority—if the project/activity cannot be placed outside PHMAs and GHMAs, locate the surface-disturbing activities in non-habitat areas first, then in the least suitable habitat for GRSG<br>l. In non-habitat, ensure the project/activity will not create a barrier to movement or connectivity between seasonal habitats and populations<br>C. Third priority—collocate the project/activity next to or in the footprint of existing infrastructure | **MD SSS 1:** In PHMAs and GHMAs, work with the proponent/applicant, whether in accordance with a valid existing right or not, and use the following screening criteria to avoid effects of the proposed human activity on GRSG habitat[l]:<br>A. First priority—locate project/activity outside PHMAs and GHMAs;<br>B. Second priority—if the project/activity cannot be placed outside PHMAs and GHMAs, locate the surface-disturbing activities in non-habitat areas first, then in the least suitable habitat for GRSG.<br>l-In non-habitat, ensure the project/activity will not create a barrier to movement or connectivity between GRSG seasonal habitats and populations;<br>C. Third priority—collocate the project/activity next to or in the footprint of existing infrastructure. | Potential change under Alternatives 3, 4, 5, and 6. |

| 2015 GRSG ARMPA (as maintained) | 2019 GRSG ARMPA (as maintained) | Potential for Change in 2023 Plan |
|---|---|---|
| **MD SSS 2:** In PHMAs, the following conditions will be met in order to avoid, minimize, and mitigate any effects on GRSG and its habitat from the project/activity:[2]<br><br>A. Manage discrete anthropogenic disturbances, whether temporary or permanent, so they cover less than 3 percent of 1) biologically significant units (BSUs; total PHMA area associated with a GRSG population area (see Appendix A; Figure 2-2)) and 2) in a proposed project analysis area. See Appendix E (Disturbance Cap Guidance) for additional information on implementing the disturbance cap, including what is and is not considered disturbance and how to calculate the proposed project analysis area, as follows:<br>1. If the 3 percent human disturbance cap is exceeded on all lands (regardless of ownership) in PHMAs in any given BSU, then no further discrete human disturbances (subject to applicable laws and regulations, such as the 1872 Mining Law, as amended, and valid existing rights) will be permitted, by BLM within GRSG PHMA in any given BSU until the disturbance has been reduced to less than the cap (see Nevada exception under MD SSS 2 a. 3. Appendix E).<br>2. If the 3 percent disturbance cap is exceeded on all lands (regardless of land ownership) within a proposed project analysis area in a PHMA, then no further anthropogenic disturbance will be permitted by BLM until disturbance in the proposed project analysis area has been reduced to maintain the area under the cap (subject to applicable laws and regulations, such as the 1872 Mining Law, as amended, valid existing rights; see Nevada exception under MD SSS 2 a. | **MD SSS 2:** In PHMAs, the following conditions will be met in order to avoid and minimize impacts to GRSG and its habitat. The BLM will consider compensatory mitigation actions only when offered voluntarily by a project proponent; when required by law other than FLPMA or as a component of compliance with a States' mitigation plan, program, or authority, such as required by the State of Nevada Executive Order 2018-32 (and any future regulations adopted by the State of Nevada regarding compensatory mitigation, consistent with federal law).<br><br>A. Manage discrete anthropogenic disturbances, whether temporary or permanent, so they cover less than 3 percent of: 1) biologically significant units (BSUs; total PHMA associated with a GRSG population area [see Appendix A; Figure 2-2]) and 2) in a proposed project analysis area. See Appendix F (Disturbance Cap Guidance) for additional information on implementing the disturbance cap, including what is and is not considered disturbance and how to calculate the proposed project analysis area, as follows:<br>1. If the 3 percent human disturbance cap is exceeded on all lands (regardless of ownership) in PHMAs in any given BSU, then no further discrete human disturbances (subject to applicable laws and regulations, such as the 1872 Mining Law, as amended, and valid existing rights) will be permitted, by the BLM within PHMA in any given BSU until the disturbance has been reduced to less than the cap (see Nevada exception under MD SSS 2 A. 2a).<br>2. If the 3 percent disturbance cap is exceeded on all lands | Potential change under Alternatives 3, 4, 5, and 6. |

| 2015 GRSG ARMPA (as maintained) | 2019 GRSG ARMPA (as maintained) | Potential for Change in 2023 Plan |
|---|---|---|
| 3. Appendix E).<br>a. For BLM land in the state of Nevada only, the following disturbance management protocol (DMP) is intended to provide for a 3 percent limitation on disturbance, except in situations where a biological analysis indicates a net conservation gain to the species.<br>• Such discretionary activities that would cause disturbances in excess of 3 percent at the project or BSU scale (see Appendix E) will be prohibited, unless a technical team described below determines that new or site-specific information indicates the project can be modified to result in a net conservation gain at the BSU level. Factors considered by the team will include GRSG abundance and trends, habitat amount and quality, extent of project disturbance, location and density of existing disturbance, project design options and other biological factors.<br>• Any exceptions to the 3 percent disturbance limitation may be approved by the Authorized Officer only with the concurrence of the State Director. The Authorized Officer may not grant an exception unless the NDOW, the USFWS, and the BLM unanimously find that the proposed action satisfies the conditions stated in the above paragraph. Such finding shall initially be made by the technical team, which consists of a | (regardless of land ownership) within a proposed project analysis area in PHMA, then no further anthropogenic disturbance will be permitted by the BLM until disturbance in the proposed project analysis area has been reduced to maintain the area under the cap (subject to applicable laws and regulations, such as the 1872 Mining Law, as amended, valid existing rights; see Nevada exception under MD SSS 2 A. 2a.).<br>a. For BLM land in the state of Nevada only, the following disturbance management protocol is intended to provide for a 3 percent limitation on disturbance, except in situations where a net conservation gain to the species is achieved as a component of compliance with a state mitigation plan, program, or authority, such as required by the State of Nevada's Executive Order 2018-32 (and any future regulations adopted by the State of Nevada regarding compensatory mitigation, consistent with federal law).<br>3. For BLM land in the state of California only, subject to applicable laws and regulations and valid existing rights, if the average density of one energy and mining facility per 640 acres (the density cap) is exceeded on all lands (regardless of land ownership) in PHMA within a proposed project analysis area, then no further disturbance from energy or mining facilities will be | *(See above.)* |

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| field biologist or other GRSG experts from each respective agency. In the event the initial finding is not unanimous, the finding may be elevated to the BLM State Director, USFWS State Ecological Services Director and NDOW Director for final resolution. In the event their finding is not unanimous, the exception will not be granted (Appendix E).<br>3. For BLM land in the state of California only, subject to applicable laws and regulations and valid existing rights, if the average density of one energy and mining facility per 640 acres (the density cap) is exceeded on all lands (regardless of land ownership) in the PHMA within a proposed project analysis area, then no further disturbance from energy or mining facilities will be permitted by BLM: (1) until disturbance in the proposed project analysis area has been reduced to maintain the limit under the cap; or (2) unless the energy or mining facility is co-located into an existing disturbed area. Energy and mining facilities to which this action applies are:<br>• Oil and gas wells and development facilities.<br>• Wind towers<br>• Geothermal wells/developments, and<br>• Active locatable, leasable, and salable developments.<br>4. For proposed projects to be located, within existing designated utility corridors, the 3% disturbance cap may be exceeded at the project scale if the site specific NEPA analysis indicates that a net conservation gain to the | permitted by the BLM: 1) until disturbance in the proposed project analysis area has been reduced to maintain the limit under the cap; or 2) unless the energy or mining facility is co-located into an existing disturbed area. Energy and mining facilities to which this action applies are:<br>• Oil and gas wells and development facilities.<br>• Wind towers<br>• Geothermal wells/developments, and<br>• Active locatable, leasable, and salable developments.<br>4. For proposed projects to be located, within existing designated utility corridors, the 3 percent disturbance cap may be exceeded at the project scale if a net conservation gain to the species will be achieved, as a component of compliance with a State's mitigation plan, program, or authority, such as required by the State of Nevada Executive Order 2018-32 (and any future regulations adopted by the State of Nevada regarding compensatory mitigation, consistent with federal law). This exception is limited to projects which fulfill the use for which the corridors were designated (e.g., transmission lines, pipelines, etc.) and the designated width of a corridor will not be exceeded as a result of any project co-location.<br>B. See **MD MIT 1**. Authorized/permitted activities are implemented by adhering to the Required Design Features (RDFs) described in **Appendix C**, consistent with applicable law. At the site-specific scale, if | *(See above.)* |

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| species will be achieved. This exception is limited to projects which fulfill the use for which the corridors were designated (ex., transmission lines, pipelines) and the designated width of a corridor will not be exceeded as a result of any project co-location.<br>B. In PHMA, in undertaking BLM management actions, and consistent with valid existing rights and applicable law, in authorizing third-party actions that result in habitat loss and degradation, the BLM will require and ensure mitigation that provides a net conservation gain to the species, including accounting for any uncertainty associated with the effectiveness of such mitigation. The project/activity with associated mitigation (such as the use of the State of Nevada Conservation Credit System) will result in an overall net conservation gain to GRSG (see Appendix F).<br>C. Authorized/permitted activities are implemented by adhering to the RDFs described in Appendix C, consistent with applicable law. At the site-specific scale, if an RDF is not implemented, at least one of the following must be demonstrated in the NEPA analysis associated with the project/activity:<br>1. A specific RDF is documented to not be applicable to the site-specific conditions of the project/activity (e.g., due to the site limitations or engineering considerations). Economic considerations, such as increased costs, do not necessarily require that an RDF be varied or rendered inapplicable.<br>2. An alternative RDF is determined to provide equal | an RDF is not implemented, at least one of the following must be demonstrated in the NEPA analysis associated with the project/activity:<br>1. A specific RDF is documented to not be applicable to the site-specific conditions of the project/activity (e.g., due to the site limitations or engineering considerations). Economic considerations, such as increased costs, do not necessarily require that an RDF be varied or rendered inapplicable.<br>2. An alternative RDF is determined to provide equal or better protection for GRSG or its habitat.<br>3. A specific RDF will provide no additional protection to GRSG or its habitat.<br>D. In undertaking BLM management actions, and consistent with valid and existing rights and applicable law in authorizing third-party actions, the BLM will utilize the lower end of the interpreted range of lek buffer-distances and guidance identified in Mainer et al. (2014) to establish the evaluation area around leks that will be used to analyze impacts during project-specific NEPA, including scientifically justifiable departures based on local data, topography, and other factors, in accordance with **Appendix B**.<br>D. Seasonal restrictions will be applied during the period specified below to manage discretionary surface-disturbing activities and uses on public lands (i.e., anthropogenic disturbances) that are disruptive to GRSG, to prevent disturbances to GRSG during seasonal life-cycle periods:<br>1. In breeding habitat within 4 miles of active and pending | *(See above.)* |

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| or better protection for GRSG or its habitat.<br>3. A specific RDF will provide no additional protection to GRSG or its habitat.<br>D. In management actions, and consistent with valid and existing rights and applicable law in authorizing third-party actions, the BLM will apply the lek buffer-distances identified in the USGS report, Conservation Buffer Distance Estimates for Greater Sage-Grouse—A Review Open File-Report 2014-1239 (Manier et al. 2014), in accordance with Appendix B.<br>E. Seasonal restrictions will be applied during the periods specified below to manage discretionary surface-disturbing activities and uses on public lands (i.e., anthropogenic disturbances) that are disruptive to GRSG, to prevent disturbances to GRSG during seasonal life-cycle periods:<br>1. In breeding habitat within 4 miles of active and pending GRSG leks from March 1 through June 30:<br>a. Lek—March 1 to May 15<br>b. Lek hourly restrictions—6 p.m. to 9 a.m.<br>c. Nesting—April 1 to June 30<br>2. Brood-rearing habitat from May 15 to September 15<br>a. Early—May 15 to June 15<br>b. Late—June 15 to September 15<br>3. Winter habitat from November 1 to February 28<br>• The seasonal dates may be modified due to documented local variations (e.g., higher/lower elevations) or annual climatic fluctuations (e.g., early/late spring, long/heavy winter), in coordination with NDOW and California Department of Fish and Wildlife (CDFW), in order | GRSG leks from March 1 through June 30<br>a. Lek—March 1 to May 15<br>b. Lek hourly restrictions—6 p.m. to 9 a.m.<br>c. Nesting—April 1 to June 30<br>2. Brood-rearing habitat from May 15 to September 15<br>a. Early—May 15 to June 15<br>b. Late—June 15 to September 15<br>3. Winter habitat from November 1 to February 28<br>The seasonal dates could be modified or waived (in coordination with NDOW and/or CDFW) based on site-specific information that indicates:<br>i. A project proposal's NEPA document and/or project record, and correspondence from NDOW and/or CDFW demonstrates that any modification (shortening/extending seasonal timeframes or waiving the seasonal timing restrictions altogether) is justified on the basis that it serves to better protect or enhance GRSG and its habitat than if the seasonal timing restrictions are implemented. Under this scenario modifications can occur if:<br>a. A proposed activity will have beneficial or neutral impacts on GRSG.<br>b. Topography or other factors eliminate direct and indirect impacts from visibility and audibility to GRSG and its habitat<br>c. There are documented local variations (e.g., higher/lower elevations) | *(See above.)* |

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| to better protect GRSG and its habitat.<br>F. Authorizations and permits will limit noise from discretionary activities (during construction, operation, and maintenance) to not exceed 10 decibels above ambient sound levels at least 0.25 mile from active and pending leks, from 2 hours before to 2 hours after sunrise and sunset during the breeding season. See Appendix M, Greater Sage-Grouse Noise Protocol. | and/or annual climatic fluctuations (e.g., early/late spring, long/heavy winter) that indicate the seasonal Life cycle periods are different than presented, or that GRSG are not using the area during a given seasonal life cycle period.<br>ii. Modifications are needed to address an immediate public health and safety concern in a timely manner (e.g., maintaining a road impacted by flooding).<br>iii. The proposed action is determined to be a routine administrative function conducted by federal, state or local governments, including prior existing uses, authorized uses, valid existing rights and existing infrastructure (i.e., rights-of-way for roads) that serve a public purpose and will have no adverse impacts on GRSG or its habitat.<br>E. Authorizations and permits will limit noise from discretionary activities (during construction, operation, and maintenance) to not exceed 10 decibels above ambient sound levels at least 0.25 mile from active and pending leks, from 2 hours before to 2 hours after sunrise and sunset during the breeding season. See **Appendix G**, Greater Sage-Grouse Noise Protocol. | *(See above.)* |

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| **MD SSS 3**: In GHMAs, the following conditions will be met in order to avoid, minimize, and mitigate any effects on GRSG or its habitat from the project/activity:<br><br>A. In GHMAs, in undertaking BLM management actions, and consistent with valid existing rights and applicable law, in authorizing third-party actions that result in habitat loss and degradation, the BLM will require and ensure mitigation that provides a net conservation gain to the species, including accounting for any uncertainty associated with the effectiveness of such mitigation. The project/activity with associated mitigation (such as the use of the State of Nevada Conservation Credit System) in GHMAs will result in an overall net conservation gain to GRSG (see Appendix F, Regional Mitigation Strategy).<br>B. Authorized/permitted activities are implemented adhering to the RDFs described in Appendix C, consistent with applicable law. At the site-specific scale, if an RDF is not implemented, at least one of the following must be demonstrated in the NEPA analysis associated with the project/activity:<br>1. A specific RDF is documented to not be applicable to the site-specific conditions of the project/activity (e.g., due to the site limitations or engineering considerations). Economic considerations, such as increased costs, do not necessarily require that an RDF be varied or rendered inapplicable.<br>2. An alternative RDF is determined to provide equal or better protection for GRSG or its habitat.<br>3. A specific RDF will provide no additional protection to GRSG or its habitat. | **MD SSS 3**: In GHMAs, the following conditions will be met:<br><br>A. See MD MIT 1.<br>B. Authorized/permitted activities are implemented adhering to the RDFs described in Appendix C, consistent with applicable law. At the site-specific scale, if an RDF is not implemented, at least one of the following must be demonstrated in the NEPA analysis associated with the project/activity:<br>1. A specific RDF is documented to not be applicable to the site-specific conditions of the project/activity (e.g., due to the site limitations or engineering considerations). Economic considerations, such as increased costs, do not necessarily require that an RDF be varied or rendered inapplicable.<br>2. An alternative RDF is determined to provide equal or better protection for GRSG or its habitat.<br>3. A specific RDF will provide no additional protection to GRSG or its habitat.<br>C. In undertaking BLM management actions, and consistent with valid and existing rights and applicable law in authorizing third-party actions, the BLM will utilize the lower end of the interpreted range of lek buffer-distances and guidance identified in Mainer et al. (2014) to establish the evaluation area around leks that will be used to analyze impacts during project-specific NEPA, including scientifically justifiable departures based on local data, topography, and other factors, in accordance with Appendix B.<br>D. Seasonal restrictions will be applied during the period specified below to manage discretionary surface-disturbing activities and uses on public | Potential change under Alternatives 3, 4, 5, and 6. |

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| C. In undertaking BLM management actions, and consistent with valid and existing rights and applicable law in authorizing third-party actions, the BLM will apply the lek buffer-distances identified in the USGS report, Conservation Buffer Distance Estimates for Greater Sage-Grouse—A Review Open File Report 2014-1239 (Manier et.al 2014]), in accordance with Appendix B.<br>D. Seasonal restrictions will be applied during the periods specified below to manage discretionary surface-disturbing activities and uses on public lands (i.e., anthropogenic disturbances) that are disruptive to GRSG, to prevent disturbances to GRSG during seasonal life-cycle periods:<br>1. In breeding habitat within 4 miles of active and pending GRSG leks from March 1 through June 30<br>a. Lek—March 1 to May 15<br>b. Lek hourly restrictions—6 p.m. to 9 a.m.<br>c. Nesting—April 1 to June 30<br>2. Brood-rearing habitat from May 15 to September 15<br>a. Early—May 15 to June 15<br>b. Late—June 15 to September 15<br>3. Winter habitat from November 1 to February 28<br>The seasonal dates may be modified due to documented local variations (e.g., higher/lower elevations) or annual climatic fluctuations (e.g., early/late spring, long/heavy winter), in coordination with NDOW and CDFW, in order to better protect GRSG and its habitat.<br>E. Authorizations and permits will limit noise from discretionary activities (during construction, operation, and maintenance) to not exceed 10 decibels above ambient sound levels at least 0.25 mile from active and pending leks from 2 hours before to 2 hours | lands (i.e., anthropogenic disturbances) that are disruptive to GRSG, to prevent disturbing GRSG during seasonal life cycle periods, as follows:<br>1. In breeding habitat within 4 miles of active and pending GRSG leks from March 1 through June 30<br>a. Lek—March 1 to May 15<br>b. Lek hourly restrictions—6 p.m. to 9 a.m.<br>c. Nesting—April 1 to June 30<br>2. Brood-rearing habitat from May 15 to September 15<br>a. Early—May 15 to June 15<br>b. Late—June 15 to September 15<br>3. Winter habitat from November 1 to February 28<br>The seasonal dates could be modified or waived (in coordination with NDOW and/or CDFW) based on site-specific information that indicates:<br>i. A project proposal's NEPA document and/or project record, and correspondence from NDOW and/or CDFW, demonstrates that any modification (shortening/extending seasonal timeframes or waiving the seasonal timing restrictions altogether) is justified on the basis that it serves to better protect or enhance GRSG and its habitat than if the seasonal timing restrictions are implemented. Under this scenario modifications can occur if:<br>a. A proposed activity will have beneficial or neutral impacts on GRSG.<br>b. Topography or other factors eliminate direct and indirect impacts | *(See above.)* |

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| after sunrise and sunset during the breeding season. See Appendix M, Greater Sage-Grouse Noise Protocol. | from visibility and audibility to GRSG and its habitat.<br>c. There are documented local variations (e.g., higher/lower elevations) and/or annual climatic fluctuations (e.g., early/late spring, long/heavy winter) that indicate the seasonal life cycle periods are different than presented, or that GRSG are not using the area during a given seasonal life cycle period.<br>ii. Modifications are needed to address an immediate public health and safety concern in a timely manner (e.g., maintaining a road impacted by flooding).<br>iii. The proposed action is determined to be a routine administrative function conducted by federal, state or local governments, including prior existing uses, authorized uses, valid existing rights and existing infrastructure (i.e., rights-of-way for roads) that serve a public purpose and will have no adverse impacts on GRSG or its habitat.<br>E. Authorizations and permits will limit noise from discretionary activities (during construction, operation, and maintenance) to not exceed 10 decibels above ambient sound levels at least 0.25 mile from active and pending leks from 2 hours before to 2 hours after sunrise and sunset during the breeding season. See Appendix G, Greater Sage-Grouse Noise Protocol. | *(See above.)* |

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| **MD SSS 4**: In OHMAs, authorized/permitted activities are implemented adhering to the RDFs described in Appendix C, consistent with applicable law. At the site-specific scale, if an RDF is not implemented, at least one of the following must be demonstrated in the NEPA analysis associated with the project/activity:<br>• A specific RDF is documented to not be applicable to the site-specific conditions of the project/activity (e.g., due to the site limitations or engineering considerations). Economic considerations, such as increased costs, do not necessarily require that an RDF be varied or rendered inapplicable.<br>• An alternative RDF is determined to provide equal or better protection for GRSG or its habitat.<br>• A specific RDF will provide no additional protection to GRSG or its habitat. | No changes made. | Potential change under Alternative 3. |
| **MD SSS 5**: Designate SFA, as shown on Figure 1-3 (2,797,400 acres). SFA will be managed as PHMAs, with the following additional management:<br>• Recommended for withdrawal from the General Mining Act of 1872, subject to valid existing rights<br>• Managed as NSO, without waiver, exception, or modification, for fluid mineral leasing<br>• Prioritized for vegetation management and conservation actions in these areas, including, but not limited to land health assessments, wild horse and burro management actions, review of livestock grazing permits/leases, and habitat restoration (see specific management sections). | **MD SSS 5 (Allocation Exception Criteria):** In PHMA, GHMA, and OHMA, the State Director may grant an exception to the allocations and stipulations described in **Table 2-1**: Comparative Summary of Alternatives if one of the following applies (in coordination with NDOW, SETT, and/or CDFW):<br>i. The location of the proposed activity is determined to be unsuitable (by a biologist with GRSG experience using methods such as Stiver et. al. 2015) and lacks the ecological potential to become marginal or suitable habitat; and will not result in direct, indirect, or cumulative impacts on GRSG and its habitat. Management allocation decisions will not apply to those areas determined to be unsuitable if the area has passed a threshold and lacks the ecological potential to become marginal or suitable habitat. | Potential change under Alternatives 3, 4, 5, and 6. |

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| *(See above.)* | ii. The proposed activities impacts will be offset to result in no adverse impacts on GRSG or its habitat, through use of the mitigation hierarchy and the State's mitigation policies and programs, such as the State of Nevada's Executive Order 2018-32 (and any future regulations adopted by the State of Nevada regarding compensatory mitigation, consistent with federal law). In cases where exceptions may be granted for projects with a residual impact, voluntary compensatory mitigation consistent with the State's mitigation policies and programs, such as the State of Nevada's Executive Order 2018-32 (and any future regulations adopted by the State of Nevada regarding compensatory mitigation, consistent with federal law) will be one mechanism by which a proponent achieves the Approved RMPA goals, objectives, and exception criteria. When a proponent volunteers compensatory mitigation as their chosen approach to address residual impacts, the BLM will incorporate those actions into the rationale used to grant an exception. The final decision to grant a waiver, exception, or modification will be based, in part, on criteria consistent with the State's GRSG management plans and policies.<br>iii. The proposed activity will be authorized to address public health and safety concerns, specifically as they relate to federal, state, local government and national priorities.<br>iv. Renewals or re-authorizations of existing infrastructure in previously disturbed sites or expansions of existing infrastructure that do not result | *(See above.)* |

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| *(See above.)* | in direct, indirect, or cumulative impacts on GRSG and its habitat.<br>v. The proposed activity is determined to be a routine administrative function conducted by federal, state or local governments, including prior existing uses, authorized uses, valid existing rights and existing infrastructure (i.e., rights-of-way for roads) that serve a public purpose and will have no adverse impacts on GRSG and its habitat, consistent with the State's mitigation policies and programs, such as the State of Nevada's Executive Order 2018-32 (and any future regulations adopted by the State of Nevada regarding compensatory mitigation, consistent with federal law).<br>vi. Exceptions to non-disposal or exchange of lands that are identified for retention in **Appendix A, Figure 2-12** could be considered if (a) they are identified for disposal through previous planning efforts or address a Congressional Act (e.g., the respective Lincoln and White Pine County Conservation, Recreation, and Development Acts), (b) the agency can demonstrate that the disposal, including land exchanges, will have no adverse direct, indirect or cumulative impacts on GRSG and its habitat, or (c) adverse impacts on GRSG or its habitat will be offset, through use of voluntary compensatory mitigation, consistent with the States' mitigation policies and programs, such as the State of Nevada's Executive Order 2018-32 (and any future regulations adopted by the State of Nevada regarding compensatory mitigation, consistent with federal law). | *(See above.)* |

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| **MD SSS 6**: Cooperate with federal and state agencies, universities, and other organizations to establish and maintain a GRSG telemetry database. | No changes made. | No change proposed. |
| **MD SSS 7**: Work with project proponents to limit project-related noise, seasonally or annually (see MDs SSS 2 and SSS 3), in GRSG habitat where it would be expected to reduce functionality of habitats that support associated GRSG populations. Support the establishment of ambient baseline noise levels for leks in PHMAs and GHMAs.<br>• As additional noise-related research and information emerge, specific new limitations appropriate to the type of projects being considered will be evaluated and appropriate measures will be implemented where necessary to minimize the potential for noise impacts on GRSG populations. | No changes made. | No change proposed. Alternatives 3, 4, 5, and 6 |
| **MD SSS 8**: As determined by BLM in coordination with NDOW or CDFW, for any surface-disturbing activities involving mineral activities (to the extent possible under existing law) and rights-of-way actions proposed in PHMAs and GHMAs, the proponent will use the services of a qualified biologist approved by the BLM to conduct surveys for GRSG breeding activity during the GRSG breeding season before project activities begin. The surveys must encompass all suitable GRSG habitats within a minimum of 4 miles of the proposed activities. Surveys will be conducted following protocols established by state fish and wildlife agencies during planning operations and during project activities. GRSG seasonal habitat delineations will also be required within a minimum of 4 miles of project activities. | No changes made. | Potential change under Alternative 3. |

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| **MD SSS 9a**: In Nevada only, the BLM will consult with the Sagebrush Ecosystem Technical Team (SETT) for application of the "avoid, minimize, and compensate" mitigation strategy and the Conservation Credit System developed by the Nevada Natural Heritage Program and the SETT (2014a, 2014b) or other applicable mitigation system such as outlined in Appendix I. This will be to ensure that a net conservation gain of GRSG habitat is achieved in mitigating human disturbances in PHMAs and GHMAs (see Appendix F) on all agency-authorized activities. The specifics of the coordination will be identified in an MOU between the agencies. | See **MD MIT 1** | Potential change under Alternatives 3, 4, 5, and 6. |
| **MD SSS 9b**: In California only, the BLM will follow the BLM mitigation strategy outlined in Appendix F. | See **MD MIT 1** | Potential change under Alternatives 3, 4, 5, and 6. |
| **MD SSS 10**: When necessary or as new data becomes available, site-specific NEPA analysis on use authorizations in PHMA and GHMA will include project level adaptive management responses to address changed conditions in GRSG habitat and population trends (see Appendix J, Adaptive Management Plan). | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |
| **MD SSS 11**: Design and construct fences consistent with BLM H-1741-1, Fencing Standards Manual (BLM 1990), and apply the Sage-Grouse Fence Collision Risk Tool to Reduce Bird Strikes (NRCS 2012). Bring existing fencing into compliance as opportunities arise. | No changes made. | No change proposed. |

[1]The screening criteria would not be applicable to vegetation treatments being conducted to enhance GRSG habitat.
[2] & [3]The conditions would not be applicable to vegetation treatments being conducted to enhance GRSG habitat, with the exceptions of seasonal restrictions and noise.

## Changes in Management from the 2015 ARMPA to the 2019 ARMPA Goals, Objectives, and Management Decisions (Continued)

| 2015 BLM GRSG Approved RMP Amendment | 2019 BLM GRSG Approved RMP Amendment | Potential for Change in 2023 Plan |
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| **Disease** | **Disease** | — |
| **Objective SSS 5:** Coordinate with state agencies to monitor trends of diseases, such as West Nile virus, in the subregion to determine if mitigation or additional RDFs need to be applied (consistent with applicable law) to use authorizations. | No changes made. | No change proposed. |
| **Management Decisions (MD):** | **Management Decisions (MD):** | — |
| **MD SSS 12**: When developing or modifying water developments on BLM-administered lands in PHMAs, GHMAs, and OHMAs and in accordance with state water law and subject to valid existing rights, use applicable RDFs consistent with applicable law to mitigate potential impacts from West Nile virus. Bring existing water developments into compliance as opportunities arise. | No changes made. | Potential change under Alternative 3. |
| **Predation** | **Predation** | — |
| **Objective SSS 6**: Manage human uses on public lands to reduce the effects of predation on GRSG. | No changes made. | No change proposed. |
| **Management Decisions (MD):** | **Management Decisions (MD):** | — |
| **MD SSS 13:** Require authorizations to include stipulations and RDFs consistent with applicable law to reduce or eliminate opportunities to attract and provide nesting, cover, or perches for predators in PHMAs and GHMAs.<br><br>**MD SSS 14:** Coordinate with other federal, state, county, and tribal governments and local working groups to reduce GRSG deaths due to predation where it is determined to be additive or is a limiting factor influencing GRSG populations. | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |
| **MD SSS 15**: Reduce and eliminate artificial hunting perches and nesting surfaces for aerial predators (e.g., remove fences, nonworking fences, and power lines and install anti-perch devices on existing and new power lines). | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |

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| ***Adaptive Management (Also see Appendix J)*** | — | — |
| **Management Decisions (MD):** | **Management Decisions (MD):** | — |
| No similar action. | **MD SSS 16:** PHMA, GHMA, and OHMA boundaries are based on composite management categories contained within USGS's *Spatially Explicit Modeling of Annual and Seasonal Habitat for Greater Sage-Grouse (Centrocercus urophasianus) in Nevada and Northeastern California—an updated decision-support tool for management* (Coates et al. 2016), (see **Appendix A: Maps**).<br>• Manage 9,265,800 acres as PHMA<br>• Manage 5,748,000 acres as GHMA<br>• Manage 4,868,900 acres as OHMA<br>BLM recognizes that landscape level mapping may not accurately reflect on-the-ground conditions. Therefore, the HMAs (**Figure 2-1**) do not constitute a land use plan decision but rather a landscape level reference of relative habitat suitability. When a proposed project is thought to be in an area that is unsuitable for GRSG within PHMA, GHMA, and/or OHMA, habitat assessments of the project site and its surrounding areas will be conducted by a biologist with GRSG experience using BLM-approved methods such as Stiver et al. 2015 and compliant with current BLM policy, to identify suitable, marginal, or unsuitable GRSG habitats at multiple scales. This habitat assessment process will inform criteria (i) under Issue: Allocation Exception Process, Management Alignment Alternative and Proposed Plan Amendment. The BLM will track all on-the-ground assessments and share this information with USGS and the States of Nevada and California to consider when updating HMA maps in the future. | Potential change under Alternatives 3, 4, 5, and 6. |

| 2015 BLM GRSG Approved RMP Amendment | 2019 BLM GRSG Approved RMP Amendment | Potential for Change in 2023 Plan |
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| **MD SSS 17**: As site-specific GRSG data (habitat assessments, lek counts, telemetry, etc.) is collected, the information will be included into future modeling efforts using the "*Spatially Explicit Modeling of Greater Sage-Grouse Habitat in Nevada and Northeastern California*" (Coates et al. 2014) to reflect the most up-to-date spatial representation of GRSG habitat categories. Through plan maintenance or plan amendment/revision, as appropriate, and in consultation with the Nevada Department of Wildlife and USFWS, based on the best scientific information, the updated modeling efforts may be adopted and appropriate allocation decisions and management actions will be applied to PHMA, GHMA, and OHMA. Future modeling efforts to incorporate site-specific GRSG data will utilize the same modeling methods (as described under *Methods and Results* in Coates et al. 2014) used to develop the current Nevada and Northeastern California Subregions' GRSG habitat management categories. The addition of site-specific GRSG data will allow for the refinement of the spatial representation of the GRSG habitat management categories. | **MD SSS 17:** Consistent with the State of Nevada's Greater Sage-Grouse Conservation Plan (2014, as amended) and CDFW's management recommendations, the HMA mapping process will be reviewed and refined every 3 to 5 years, or when new data are incorporated in the model. New or improved spatial data (e.g., additional GRSG telemetry data, updated or improved vegetation community data) will be incorporated during the refinement process. The review and refinement process will be scientifically based and include review and input from the Sagebrush Ecosystem Technical Team (SETT), NDOW, BLM, USFS, USFWS, and local agencies as appropriate. For refinements on California BLM managed lands, this process will also include CDFW. Other stakeholders will be encouraged to participate in the process by submitting relevant information to the listed agencies. The USGS' habitat suitability modeling processes (Coates et al. 2016) will be the basis for future refinements, which may include results of BLM habitat suitability determinations shared with the USGS for their consideration. As these HMAs boundaries are adjusted and approved by the States of Nevada and California, adjustments to the BLM's PHMA, GHMA, and/or OHMA boundaries (along with the existing allocation decisions and management actions tied to these areas) will be made by the BLM through plan maintenance or amendment, as appropriate. | Potential change under Alternatives 3, 4, 5, and 6. |

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| **MD SSS 18**: A BSU (see Appendix A; Figure 2-2) that has hit a soft trigger due to vegetation disturbance will be a priority for restoration treatments consistent with Fire and Invasives Assessment Tool (FIAT) (Appendix J). | **MD SSS 18:** The BLM will implement the Adaptive Management Strategy as described in **Appendix D**. The revised soft and hard population triggers, warnings, and new BSU and lek cluster boundaries were derived from USGS's *Hierarchical Population Monitoring of Greater Sage-Grouse (Centrocercus urophasianus) in Nevada and California— Identifying Populations for Management at the Appropriate Spatial Scale: U.S. Geological Survey Open-File Report 2017– 1089* (Coates et al. 2017). These triggers, warnings, BSU boundaries, and lek cluster boundaries can be found in **Appendix D**. Soft and hard trigger responses will be removed when the criteria for recovery have been met (see **Appendix D**, Longevity of Responses). Removal of the soft and hard trigger responses returns management direction in the affected lek cluster and/or BSU to the management directions that were in place prior to reaching a trigger. | Potential change under Alternatives 3, 4, 5, and 6. |

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| **MD SSS 19**: If a soft trigger is reached, the BLM will identify the causal factor and apply additional project-level adaptive management and/or mitigation measures contained in the authorization (and for future similar authorizations), to alleviate the specific or presumptive causes in the decline of GRSG populations or its habitats and include the following:<br>• The adjustment in management would be based on the causal factor and would affect only the area being impacted in the lek cluster or other appropriate scale (e.g., BSU)<br>• GRSG populations and habitat would continue to be monitored annually<br>• If the causal factor were not readily discernable, then an interdisciplinary team, including the BLM, Forest Service (as applicable), and state wildlife agency representatives, would identify the appropriate mitigation or adjusted management actions in a timely manner | No similar action. (MD SSS 19 was removed) | Potential change under Alternatives 3, 4, 5, and 6. |
| **MD SSS 20**: Once a hard trigger has been reached, all responses in Table J-1 and Table J-2 in Appendix J will be implemented. This includes where soft triggers have been reached for both population and habitat. | No similar action. (MD SSS 20 was removed) | Potential change under Alternatives 3, 4, 5, and 6. |
| **MD SSS 21**: When a hard trigger is hit in a PAC that has multiple BSUs, including those that cross state lines, the WAFWA Management Zone GRSG Conservation Team will convene to determine the cause, will put project level responses in place, as appropriate, and will discuss further appropriate actions to be applied. The team will also investigate the status of the hard triggers in other BSUs in the PAC and will invoke the appropriate plan response. Adopting any further actions at the plan level may require initiating a plan amendment process. | No similar action. (MD SSS 21 was removed) | Potential change under Alternatives 3, 4, 5, and 6. |

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| **MD SSS 22**: As determined by BLM in coordination with NDOW, for any surface-disturbing activities involving mineral activities and rights-of-way actions (with the possible exception of short duration activities outside of seasonal GRSG habitats) BLM will require that active and pending leks be monitored annually within 4 miles of disturbance until the use terminates and all disturbances have been restored. The proponent will fund the services of an independent qualified biologist approved by the BLM, in coordination with NDOW or CDFW, consistent with applicable law. | **MD SSS 22:** As determined by the BLM in coordination with the state wildlife agencies, for any surface-disturbing activities involving mineral activities and rights-of-way actions (with the possible exception of short duration activities outside of seasonal GRSG habitats) BLM will require that active and pending leks be monitored annually within 4 miles of disturbance until the use terminates and all disturbances have been restored. The proponent will fund the services of an independent qualified biologist approved by the BLM, in coordination with NDOW or CDFW, consistent with applicable law. | No change proposed. |
| **MD SSS 23**: In making amendments to this plan, the BLM will coordinate with the FWS as BLM continues to meet its objective of conserving, enhancing and restoring GRSG habitat by reducing, minimizing or eliminating threats to GRSG and its habitat. | No changes made. | No change proposed. |
| **MD SSS 24**: The hard and soft trigger data will be analyzed as soon as it becomes available after the signing of the ROD and then at a minimum, analyzed annually thereafter. | No similar action. (MD SSS 24 was removed) | Potential change under Alternatives 3, 4, 5, and 6. |
| ***VEGETATION (VEG)*** ***SAGEBRUSH-STEPPE*** | ***VEGETATION (VEG)*** | — |
| **Objectives:** | **Objectives:** | — |
| **Objective VEG 1:** In all SFA and PHMAs, the desired condition is to maintain all lands ecologically capable of producing sagebrush (but no less than 70%) with a minimum of 15% sagebrush cover or as consistent with specific ecological site conditions. The attributes necessary to sustain these habitats are described in Interpreting Indicators of Rangeland Health (BLM Tech Ref 1734-6). | **Objective VEG 1**: In PHMAs, the desired condition is to maintain all lands ecologically capable of producing sagebrush (but no less than 70%) with a minimum of 15% sagebrush cover or as consistent with specific ecological site conditions. The attributes necessary to sustain these habitats are described in Interpreting Indicators of Rangeland Health (BLM Tech Ref 1734-6). | No change proposed. |

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| **Objective VEG 2**: On public lands, establish, maintain, and enhance a resistant and resilient sagebrush vegetative community and restore sagebrush vegetation communities to reduce GRSG habitat fragmentation and maintain or reestablish GRSG habitat connectivity over the long term (Chambers et al. 2014). | No changes made. | No change proposed. |
| **Objective VEG 3**: Manage PHMAs and GHMAs for vegetation composition and structure, consistent with ecological site potential and to achieve GRSG habitat objectives (**Table 2-2**). | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |
| **Management Decisions (MD):** | **Management Decisions (MD):** | — |
| **MD VEG 1**: Review Objective SSS 4 and apply MDs SSS 1 through SSS 4 when reviewing and analyzing projects and activities proposed in GRSG habitat. | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |
| **MD VEG 2**: Incorporate GRSG habitat objectives (**Table 2-2**) in the design of habitat restoration projects and manage treated areas to meet GRSG habitat objectives. | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |

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|---|---|---|
| **MD VEG 3**: Use BLM GRSG habitat maps, habitat objectives (see Table 2-2 for GRSG habitat objectives), ecological site potential, state and transition models, and concepts of resistance and resilience (Appendix H) to prioritize habitat restoration projects, including those following wildfire, to address the most limiting GRSG habitat vegetation components and to connect seasonal ranges.<br><br>Habitat restoration includes the following:<br>i. Restoring sagebrush canopy in PHMAs and GHMAs to meet GRSG habitat objectives (Table 2-2)<br>ii. Reestablishing perennial grasses and native forbs in PHMAs and GHMAs<br>iii. Reducing or removing pinyon or juniper in PHMAs and GHMAs to enhance seasonal range connectivity and to maintain sagebrush canopy and understory integrity<br>iv. Restore areas affected by wildfire and the continuing invasive annual fire cycle to meet GRSG habitat objectives (Table 2-2)<br>iv. Prioritize restoration in areas that have not crossed an ecological threshold | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |
| **MD VEG 4:** Plan vegetation treatments (including GRSG habitat treatments) in a landscape-scale context to address habitat fragmentation, effective patch size, invasive species presence, and intact sagebrush community protection, consistent with the GRSG habitat objectives identified in **Table 2-2**. | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |

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| **MD VEG 5**: For Wyoming, mountain, and basin big sagebrush communities in PHMAs and GHMAs:<br>i. Prioritize treatments that focus on enhancing, reestablishing, or maintaining the most limiting GRSG habitat component<br>ii. Reestablish sagebrush to meet GRSG habitat objectives (Table 2-2)<br>iii. Manage sagebrush communities to achieve age-class, structure, cover, and species composition objectives in GRSG habitat (Table 2-2)<br>iv. Restore herbaceous understory in brush-dominated areas to meet GRSG habitat objectives (Table 2-2)<br>iv. Treat areas that contain cheatgrass and other invasive or noxious species to minimize competition and favor establishment of desired species (Table 2-2)<br>v. Treat disturbed areas in accordance with FIAT (see Appendix H), including implementation-level assessments | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |
| **MD VEG 6:** Manage for establishment of sagebrush in unmaintained nonnative seedings (e.g., crested wheatgrass seedings) in or next to GRSG habitat to meet habitat objectives (**Table 2-2**). | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |

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| **MD VEG 7:** In PHMAs and GHMAs, give preference to native seeds for restoration, based on availability, adaptation (ecological site potential), and probability of success. Where the probability of success or adapted seed availability is low, nonnative seeds may be used, as long as they support GRSG habitat objectives. Choose native plant species outlined in Ecological Site Descriptions (ESDs), where available, to revegetate sites. Emphasize use of local seed collected from intact stands or greenhouse cultivation. If the commercial supply of appropriate native seeds and plants is limited, work with the BLM Native Plant Materials Development Program, Natural Resource Conservation Service (NRCS) Plant Material Program, or State Plant Material Programs. If currently available supplies are limited, use the materials that provide the greatest benefit for GRSG. In all cases, seed must be certified as weed free. | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |
| **MD VEG 8:** To increase seeding success and to ensure effective soil and seed contact, consider the use of specialized seed drills or other proven and effective methods that may become available based on new science. | No changes made. | No change proposed. |
| **MD VEG 9a:** For Nevada BLM-managed lands, before implementation, establish project monitoring sites where vegetation treatment is planned. Treatment areas will be monitored both pre- and post- treatment on a multiple-year basis to ensure that project objectives are achieved. | No changes made. | No change proposed. |

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| **MD VEG 9b:** For California BLM-managed lands, before implementation, establish project monitoring sites where vegetation treatment is planned. Treatment areas will be monitored both pre- and post- treatment on a multiple-year basis to ensure that project objectives are achieved. Juniper treatments will be monitored in accordance with the Sage Steppe Ecosystem Restoration FEIS (BLM 2008). | No changes made. | No change proposed. |
| **MD VEG 10:** On public lands, where the attributes, quality, or lack of GRSG winter habitat has been identified as a limiting factor, emphasize vegetation treatments in known winter habitat to enhance quality or reduce wildfire risk around or in winter habitat. | No changes made. | No change proposed. |
| **MD VEG 11:** In perennial grass, invasive annual grass, and conifer-invaded cover types, restore sagebrush steppe with local sagebrush seedings or planted seedlings where feasible. | No changes made. | No change proposed. |
| **MD VEG 12:** Continue to coordinate with NDOW, CDFW, and NRCS for all development or habitat restoration proposals in PHMAs and GHMAs. Also, coordinate with the Nevada SETT, tribes, and local working groups on projects proposed in sagebrush ecosystems. | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |
| ***VEGETATION (VEG)*** | ***VEGETATION (VEG)*** | — |
| ***Conifer Encroachment*** | ***Conifer Encroachment*** | — |
| **Objectives:** | **Objectives:** | — |
| **Objective VEG 4:** In accordance with the vegetation dynamic development tool (VDDT; Appendix L), improve GRSG habitat by removing invading conifers in the number of acres shown in **Table 2-2** by decade for the next 50 years. | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |

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| **Management Decisions (MD):** | **Management Decisions (MD):** | — |
| **MD VEG 13:** Remove conifers encroaching into sagebrush habitats, in a manner that considers tribal cultural values. Prioritize treatments closest to occupied GRSG habitats and near occupied leks and where juniper encroachment is phase 1 and phase 2. Use of site-specific analysis and tools like VDDT and FIAT (see Appendix L for VDDT and Appendix H for FIAT) will help refine the location for specific areas to be treated. | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |
| **MD VEG 14:** Do not construct or create new roads (temporary or permanent), skid trails, or landings in phase I pinyon or juniper removal areas during project implementation for vegetation treatments. Administrative access, including off-road travel with heavy equipment and vehicles, will be allowed during implementation. | No changes made. | No change proposed. |
| **MD VEG 15:** Only treat habitats in late phase II or phase III pinyon or juniper condition to create movement corridors, connect habitats, or reduce the potential for catastrophic fire (see **Table 2-3**). | No changes made. | No change proposed. |
| ***Vegetation (VEG)*** | ***Vegetation (VEG)*** | — |
| ***Invasive Species*** | ***Invasive Species*** | — |
| **Objectives:** | **Objectives:** | — |
| **Objective VEG 5**: Reduce the amount of GRSG habitat loss due to wide-spread wildfires and invasion by nonnative species. | No changes made. | No change proposed. |
| **Objective VEG 6**: Control invasive species infestations in GRSG habitat already compromised by invasion. | No changes made. | No change proposed. |
| **Objective VEG 7**: In accordance with the VDDT (Appendix L), improve GRSG habitat by treating annual grasses in the number of acres shown in **Table 2-4** by decade using the FIAT (Appendix H). | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |

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| **Management Decisions (MD):** | **Management Decisions (MD):** | — |
| **MD VEG 16**: Prevent the establishment of invasive species into uninvaded areas in PHMAs and GHMAs through properly managed grazing and by conducting systematic and strategic detection surveys, collecting data, mapping these areas, and engaging in early response to contain and eradicate invasion if it occurs. | No changes made. | Potential change under Alternative 3. |
| **MD VEG 17**: Control the spread and introduction of noxious weeds listed by the Nevada Department of Agriculture and California Department of Food and Agriculture (NAC 555.010, Classes A through C, inclusive and 3 CCR 4500, Noxious Weed Species Pest Rating A, B, C, and Q) and undesirable nonnative plant species (Gelbard and Belnap 2003; Bergquist et al. 2007). Work with federal, state, local, and tribal groups, such as Weed Control Districts, Cooperative Weed Management Areas, and Conservation Districts, in detecting and treating nonnative species. | No changes made. | No change proposed. |
| **MD VEG 18**: Where scientific support is lacking, carefully construct treatments to rigorously assess the value or detriment of untested methods to determine their value for future application to GRSG habitats. | No changes made. | No change proposed. |
| **MD VEG 19**: The BLM will cooperate with other federal, state, tribal and local agencies along with academia in researching the development of biological control agents and deploying emerging technologies as they become available. | No changes made. | No change proposed. |
| **MD VEG 20**: Monitor and adjust treatment sites and methods as needed to ensure effectiveness of efforts to prevent and control invasive species and restore GRSG habitat. | No changes made. | No change proposed. |

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| **MD VEG 21**: Assess invasive annual grass presence and distribution before implementing vegetation restoration projects to determine if treatments are required to treat invasive annual grasses. | No changes made. | No change proposed. |
| **MD VEG 22**: Treat sites in PHMAs and GHMAs that contain invasive species infestations through an integrated pest management (IPM) approach, using fire, chemical, mechanical, and biological (e.g., targeted grazing) methods, based on site potential and in accordance with FIAT (Appendix H). Treat areas that contain cheatgrass and other invasive or noxious species to minimize competition and favor establishment of desired species. | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |
| ***Vegetation (VEG)***<br>***Riparian and Wetlands Habitat*** | ***Vegetation (VEG)***<br>***Riparian and Wetlands Habitat*** | — |
| **Objectives:** | **Objectives:** | — |
| **Objective VEG 8**: Manage riparian areas in PHMAs and GHMAs for vegetation composition and structure, consistent with ecological site potential and to achieve GRSG habitat objectives (**Table 2-2**). | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |
| **Objective VEG 9**: Manage upland habitat associated with riparian areas to promote cover relative to site potential to facilitate brood-rearing habitat (**Table 2-2**). | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |
| **Objective VEG 10**: Where riparian function has been compromised or lost, manage to restore riparian function and meet GRSG habitat objectives (**Table 2-2**). | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |
| **Objective VEG 11**: In riparian and wet meadow areas, inventory, monitor, and control invasive species in PHMAs and GHMAs. | No changes made. | Potential change under Alternative 3. |
| **Management Decisions (MD):** | **Management Decisions (MD):** | — |
| **MD VEG 23**: Design and implement vegetation treatments in PHMAs and GHMAs to restore, enhance, and maintain riparian areas (**Table 2-2**). | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |

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| **MD VEG 24**: Consider an array of vegetation treatments to increase edge and expand mesic areas in PHMAs and GHMAs where riparian extent is limited by shrub encroachment (**Table 2-2**). | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |
| **MD VEG 25**: Manage lotic riparian habitats in conjunction with adjacent terraces and valley bottoms as natural fuel breaks to reduce the size and frequency of wildfires in PHMAs and GHMAs. | No changes made. | Potential change under Alternative 3. |
| ***Vegetation (VEG)***<br>***Climate Change*** | ***Vegetation (VEG)***<br>***Climate Change*** | — |
| **Objectives:** | **Objectives:** | — |
| **Objective VEG 12**: Use the landscape approach and promote landscape-scale, ecosystem-based actions to enhance resiliency and sustainability of PHMAs and GHMAs to climate stress. | No changes made. | Potential change under Alternative 3. |
| **Objective VEG 13**: In PHMAs and GHMAs, manage risks of GRSG habitat degradation or loss from landscape stressors of drought, invasive species, and wildfire exacerbated by climate change to maintain existing GRSG populations and habitats. | No changes made. | Potential change under Alternative 3. |
| **Management Decisions (MD):** | **Management Decisions (MD):** | — |
| **MD VEG 26**: As climate change data become available through Rapid Ecoregional Assessments or other ecological studies, identify areas of unfragmented GRSG habitat and corridors that provide the life-cycle and genetic transfer needs for GRSG and adjust resource management practices, as needed. | No changes made. | No change proposed. |
| **MD VEG 27**: Cooperate with multiple agencies and stakeholders to establish and maintain a network of climate monitoring sites and stations. | No changes made. | No change proposed. |

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| ***FIRE AND FUELS MANAGEMENT (FIRE)*** ***WILDFIRE MANAGEMENT*** | ***FIRE AND FUELS MANAGEMENT (FIRE)*** ***WILDFIRE MANAGEMENT*** | — |
| ***OBJECTIVE*** | ***OBJECTIVE*** | — |
| **Objective FIRE 1**: The protection of human life is the single, overriding priority. Setting priorities among protecting human communities and community infrastructure, other property and improvements, and natural and cultural resources will be done based on the values to be protected, human health and safety, and the costs of protection. GRSG habitat will be prioritized commensurate with property values and other critical or sensitive habitats to be protected, with the goal to restore, enhance, and maintain areas suitable for GRSG. | No changes made. | No change proposed. |
| **Management Decisions (MD):** | **Management Decisions (MD):** | — |
| **MD FIRE 1:** Support the conservation of GRSG habitat objectives (**Table 2-2**) through appropriate wildfire management planning, coordination, staffing, resource allocations, training, equipment, and management oversight. | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |
| **MD FIRE 2:** Prioritize fire operations and fuels management decisions in SFA first, followed by PHMAs outside of SFA in accordance with the implementation-level FIAT assessments, and then GHMAs for conservation and protection during fire operations and fuels management decision-making. When suppression resources are widely available, place maximum efforts on limiting fire growth in GHMAs as well. | **MD FIRE 2:** Prioritize fire operations and fuels management decisions in PHMA in accordance with the implementation-level FIAT assessments, and then GHMAs for conservation and protection during fire operations and fuels management decision-making. When suppression resources are widely available, place maximum efforts on limiting fire growth in GHMAs as well. | Potential change under Alternative 3. |
| **MD FIRE 3:** BLM planning units, in coordination with the USFWS and relevant state agencies, will annually review the GRSG landscape wildfire and invasive species habitat assessments (FIAT). Based on this review, revised actions to ameliorate invasive species must be incorporated into the assessment. | No changes made. | No change proposed. |

| 2015 BLM GRSG Approved RMP Amendment | 2019 BLM GRSG Approved RMP Amendment | Potential for Change in 2023 Plan |
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| **MD FIRE 4:** Compile relevant field office- and district-level information into the statewide GRSG Annual Operating Handbook for use by resource advisors, wildfire crews, and agency administrators. The handbook will contain GRSG maps (including habitat and fuels treatment maps) and lists of state and local GRSG resource advisors and their contact information, local guidance, and other relevant information for each field office and district, aggregated into a statewide document. | No changes made. | No change proposed. |
| **MD FIRE 5:** Coordinate and collaborate with federal, tribal, state, and local governments and associations sanctioned through either California or Nevada that meet fire standards for effective and efficient wildfire response. | No changes made. | No change proposed. |
| **MD FIRE 6:** Strengthen and improve interagency wildfire prevention statewide through targeted wildfire prevention messages, including providing education on GRSG habitat loss, updating interagency agreements, and conducting wildfire prevention workshops and demonstration projects. | No changes made. | No change proposed. |
| ***FIRE AND FUELS MANAGEMENT (FIRE)***<br>***Pre-Suppression*** | ***FIRE AND FUELS MANAGEMENT (FIRE)***<br>***Pre-Suppression*** | — |
| ***OBJECTIVE*** | | — |
| **Objective FIRE 2:** Use pre-suppression efforts to reduce the size and impact of wildfires in SFA, PHMAs, and GHMAs. | **Objective FIRE 2:** Use pre-suppression efforts to reduce the size and impact of wildfires in PHMAs and GHMAs. | Potential change under Alternatives 3, 4, 5, and 6. |
| **Objective FIRE 3:** Protect post-fire treatments in SFA first, followed by PHMAs outside of SFA, and then GHMAs from subsequent wildfires. | **Objective FIRE 3:** Protect post-fire treatments in PHMAs first, followed by GHMAs from subsequent wildfires. | Potential change under Alternatives 3, 4, 5, and 6. |
| **Management Decisions (MD):** | **Management Decisions (MD):** | — |
| **MD FIRE 7:** Identify and prioritize areas that are vulnerable to wildfires and prescribe actions important for GRSG protection, in accordance with FIAT (see Appendix H, USDI 2015) and further refined in the implementation-level FIAT assessments. | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |

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| **MD FIRE 8:** Create fire management plans to guide wildfire suppression in order to protect PHMAs and GHMAs. | No changes made. | Potential change under Alternative 3. |
| **MD FIRE 9**: Before the fire season, train GRSG resource advisors on wildfire suppression organization, objectives, tactics, and procedures to develop a cadre of qualified individuals. Involve state wildlife agency experts in fire operations through the following:<br>• Instruction of resource advisors during preseason trainings<br>• Qualification as resource advisors<br>• Coordination with resource advisors before fire season<br>• Contribution to incident planning with information, such as habitat features or other key data useful in fire decision-making | No changes made. | No change proposed. |
| ***FIRE AND FUELS MANAGEMENT (FIRE)***<br>***Suppression*** | ***FIRE AND FUELS MANAGEMENT (FIRE)***<br>***Suppression*** | — |
| ***OBJECTIVE*** | ***OBJECTIVE*** | — |
| **Objective FIRE 4:** Use suppression to reduce the size and impact of wildfires in SFA, PHMAs, and GHMAs. | **Objective FIRE 4:** Use suppression to reduce the size and impact of wildfires in PHMAs and GHMAs. | Potential change under Alternative 3. |
| **Management Decisions (MD):** | **Management Decisions (MD):** | — |
| **MD FIRE 10:** Provide local GRSG habitat maps to dispatch offices and extend attack incident commanders to prioritize wildfire suppression resources and design suppression tactics. Ensure GRSG habitat maps and suppression strategies are uploaded and updated in WFDSs. | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |
| **MD FIRE 11:** Assign a resource advisor with GRSG habitat expertise or with access to GRSG habitat expertise to all extended attack fires in or near SFA, PHMAs, and GHMAs. | **MD FIRE 11:** Assign a resource advisor with GRSG habitat expertise or with access to GRSG habitat expertise to all extended attack fires in or near PHMAs and GHMAs. | Potential change under Alternative 3. |
| **MD FIRE 12:** In advance of critical fire weather, station additional federal fire suppression resources to optimize a quick and efficient response in SFA, PHMAs, and GHMAs. | **MD FIRE 12:** In advance of critical fire weather, station additional federal fire suppression resources to optimize a quick and efficient response in PHMAs and GHMAs. | Potential change under Alternative 3. |

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| **MD FIRE 13:** During periods of multiple fires, ensure line officers prioritize decisions by coordinating with resource advisors. | No changes made. | No change proposed. |
| **MD FIRE 14:** To the extent possible, locate wildfire suppression facilities (e.g., base camps, spike camps, drop points, staging areas, and helicopter bases) in areas to avoid disturbing PHMAs and GHMAs. These include disturbed areas, grasslands, roads and trails, or in other areas with existing disturbance or minimal sagebrush cover. | No changes made. | Potential change under Alternative 3. |
| **MD FIRE 15:** Document fire operations (e.g., disturbance) in PHMAs and GHMAs for potential follow- up coordination and restoration. | No changes made. | Potential change under Alternative 3. |
| **MD FIRE 16:** Use indirect attack tactics (including burn-out operations) when:<br>Direct attack is not effective in stopping fires with the potential of becoming significantly larger due to fuel loading, weather conditions, and fire behavior. If firefighter and public safety would be threatened or compromised | No changes made. | No change proposed. |
| **MD FIRE 17:** Use retardant, mechanized equipment, and other available resources to minimize burned acreage during initial attack. As safety allows, conduct mop-up where the black adjoins unburned islands, dog legs, or other habitat features to minimize sagebrush loss. | No changes made. | No change proposed. |
| **MD FIRE 18:** Minimize unnecessary cross-country vehicle travel during fire operations in GRSG habitat. | No changes made. | No change proposed. |
| ***FIRE AND FUELS MANAGEMENT (FIRE)***<br>***Fuels Management*** | ***FIRE AND FUELS MANAGEMENT (FIRE)***<br>***Fuels Management*** | — |
| ***OBJECTIVE*** | ***OBJECTIVE*** | — |
| **Objective FIRE 5:** Protect and enhance PHMAs and GHMAs and areas of connectivity that support GRSG populations, including large contiguous blocks of sagebrush, through fuels management and incorporation of the FIAT assessment (Appendix H). | No changes made. | Potential change under Alternative 3. |

| 2015 BLM GRSG Approved RMP Amendment | 2019 BLM GRSG Approved RMP Amendment | Potential for Change in 2023 Plan |
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| ***MANAGEMENT DECISIONS (MD):*** | ***MANAGEMENT DECISIONS (MD):*** | — |
| **MD FIRE 19:** Review Objective SSS 4 and apply MDs SSS 1 through SSS 4 when reviewing and analyzing projects and activities proposed in GRSG habitat. | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |
| **MD FIRE 20:** In PHMAs and GHMAs, apply fuels treatments on a landscape level to modify fire behavior, intensity, complexity (fire patchiness), size, and effects in which fire management efforts are enhanced. | No changes made. | Potential change under Alternative 3. |
| **MD FIRE 21:** Establish and maintain fuel breaks to protect GRSG and its habitat to limit fire size and mitigate fire behavior to increase suppression effectiveness. When possible, establish fuel breaks next to roads or other previously disturbed areas. | No changes made. | No change proposed. |
| **MD FIRE 22:** Use a full range of fuels management strategies and tactics within acceptable risk levels across the range of GRSG habitat consistent with land use plan direction. | No changes made. | No change proposed. |

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| **MD FIRE 23:** If prescribed fire is used in GRSG habitat, the NEPA analysis for the Burn Plan will address:<br>• Why alternative techniques were not selected as a viable option<br>• How GRSG goals and objectives will be met by its use<br>• How the COT report objectives will be addressed and met<br>• A risk assessment to address how potential threats to GRSG habitat will be minimized.<br><br>Allow prescribed fire as a vegetation or fuels treatment, and it shall only be considered after the NEPA analysis for the burn plan has addressed the four bullets outlined above. Prescribed fire can be used to meet specific fuels objectives that will protect GRSG habitat in PHMAs (e.g., creation of fuel breaks that would disrupt the fuel continuity across the landscape in stands where annual invasive grasses are a minor component in the understory, burning slash piles from conifer reduction treatments, used as a component with other treatment methods to combat annual grasses and restore native plant communities).<br><br>Allow prescribed fire in known winter range, and it shall only be considered after the NEPA analysis for the burn plan has addressed the four bullets outlined above. Any prescribed fire in winter habitat will need to be designed to strategically reduce wildfire risk around and/or in the winter range and designed to protect winter range habitat quality. | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |

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| **MD FIRE 24:** In coordination with the USFWS and relevant state agencies and in accordance with FIAT (see Appendix H), develop a fuels management strategy for the BLM with large blocks of GRSG habitat. The strategy shall include an up-to-date fuels profile, land use plan direction, current and potential habitat fragmentation, sagebrush and GRSG ecological factors, and active vegetation management steps to provide critical breaks in fuel continuity. When developing this strategy, consider the risk of increased habitat fragmentation from a proposed action versus the risk of large-scale fragmentation posed by wildfires if the action were not taken. | No changes made. | No change proposed. |
| **MD FIRE 25:** Design fuels treatments through an interdisciplinary team process to expand, enhance, maintain, and protect PHMAs and GHMAs. Fuel reduction techniques, such as prescribed fire and chemical, biological (including targeted grazing), and mechanical treatments, are acceptable. Use green strips and fuel breaks, where appropriate, to protect seeding from subsequent fires. | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |
| **MD FIRE 26:** In coordination with the USFWS and relevant state agencies and in accordance with FIAT (see Appendix H), BLM will identify treatment needs for wildfire and invasive species management. Ongoing treatment needs will be coordinated on state and regional scales and across jurisdictional boundaries for long-term conservation of GRSG and its habitat. | No changes made. | No change proposed. |
| **MD FIRE 27:** On project completion, monitor and manage fuels projects to ensure long-term success, including persistence of seeded species and other treatment components. Control invasive vegetation post-treatment. | No changes made. | No change proposed. |

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| **MD FIRE 28**: Design fuels treatments to protect sagebrush ecosystems, modify fire behavior, restore ecological function, and create landscape patterns that most benefit PHMAs and GHMAs and promote use by GRSG. | No changes made. | Potential change under Alternative 3. |
| **MD FIRE 29:** Train fuels treatment personnel on GRSG biology, habitat requirements, and identification of areas used locally. | No changes made. | No change proposed. |
| **MD FIRE 30:** Use burning prescriptions that minimize undesirable effects on vegetation or soils (e.g., minimize killing desirable perennial plant species and reduce risk of annual grass invasion) and incorporate FIAT assessment (Chambers et. al 2014) in PHMAs and GHMAs. | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |
| **MD FIRE 31:** Ensure proposed sagebrush treatments are planned with interdisciplinary input from the BLM and coordinated with USFWS and state fish and wildlife agencies to meet GRSG habitat objectives (**Table 2-2**). | No changes made. | Potential change under Alternative 3. |
| **MD FIRE 32:** Design vegetation treatments in areas of high fire frequency to facilitate firefighter safety, reduce the potential acres burned, and reduce the fire risk to GRSG habitat. | No changes made. | No change proposed. |
| **MD FIRE 33a:** For Nevada BLM-administered lands, before implementation, establish project monitoring sites where fuels management projects are planned. Monitor treatment areas both pre- and post-treatment on a multiple-year basis to ensure that project objectives are achieved. | No changes made. | No change proposed. |

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| **MD FIRE 33b:** For California BLM-managed lands, before implementation, establish project monitoring sites where fuels management projects are planned. Monitor treatment areas both pre- and post- treatment on a multiple-year basis to ensure that project objectives are achieved. Juniper treatments will be monitored in accordance with the Sage Steppe Ecosystem Restoration FEIS (BLM 2008). | No changes made. | No change proposed. |
| ***FIRE AND FUELS MANAGEMENT (FIRE)***<br>***Post Fire Management*** | ***FIRE AND FUELS MANAGEMENT (FIRE)***<br>***Post Fire Management*** | — |
| ***OBJECTIVE*** | ***OBJECTIVE*** | — |
| **Objective FIRE 6:** Retain, protect, and improve intact unburned sagebrush communities in burned areas by incorporating the FIAT assessment (Chambers et. al 2014). | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |
| ***Management Decisions (MD):*** | ***Management Decisions (MD):*** | — |
| **MD FIRE 34:** Review Objective SSS 4 and apply MDs SSS 1 through SSS 4 when reviewing and analyzing projects and activities proposed in GRSG habitat. | No changes made. | No change proposed. |
| **MD FIRE 35:** Prioritize post-fire treatments in PHMAs and GHMAs to maximize benefits to GRSG and its habitat. Focus post-fire treatments on replacing or reestablishing burned sagebrush habitat with the appropriate cover and structure to support GRSG habitat objectives (**Table 2-2**). | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |
| **MD FIRE 36:** In post-fire rehabilitation plans in PHMAs and GHMAs, design revegetation projects to accomplish the following:<br>• Maintain and enhance unburned intact sagebrush communities when at risk from adjacent threats<br>• Stabilize soils<br>• Reestablish hydrologic function<br>• Maintain and enhance biological integrity<br>• Promote plant resiliency<br>• Limit expansion or dominance or invasive species<br>• Reestablish native species | No changes made. | Potential change under Alternative 3. |

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| **MD FIRE 37:** Implement post-fire treatments in PHMAs and GHMAs that emphasize stabilizing, rehabilitating, and restoring sagebrush ecosystems damaged by wildfires, including controlling invasive species. | No changes made. | Potential change under Alternative 3. |
| **MD FIRE 38:** Increase post-fire treatment activities in PHMAs and GHMAs through the use of integrated funding opportunities with other resource programs and partners. | No changes made. | Potential change under Alternative 3. |
| **MD FIRE 39:** Following post-fire treatments, monitor and implement management actions in PHMAs and GHMAs that promote healthy perennial grass, shrub and forb communities, and lentic (slow-moving freshwater) and lotic (rapid freshwater) riparian habitats so as to further restoration and ensure long-term persistence of seeded or pre-burn native plants, in accordance with GRSG habitat objectives (**Table 2-2**). | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |
| **MD FIRE 40:** Evaluate the potential for sagebrush island plantings based on ESDs in large burn areas that may lack sufficient sagebrush seed sources in order to ensure the reestablishment of sagebrush in GRSG habitat. | No changes made. | No change proposed. |
| **MD FIRE 41**: Monitor post-fire rehabilitation treatments on a multiple-year basis to ensure that project objectives are achieved. | No changes made. | No change proposed. |
| **MD FIRE 42:** Use GRSG habitat objectives (**Table 2-2**) and emphasize the use of native plant species in post-fire rehabilitation (e.g., reseeding), recognizing that nonnative species may be necessary, depending on the availability of native seed and prevailing site conditions. Selected species shall maintain site ecological function based on pre-burn conditions and anticipated threat of invasive and noxious weed establishment. Use ESDs and state and transition models if available. | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |

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| ***LIVESTOCK GRAZING (LG)*** | ***LIVESTOCK GRAZING (LG)*** | ***LIVESTOCK GRAZING (LG)*** |
| ***OBJECTIVE*** | ***OBJECTIVE*** | — |
| **Objective LG 1:** Manage permitted livestock grazing to maintain and/or enhance PHMAs and GHMAs to meet or make progress towards meeting all GRSG life-cycle requirements and habitat objectives (**Table 2-2**), based on site potential. | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |
| ***Management Decisions (MD):*** | ***Management Decisions (MD):*** | — |
| **MD LG 1:** When livestock management practices are determined to not be compatible with meeting or making progress towards achievable habitat objectives following appropriate consultation, cooperation and coordination, implement changes in grazing management through grazing authorization modifications, or allotment management plan implementation. Potential modifications include, but are not limited to, changes in:<br>• Season or timing of use;<br>• Numbers of livestock;<br>• Distribution of livestock use;<br>• Duration and/or level of use;<br>• Kind of livestock (e.g., cattle, sheep, horses, or goats) (Briske et al. 2011);<br>• Grazing schedules (including rest or deferment);<br>• Class of livestock;<br>• Grazing schedules (including rest or deferment)<br>• Making allotment unavailable to grazing<br>• *Not in priority order | **MD LG 1:** When livestock management practices are determined to not be compatible with meeting or making progress towards achievable habitat objectives following appropriate consultation, cooperation and coordination, implement changes in grazing management through grazing authorization modifications, or allotment management plan implementation and consistent with 43 CFR 4160.1 and IM-2018-023. Potential modifications include, but are not limited to, changes in:<br>• Season or timing of use;<br>• Numbers of livestock;<br>• Distribution of livestock use;<br>• Duration and/or level of use;<br>• Kind of livestock (e.g., cattle, sheep, horses, or goats) (Briske et al. 2011);<br>• Grazing schedules (including rest or deferment);<br>• Class of livestock;<br>• Grazing schedules (including rest or deferment)<br>• Making allotment unavailable to grazing<br>• *Not in priority order | Potential change under Alternatives 3, 4, 5, and 6. |

| 2015 BLM GRSG Approved RMP Amendment | 2019 BLM GRSG Approved RMP Amendment | Potential for Change in 2023 Plan |
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| **MD LG 2:** The BLM will prioritize (1) the review of grazing permits/leases, in particular to determine if modification is necessary prior to renewal, and (2) the processing of grazing permits/leases in SFA followed by PHMAs outside of the SFA. In setting workload priorities, precedence will be given to existing permits/leases in these areas not meeting land health standards, with focus on those containing riparian areas, including wet meadows. The BLM may use other criteria for prioritization to respond to urgent natural resource concerns (e.g., fire) and legal obligations. | **MD LG 2:** The BLM will prioritize (1) the review of grazing permits/leases, in particular to determine if modification is necessary prior to renewal, and (2) the processing of grazing permits/leases in PHMAs. In setting workload priorities, precedence will be given to existing permits/leases in these areas not meeting land health standards, with focus on those containing riparian areas, including wet meadows. The BLM may use other criteria for prioritization to respond to urgent natural resource concerns (e.g., fire) and legal obligations. | Potential change under Alternatives 3, 4, 5, and 6. |
| **MD LG 3:** The NEPA analysis for renewals and modifications of livestock grazing permits/leases that include lands within SFA and PHMAs will include specific management thresholds based on GRSG Habitat Objectives Table (**Table 2-2**), Land Health Standards (43 CFR, Part 4180.2) and ecological site potential, and one or more defined responses that will allow the authorizing officer to make adjustments to livestock grazing that have already been subjected to NEPA analysis. | **MD LG 3:** The NEPA analysis for renewals and modifications of livestock grazing permits/leases that include lands within PHMAs will include specific management thresholds based on GRSG Habitat Objectives Table (**Table 2-2**), Land Health Standards (43 CFR, Part 4180.2) and ecological site potential, and one or more defined responses that will allow the authorizing officer to make adjustments to livestock grazing that have already been subjected to NEPA analysis. | Potential change under Alternatives 3, 4, 5, and 6. |

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| **MD LG 4:** Complete land health assessments in PHMAs and GHMAs to identify whether or not GRSG habitat objectives (**Table 2-2**) are being met. The priority order for completing land health assessments in GRSG habitat is:<br>• Allotments containing SFA that have never been evaluated;<br>• Allotments containing SFA that have not been re-evaluated in 10 or more years;<br>• Allotments containing PHMAs that have never been evaluated;<br>• Allotments containing PHMAs that have not been re-evaluated in 10 or more years;<br>• Allotments containing GHMAs that have never been evaluated;<br>• Allotments containing GHMAs that have not been re-evaluated in 10 or more years. | **MD LG 4:** Complete land health assessments in PHMAs and GHMAs to identify whether or not GRSG habitat objectives (**Table 2-2**) are being met. The priority order for completing land health assessments in GRSG habitat is:<br>• Allotments containing PHMAs that have never been evaluated;<br>• Allotments containing PHMAs that have not been re-evaluated in 10 or more years;<br>• Allotments containing GHMAs that have never been evaluated;<br>• Allotments containing GHMAs that have not been re-evaluated in 10 or more years. | Potential change under Alternatives 3, 4, 5, and 6. |

| 2015 BLM GRSG Approved RMP Amendment | 2019 BLM GRSG Approved RMP Amendment | Potential for Change in 2023 Plan |
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| **MD LG 5:** If results from a land health assessment indicate that GRSG habitat objectives (**Table 2-2**) are not met in SFA, PHMAs, or GHMAs and grazing is a causal factor, and until appropriate modifications (MD LG 1) are incorporated through the permit renewal process, implement management strategies that may include, but are not limited to, the following:<br>• Provide periods of rest or deferment during critical growth periods of key vegetation species<br>• Limit grazing duration and intensity to allow plant growth sufficient to meet GRSG habitat objectives (**Table 2-2**)<br>• Employ herd management techniques to minimize impacts of livestock on breeding, nesting, and brood-rearing habitat during the breeding season (March 1 to June 30; Lek—March 1 to May 15, and Nesting—April 1 to June 30)<br>• Consider any temporary projects that can mitigate livestock impacts (e.g., temporary fencing or temporary water hauling locations;<br>• Work with permittees to avoid concentrated turn-out locations for livestock within 4 miles of active and pending leks from March 1 to June 30<br>• Avoid domestic sheep use and bedding areas and herder camps within 2 miles of active and pending leks from March 1 to June 30<br>• Utilizing land features and roads on maps provided to the permittee to help delineate livestock use avoidance areas<br>• Considering no grazing from May 15 – Sept. 15 in riparian areas and wet meadows.<br>• Removing livestock within 3-7 days for the remainder of the grazing year once the allowable use levels are reached (BLM 1996, | **MD LG 5:** If results from a land health assessment indicate that GRSG habitat objectives (**Table 2-2**) are not met in PHMAs or GHMAs and grazing is a causal factor, and until appropriate modifications (MD LG 1) are incorporated through the permit renewal process, then, consistent with applicable law and regulations, implement management strategies that may include, but are not limited to, the following:<br>• Provide periods of rest or deferment during critical growth periods of key vegetation species<br>• Limit grazing duration and intensity to allow plant growth sufficient to meet GRSG habitat objectives (**Table 2-2**)<br>• Employ herd management techniques to minimize impacts of livestock on breeding, nesting, and brood-rearing habitat during the breeding season (March 1 to June 30; Lek—March 1 to May 15, and Nesting—April 1 to June 30)<br>• Consider any temporary projects that can mitigate livestock impacts (e.g., temporary fencing or temporary water hauling locations;<br>• Work with permittees to avoid concentrated turn-out locations for livestock within 4 miles of active and pending leks from March 1 to June 30<br>• Avoid domestic sheep use and bedding areas and herder camps within 2 miles of active and pending leks from March 1 to June 30<br>• Utilizing land features and roads on maps provided to the permittee to help delineate livestock use avoidance areas<br>• Considering no grazing from May 15 – Sept. 15 in riparian areas and wet meadows.<br>• Removing livestock within 3-7 days for the remainder of the grazing year once the allowable use levels are reached (BLM 1996, | Potential change under Alternatives 3, 4, 5, and 6. |

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| Burton et. al 2011, Cagney et. al, 2010, Connelly et. al 2000, France et. al 2008, Hagen et. al 2007, Holechek 1988, Platts 1990, and Tanaka et. al 2014):<br>▪ In riparian areas and wet meadows the allowable percent utilization is 35% woody species, and a minimum stubble height of 4-6 inches (10-15 cm) for herbaceous riparian vegetation based on site.<br>▪ In mountain big sage habitat, the allowable percent utilization is 40 % herbaceous key species and/or 35 % shrub key species.<br>▪ In Wyoming Basin big sage habitat, the allowable percent utilization is 35% herbaceous key species and/or 35 % shrub key species.<br>▪ In black sage habitat, the allowable percent utilization is 35% herbaceous key species and/or 35 % shrub key species. | Burton et. al 2011, Cagney et. al, 2010, Connelly et. al 2000, France et. al 2008, Hagen et. al 2007, Holechek 1988, Platts 1990, and Tanaka et. al 2014):<br>▪ In riparian areas and wet meadows, the allowable percent utilization is 35% woody species, and a minimum stubble height of 4-6 inches (10-15 cm) for herbaceous riparian vegetation based on site.<br>▪ In mountain big sage habitat, the allowable percent utilization is 40 % herbaceous key species and/or 35 % shrub key species.<br>▪ In Wyoming Basin big sage habitat, the allowable percent utilization is 35% herbaceous key species and/or 35 % shrub key species.<br>▪ In black sage habitat, the allowable percent utilization is 35% herbaceous key species and/or 35 % shrub key species.<br><br>To the extent that the implementation of these strategies would be in conflict with the terms and conditions of any applicable livestock grazing permit or lease, then the BLM would complete a new decision-making process before implementing the strategies. | *(See above.)* |
| **MD LG 6:** Appropriate allowable utilization levels will be defined through the grazing permit renewal process. At least one alternative in the NEPA process will consider the utilization levels identified in MD LG 5. | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |

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| **MD LG 7:** In pastures where post livestock removal use monitoring results in utilization levels that exceed allowable use levels and livestock are identified as a causal factor, reduce animal unit months (AUMs) grazed the following year accordingly. AUMs cannot be applied to another pasture that is already being used by livestock or is being purposefully rested. | **MD LG 7:** In pastures where post livestock removal use monitoring results in utilization levels that exceed allowable use levels and livestock are identified as a causal factor, reduce animal unit months (AUMs) grazed the following year in accordance with 43 CFR 4160.1 and IM 2018-023. AUMs cannot be applied to another pasture that is already being used by livestock or is being purposefully rested. | Potential change under Alternatives 3, 4, 5, and 6. |
| **MD LG 8:** Within PHMAs and GHMAs, incorporate terms and conditions into grazing permits to meet GRSG habitat objectives (**Table 2-2**), specific terms and conditions will be based on rangeland health assessments (and subsequent monitoring data). | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |

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| **MD LG 9:** When a transfer application is received for preference on an allotment within GRSG habitat:<br>• Transfer of Preference: A transfer of preference will be approved unless the applicant does not meet qualifications (43 CFR, Part 4110.1 and 4110.2). A transfer will be approved to an unqualified applicant if 4110.2-3(e) applies.<br>• Issuing the permit: In accordance with Section 402(c)(2) of FLPMA, a new permit will be issued to the new preference holder with the same terms and conditions as the terminated permit unless:<br>▪ A NEPA analysis of alternative terms and conditions has been completed. If changes in terms and conditions are needed to meet sage-grouse habitat needs or otherwise make progress toward meeting land health standards, issue a decision offering a permit with the new terms and conditions<br>• If a new permit is issued as required by Section 402(c)(2) of FLPMA, then determine priority for completing land health evaluations, habitat assessments and NEPA analysis as described in MD LG 1. | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |
| **MD LG 10**: In any allotment where land health standards were not met and livestock grazing was found to be a significant causal factor, compliance monitoring will be conducted annually until GRSG habitat objectives (**Table 2-2**) are met. If compliance monitoring finds that the implemented management strategies identified in MD LG 5 are not achieving the desired results, a change in action will be required. | **MD LG 10:** In any allotment where land health standards were not met and livestock grazing was found to be a significant causal factor, compliance monitoring will be conducted annually until GRSG habitat objectives (**Table 2-2**) are met or making progress towards meeting habitat objectives. If compliance monitoring finds that the implemented management strategies identified in MD LG 5 are not achieving the desired results, a change in action will be required in compliance with CFR 43 CFR 4160.1 and IM 2018-023. | Potential change under Alternatives 3, 4, 5, and 6. |

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| **MD LG 11**: Allotments within SFA, followed by those within PHMAs, and focusing on those containing riparian areas, including wet meadows, will be prioritized for field checks to help ensure compliance with the terms and conditions of the grazing permits. Field checks could include monitoring for actual use, utilization, and use supervision. | **MD LG 11:** Allotments within PHMAs, focusing on those containing riparian areas, including wet meadows, will be prioritized for field checks to help ensure compliance with the terms and conditions of the grazing permits. Field checks could include monitoring for actual use, utilization, and use supervision. | Potential change under Alternatives 3, 4, 5, and 6. |
| **MD LG 12**: Grazing management strategies for riparian areas and wet meadows will, at a minimum, maintain or achieve proper functioning condition (PFC) and promote GRSG brood-rearing habitat objectives (**Table 2-2**) within PHMAs and GHMAs. | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |
| **MD LG 13:** For range improvement projects, review Objective SSS 4 and apply MDs SSS 1 through SSS 4 when reviewing and analyzing projects and activities proposed in GRSG habitat. | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |
| **MD LG 14:** Build or modify livestock exclosures so that they are large enough to provide hiding cover to GRSG and other wildlife and to reduce the possibility of wildlife collisions with fences (Christiansen 2009; Stevens 2011; NRCS 2012). | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |
| **MD LG 15:** In accordance with state water law and subject to valid existing rights, remove or modify water developments that are negatively impacting GRSG habitats. | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |
| **MD LG 16:** Authorize new water developments for diversion from spring or seep source, in accordance with state water law and subject to valid existing rights when PHMAs and GHMAs will benefit from or not be negatively impacted by the new development. This includes developing new water sources for livestock as part of a grazing management plan to improve GRSG habitat. | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |

| 2015 BLM GRSG Approved RMP Amendment | 2019 BLM GRSG Approved RMP Amendment | Potential for Change in 2023 Plan |
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| **MD LG 17:** Modify water development projects to ensure riparian habitats in PHMAs and GHMAs are being maintained or improved in compliance with valid existing rights and in accordance with state water law. | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |
| **MD LG 18:** Locate salting and supplemental feeding locations, temporary or mobile watering, and new handling facilities (e.g., corrals and chutes) at least 1 mile from riparian areas, springs, and meadows. The distance can be greater based on site-specific conditions. | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |
| **MD LG 19:** In PHMAs and GHMAs, remove livestock ponds built in perennial channels that are negatively impacting riparian habitats, either directly or indirectly, unless riparian access is able to be controlled and negative impacts effectively mitigated (e.g.; water gap fence to pond), and do not permit new ones to be built in these areas subject to valid existing rights. Prior to pond removal, offsite watering options will be examined and considered. | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |
| **MD LG 20:** In PHMA and GHMA, rest areas that have received vegetative treatments from livestock grazing until resource monitoring data verifies the treatment objectives are being met and an appropriate grazing regime has been developed. Any livestock grazing temporary suspended use or other management changes per 43 CFR, Part 4110.3-2a for the purpose of a vegetation treatment will be done through the grazing decision, prior to treatment. | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |

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| **MD LG 21:** At the time a permittee or lessee voluntarily relinquishes a permit or lease, the BLM will consider whether the public lands where that permitted use was authorized shall remain available for livestock grazing or be used for other resource management objectives, such as reserve common allotments and fire breaks. This does not apply to or impact grazing preference transfers, which are addressed in 43 CFR, Part 4110.2-3. | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |
| **MD LG 22:** After grazing rest associated with vegetation treatments in PHMAs and GHMAs, monitor annually for a minimum of 5 years to ensure project objectives are being maintained. | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |
| **MD LG 23:** Fences shall not be constructed or reconstructed within 1.2 miles from the perimeter of occupied leks, unless the collision risk can be mitigated through design features or markings (e.g., mark, laydown fences, and design). | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |
| ***WILD HORSES AND BURROS (WHB)*** | ***WILD HORSES AND BURROS (WHB)*** | — |
| ***Management Decisions (MD):*** | ***Management Decisions (MD):*** | — |
| **MD WHB 1:** For WHB management activities (e.g., gathers), review Objective SSS 4 and apply MDs SSS 1 through SSS 4 when reviewing and analyzing projects and activities proposed in GRSG habitat. | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |
| **MD WHB 2:** Manage herd management areas (HMAs) in GRSG habitat within established AML ranges to achieve and maintain GRSG habitat objectives (**Table 2-2**). | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |

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| **MD WHB 3:** Complete rangeland health assessments for HMAs containing GRSG habitat using an interdisciplinary team of specialists (e.g., range, wildlife, and riparian). The priorities for conducting assessments are:<br>1. HMAs containing SFA;<br>2. HMAs containing PHMAs, which include riparian areas;<br>3. HMAs containing only GHMAs;<br>4. HMAs containing sagebrush habitat outside of PHMAs and GHMAs mapped habitat;<br>5. HMAs without GRSG habitat. | **MD WHB 3:** Complete rangeland health assessments for HMAs containing GRSG habitat using an interdisciplinary team of specialists (e.g., range, wildlife, and riparian). The priorities for conducting assessments are:<br>1. HMAs containing PHMAs, which include riparian areas;<br>2. HMAs containing only GHMAs;<br>3. HMAs containing sagebrush habitat outside of PHMAs and GHMAs mapped habitat;<br>4. HMAs without GRSG habitat. | Potential change under Alternatives 3, 4, 5, and 6. |
| **MD WHB 4:** Prioritize gathers and population growth suppression techniques in HMAs in GRSG habitat, unless removals are necessary in other areas to address higher priority environmental issues, including herd health impacts. Place higher priority on herd areas not allocated as HMAs and occupied by wild horses and burros in SFA, followed by PHMAs. | **MD WHB 4:** Prioritize gathers and population growth suppression techniques in HMAs in GRSG habitat, unless removals are necessary in other areas to address higher priority environmental issues, including herd health impacts. Place higher priority on herd areas not allocated as HMAs and occupied by wild horses and burros in PHMAs. | Potential change under Alternatives 3, 4, 5, and 6. |
| **MD WHB 5**: In SFA and PHMAs outside SFA, assess and adjust AMLs through the NEPA process within HMAs when wild horses or burros are identified as a significant causal factor in not meeting rangeland health standards, even if current AML is not being exceeded. | **MD WHB 5:** In PHMAs, assess and adjust AMLs through the NEPA process within HMAs when wild horses or burros are identified as a significant causal factor in not meeting rangeland health standards, even if current AML is not being exceeded. | Potential change under Alternatives 3, 4, 5, and 6. |
| **MD WHB 6:** In SFA and PHMAs outside of SFA, monitor the effects of WHB use in relation to GRSG habitat objectives (**Table 2-2**) on an annual basis to help determine future management actions. | **MD WHB 6:** In PHMAs, monitor the effects of WHB use in relation to GRSG habitat objectives (**Table 2-2**) on an annual basis to help determine future management actions. | Potential change under Alternatives 3, 4, 5, and 6. |
| **MD WHB 7**: Develop or amend herd management area plans (HMAPs) to incorporate GRSG habitat objectives (**Table 2-2**) and management considerations for all HMAs within GRSG habitat, with emphasis placed on SFA and PHMAs outside of SFA. | **MD WHB 7:** Develop or amend herd management area plans (HMAPs) to incorporate GRSG habitat objectives (**Table 2-2**) and management considerations for all HMAs within GRSG habitat, with emphasis placed on PHMAs. | Potential change under Alternatives 3, 4, 5, and 6. |

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| **MD WHB 8**: Consider removals or exclusion of WHB during or immediately following emergency situations (such as fire, floods, and drought) to facilitate meeting GRSG habitat objectives (**Table 2-2**) where HMAs overlap with GRSG habitat. | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |
| **MD WHB 9:** When conducting NEPA analysis for wild horse/burro management activities, water developments, or other rangeland improvements for wild horses, address the direct and indirect effects to GRSG populations and habitat. Implement any water developments or rangeland improvements using the criteria identified for domestic livestock. | No changes made. | Potential change under Alternative 3. |
| **MD WHB 10:** Coordinate with professionals from other federal and state agencies, researchers at universities, and others to utilize and evaluate new management tools (e.g., population growth suppression, inventory techniques, and telemetry) for implementing the WHB program. | No changes made. | Potential change under Alternative 3. |
| ***MINERALS RESOURCES (MR)*** | ***MINERALS RESOURCES (MR)*** | — |
| ***Leasable Minerals*** | ***Leasable Minerals*** | — |
| ***Objectives*** | ***Objectives*** | — |
| **Objective MR 1**: Priority will be given to leasing and development of fluid mineral resources, including geothermal, outside of PHMAs and GHMAs. When analyzing leasing and authorizing development of fluid mineral resources, including geothermal, in PHMAs and GHMAs, that are subject to applicable stipulations for the conservation of GRSG, priority will be given to development in non-habitat areas first and then in the least suitable habitat for GRSG. The implementation of these priorities will be subject to valid existing rights and any applicable law or regulation, including, but not limited to, 30 U.S.C. 226(p) and 43 C.F.R. 3162.3-1(h). | **Objective MR 1 Removed** | Potential change under Alternatives 3, 4, 5, and 6. |

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| **Objective MR 2**: Where a proposed fluid mineral development project on an existing lease could adversely affect GRSG populations or habitat, the BLM will work with the lessees, operators, or other project proponents to avoid, reduce and mitigate adverse impacts to the extent compatible with lessees' rights to drill and produce fluid mineral resources. The BLM will work with the lessee, operator, or project proponent in developing an application for permit to drill (APD) for the lease to avoid and minimize impacts on GRSG or its habitat and will ensure that the best information about GRSG and its habitat informs and helps to guide development of such federal leases. | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |
| ***Management Decisions (MD): Unleased Fluid Minerals*** | ***Management Decisions (MD): Unleased Fluid Minerals*** | — |
| **MD MR 1:** Review Objective SSS 4 and apply MDs SSS 1 through SSS 4 when reviewing and analyzing projects and activities proposed in GRSG habitat. | No changes made. | No change proposed. |
| **MD MR 2:** Manage SFA as NSO without waivers, exceptions, or modifications (see Appendix A; Figure 2-4). | **MD MR 2 Removed** | Potential change under Alternatives 3, 4, 5, and 6. |
| **MD MR 3:** In PHMAs outside of SFA, no waivers or modifications to an oil and gas lease no-surface-occupancy stipulation will be granted. In PHMAs, the Authorized Officer may grant an exception to an oil and gas lease no-surface-occupancy stipulation only where the proposed action:<br><br>MD MR 1: Review Objective SSS 4 and apply MDs SSS 1 through SSS 4 when reviewing and analyzing projects and activities proposed in GRSG habitat.<br>i. Will not have direct, indirect, or cumulative effects on GRSG or its habitat; or,<br>ii. Is proposed to be undertaken as an alternative to a similar action occurring on a nearby parcel, and | **MD MR 3:** In PHMAs, manage oil and gas with major constraints (no-surface occupancy) and timing limitations. See **MD SSS 5 (Allocation Exceptions)** and **Appendix E** regarding waivers, exceptions, and modifications for oil and gas lease stipulations. | Potential change under Alternatives 3 and 66. |

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| will provide a clear conservation gain to GRSG.<br><br>Exceptions based on conservation gain (ii) may only be considered in (a) PHMAs of mixed ownership where federal minerals underlie less than fifty percent of the total surface, or (b) Areas of the public lands where the proposed exception is an alternative to an action occurring on a nearby parcel subject to a valid federal oil and gas lease existing as of the date of this RMP amendment. Exceptions based on conservation gain must also include measures, such as enforceable institutional controls and buffers, sufficient to allow the BLM to conclude that such benefits will endure for the duration of the proposed action's impacts (see Appendix G).<br><br>Any exceptions to this lease stipulation may be approved by the Authorized Officer only with the concurrence of the State Director. The Authorized Officer may not grant an exception unless the applicable state wildlife agency, the USFWS, and the BLM unanimously find that the proposed action satisfies (i) or (ii). Such finding shall initially be made by a team of one field biologist or other GRSG expert from each respective agency. In the event the initial finding is not unanimous, the finding may be elevated to the appropriate BLM State Director, USFWS State Ecological Services Director, and state wildlife agency head for final resolution. In the event their finding is not unanimous, the exception will not be granted. Approved exceptions will be made publicly available at least quarterly. | *(See above.)* | *(See above.)* |

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| **MD MR 4a**: For BLM land in the state of Nevada only, in the portions of the PHMAs outside of SFA, geothermal projects may be considered for authorization if all of the following conditions are met:<br>• A team comprised of BLM, FWS, and NDOW specialists advises the BLM State Director on appropriate mitigation measures for the project and its ancillary facilities, including lek buffer distances using the best available science;<br>• Mitigation actions are consistent with this Plan's mitigation strategy such as the Nevada Conservation Credit System, and;<br>• The footprint of the project is consistent with the disturbance management protocols identified in this plan (see MD SSS 2 and Appendix E) | **MD MR 4a:** In PHMAs, manage geothermal fluid minerals with major constraints (no-surface occupancy) and timing limitations. See **MD SSS 5 (Allocation Exceptions)** and **Appendix E** regarding waivers, exceptions, and modifications for oil and gas lease stipulations. | Potential change under Alternatives 3, 4, 5, and 6. |
| **MD MR 4b:** For BLM lands in California only, manage geothermal leasing in PHMAs in accordance with MD MR 3 (see Appendix G). | **MD MR 4b Removed** | Potential change under Alternatives 3 and 66. |
| **MD MR 5:** In GHMAs, manage oil and gas and geothermal fluid minerals with moderate constraints, timing limitations, and controlled surface use stipulations (see Appendix A; Figure 2-4). | No changes made. | Potential change under Alternative 3. |
| **MD MR 6:** In PHMAs and GHMAs, allow only geophysical exploration that does not crush sagebrush or create new or additional surface disturbance. Examples of technologies that may meet this requirement are drilling methods using helicopters, articulated rubber-tired vehicles that leave no trace, and vibroseis geophysical operations on roads and bladed shoulders. | No changes made. | Potential change under Alternative 3. |
| **MD MR 7:** Prohibit surface shot methods in PHMAs. | No changes made. | Potential change under Alternative 3. |

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| ***Leased Federal Fluid Mineral Estate Actions*** | ***Leased Federal Fluid Mineral Estate Actions*** | — |
| ***Management Decisions (MD):*** | ***Management Decisions (MD):*** | — |
| **MD MR 8:** Review Objective SSS 4, and to the extent allowed by law, apply MDs SSS 1 through SSS 4 when reviewing and analyzing projects and activities proposed in GRSG habitat. | No changes made. | No change proposed. |
| **MD MR 9:** Use directional and horizontal drilling to reduce surface disturbance. | No changes made. | No change proposed. |
| **MD MR 10:** On leased federal fluid mineral estate, where no APD or geothermal drilling permit (GDP) has been issued, apply RDFs consistent with applicable law and other conditions of approval (COAs) that conserve GRSG. Manage existing fluid mineral leases through COAs applied at the time APD or GDP is approved. | No changes made. | No change proposed. |
| **MD MR 11:** On leased federal fluid mineral estate in PHMAs, complete master development plans for oil and gas in lieu of APD-by-APD, or operations/utilization plans for geothermal processing for all but exploration wells. | No changes made. | No change proposed. |
| **MD MR 12:** On leased, federal, fluid mineral estate in PHMAs, require a full reclamation bond specific to the site. Ensure bonds are sufficient for reclamation costs for full restoration. Base the reclamation costs on the assumption that BLM contractors will perform the work. | No changes made. | No change proposed. |
| **MD MR 13:** In PHMAs and GHMAs, place infrastructure in already disturbed locations to the extent feasible. | No changes made. | Potential change under Alternative 3. |
| **MD MR 14:** Locate new compressor stations outside PHMAs and GHMAs and design them to reduce noise that may be directed toward PHMAs and GHMAs (see MDs SSS 2 and SSS 3 and Appendix M). | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |

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| ***Locatable Minerals*** | ***Locatable Minerals*** | — |
| ***Management Decisions (MD):*** | ***Management Decisions (MD):*** | — |
| **MD MR 15:** Review Objective SSS 4, and to the extent allowed by law, apply MDs SSS 1 through SSS 4 when reviewing and analyzing projects and activities proposed in GRSG habitat. | No changes made. | Potential change under Alternative 3. |
| **MD MR 16:** Recommend for withdrawal SFA under the General Mining Act of 1872, as amended, subject to valid existing rights (see Appendix A; Figures 2-1 and 2-4). | **MD MR 16 Removed** | Potential change under Alternatives 3, 4, 5, and 6. |
| **MD MR 17:** On public lands, manage disturbances associated with notice-level activity in GRSG habitat on a landscape basis to avoid segmenting a project. Do this by encouraging operators and claimants to consolidate exploration into a plan of operations to reduce the proliferation of mining notices, in accordance with 43 CFR, Part 3809.21(b). | No changes made. | Potential change under Alternative 3. |
| **MD MR 18:** Subject to valid existing rights and applicable law, authorize locatable mineral development activity, by approving plans of operation and apply mitigation and best management practices that minimize the loss of PHMAs and GHMAs or that enhance GRSG habitat by applying the "avoid, minimize and compensatory mitigation" process through an applicable mitigation system, such as the Nevada Conservation Credit System and exemplified in the Barrick Nevada Sage-Grouse Bank Enabling Agreement (March 2015). | **MD MR 18:** Subject to valid existing rights and applicable law, authorize locatable mineral development activity, by approving plans of operation and apply mitigation and best management practices that minimize the loss of PHMAs and GHMAs or that enhance GRSG habitat by applying the mitigation strategy outlined in **MD MIT 1** and exemplified in the Barrick Nevada Sage-Grouse Bank Enabling Agreement (March 2015). | Potential change under Alternatives 3, 4, 5, and 6. |
| **MD MR 19:** Close or mitigate abandoned mine sites in PHMAs and GHMAs to reduce GRSG predation by eliminating physical structures that could provide nesting opportunities and perching sites for predators. | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |

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| ***Saleable Materials*** | ***Saleable Materials*** | — |
| ***Management Decisions (MD):*** | ***Management Decisions (MD):*** | — |
| **MD MR 20:** Review Objective SSS 4 and apply MDs SSS 1 through SSS 4 when reviewing and analyzing projects and activities proposed in GRSG habitat. | No changes made. | Potential change under Alternatives 3 and 66. |
| **MD MR 21:** PHMAs are closed to new mineral material sales (see Appendix A; Figure 2-6). However, these areas remain open to free use permits and the expansion of existing active pits, if requirements in MD MR 20 can be met. | **MD MR 21:** PHMAs are closed to new mineral material sales **(see Appendix A; Figure 2-6)**. However, these areas remain open to free use permits and the expansion of existing active pits, if requirements in **MD MR 20** are met and/or if the new mineral material sale meets one of the allocation exception criteria outlined in **MD SSS 5**. | Potential change under Alternatives 3 and 66. |
| **MD MR 22:** Manage GHMAs as open to existing and new mineral materials disposal sites (see Appendix A; Figure 2-6). | No changes made. | Potential change under Alternatives 3 and 66. |
| **MD MR 23:** Provide reasonable access and development opportunity to Federal Highway Administration, Nevada Department of Transportation (NDOT), California Department of Transportation (Caltrans), counties, tribes and the public for existing mineral material pits in PHMAs and GHMAs. | No changes made. | Potential change under Alternative 3. |
| ***Non-Energy Leasable Minerals*** | ***Non-Energy Leasable Minerals*** | — |
| ***Management Decisions (MD):*** | ***Management Decisions (MD):*** | — |
| **MD MR 24:** Review Objective SSS 4 and apply MDs SSS 1 through SSS 4 when reviewing and analyzing projects and activities proposed in GRSG habitat. | No changes made. | Potential change under Alternatives 3 and 66. |
| **MD MR 25:** Manage PHMAs as closed to new non-energy leasable mineral leasing (see Appendix A; Figure 2-7). | **MD MR 25:** Manage PHMAs as closed to new non-energy leasable mineral leasing, unless the new non-energy leasable mineral lease meets one of the allocation exception criteria outlined in **MD SSS 5** (see **Appendix A; Figure 2-7**). | Potential change under Alternatives 3, 4, 5, and 6. |
| **MD MR 26:** Expansion of existing leases will be considered in PHMA for development. | No changes made. | Potential change under Alternatives 3 and 66. |
| **MD MR 27:** Manage GHMAs as open to new non-energy leasable mineral leasing (see Appendix A; Figure 2-7). | No changes made. | Potential change under Alternatives 3 and 66. |

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| ***Mineral Split-Estate*** | ***Mineral Split-Estate*** | — |
| ***Management Decisions (MD):*** | ***Management Decisions (MD):*** | — |
| **MD MR 28:** Review Objective SSS 4, and to the extent allowed by law, apply MDs SSS 1 through SSS 4 when reviewing and analyzing projects and activities proposed in GRSG habitat in split estate situations. | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |
| **MD MR 29:** Where the federal government owns the mineral estate in PHMAs and GHMAs, and the surface is in non-federal ownership, apply the same stipulations, conditions of approval (COAs), and/or conservation measures and RDFs applied (consistent with applicable law) if the mineral estate is developed on BLM-administered lands in that management area, to the maximum extent permissible under existing authorities, and in coordination with the landowner. | No changes made. | Potential change under Alternative 3. |
| ***RENEWABLE ENERGY (WIND AND SOLAR) (RE)*** | ***RENEWABLE ENERGY (WIND AND SOLAR) (RE)*** | — |
| ***Management Decisions (MD): Industrial Solar*** | ***Management Decisions (MD): Industrial Solar*** | — |
| **MD RE 1**: Designate PHMAs and GHMAs as ROW exclusion for utility-scale solar energy facilities (those that generate 20 megawatts or more) (see Appendix A; Figure 2-9). | **MD RE 1:** Manage PHMAs and GHMAs as ROW exclusion for utility-scale solar energy facilities (those that generate 20 megawatts or more), unless the utility-scale solar energy facility meets one of the allocation exception criteria outlined in **MD SSS 5**, (see **Appendix A; Figure 2-9**) and in accordance with the Final Solar Energy Development Programmatic Environmental Impact Statement (BLM 2012). | Potential change under Alternatives 3, 4, 5, and 6. |
| **MD RE 2:** In PHMAs and GHMAs, consider approving solar facilities on existing industrial infrastructure (e.g., a mine site) to generate power on-site. Review Objective SSS 4 and apply MDs SSS 1 through SSS 3 when reviewing and analyzing projects and activities proposed in GRSG habitat. In OHMAs, apply Action SSS 4. | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |

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| ***Management Decisions (MD):*** ***Wind Energy Development*** | ***Management Decisions (MD):*** ***Wind Energy Development*** | — |
| **MD RE 3:** Designate PHMAs as ROW exclusion for utility-scale commercial wind energy facilities (those that generate 20 megawatts or more) (see Appendix A; Figure 2-8). | **MD RE 3:** Manage PHMAs as ROW exclusion for utility-scale commercial wind energy facilities (those that generate 20 megawatts or more), unless the commercial wind energy facility meets one of the allocation exception criteria outlined in **MD SSS 5** (see **Appendix A; Figure 2-8**). | Potential change under Alternatives 3, 4, 5, and 6. |
| **MD RE 4:** Within PHMAs, wind facilities associated with existing industrial infrastructure (e.g., a mine site) to provide on-site power generation could be considered for approval, subject to a net conservation gain. Apply MDs SSS 1 through SSS 2 when reviewing and analyzing projects/activities proposed within GRSG habitat. | **MD RE 4:** Within PHMAs, wind facilities associated with existing industrial infrastructure (e.g., a mine site) to provide on-site power generation could be considered for approval, subject to meeting one of the allocation exception criteria outlined in **MD SSS 5** (see **Appendix A; Figure 2-8**). Apply MDs SSS 1 through SSS 2 when reviewing and analyzing projects/activities proposed within GRSG habitat. | Potential change under Alternatives 3, 4, 5, and 6. |
| **MD RE 5:** Designate GHMAs as ROW avoidance for utility-scale commercial wind energy facilities (i.e., facilities that generate 20 megawatts or more) (see Appendix A; Figure 2-8). Review Objective SSS 4 and apply Actions SSS 1 through SSS 3 when reviewing and analyzing projects/activities proposed within GRSG habitat. In OHMAs apply Action SSS 4. | **MD RE 5:** Manage GHMAs as ROW avoidance for utility-scale commercial wind energy facilities (i.e., facilities that generate 20 megawatts or more), unless the commercial wind energy facility meets one of the allocation exception criteria outlined in **MD SSS 5** (see **Appendix A; Figure 2-8**). Review Objective SSS 4 and apply Actions SSS 1 through SSS 3 when reviewing and analyzing projects/activities proposed within GRSG habitat. In OHMAs apply Action SSS 4. | Potential change under Alternatives 3, 4, 5, and 6. |
| ***LANDS AND REALTY (LR)*** | ***LANDS AND REALTY (LR)*** | ***LANDS AND REALTY (LR)*** |
| **Objectives:** | **Objectives:** | **Objectives:** |
| **Objective LR 1:** Manage land use authorizations, including ROWs, leases, permits, and tenure adjustments, to maintain or enhance PHMAs and GHMAs and connectivity. | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |

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| **Objective LR 2:** Effects of infrastructure projects, including siting, will be minimized using the best available science, and updated as monitoring information on current infrastructure projects becomes available. | No changes made. | No change proposed. |
| ***Management Decisions (MD): Utility Corridors and Communication Sites*** | ***Management Decisions (MD): Utility Corridors and Communication Sites*** | — |
| **MD LR 1:** Review Objective SSS 4 and apply MDs SSS 1 through SSS 4 when reviewing and analyzing projects and activities proposed in GRSG habitat. | No changes made. | No change proposed. |
| **MD LR 2:** Only utility corridors identified in Appendix A, Figure 2-10 remain as designated corridors in PHMAs and GHMAs. All previously designated corridors in PHMAs and GHMAs not shown on the map that were designated through past land use planning efforts have been evaluated and undesignated. | No changes made. | Potential change under Alternative 3. |
| **MD LR 3:** On public lands, keep the designated corridors identified in Appendix A, Figure 2-10 in PHMAs and GHMAs available to new uses, subject to a maximum corridor width of 3,500 feet, unless a narrower width is specified in an existing plan, or a different width is specified for congressionally designated corridors. | No changes made. | Potential change under Alternative 3. |
| **MD LR 4:** When issuing new communication site management plans or amending existing plans, include GRSG habitat objectives (**Table 2-2**). Current authorizations will then be amended to reflect the updated communication site management plans. | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |

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| ***Management Decisions (MD): Land Use Authorizations*** | ***Management Decisions (MD): Land Use Authorizations*** | — |
| **MD LR 5:** PHMAs and GHMAs are designated as avoidance areas for high voltage transmission line ROWs (>100 kV) (see Appendix A; Figure 2-11a), except for the transmission projects specifically identified below. All authorizations in these areas, other than the identified projects, must comply with the conservation measures outlined in this proposed plan amendment, including all of the requirements presented in MDs SSS 1 – SSS 4. The BLM is currently processing an application for the TransWest Express transmission line and the NEPA review for this project is well underway. Conservation measures for GRSG are being analyzed through the project's NEPA review process, which should achieve a net conservation benefit for the GRSG. | **MD LR 5:** PHMAs and GHMAs are designated as avoidance areas for high voltage transmission line ROWs (>100 kV) (see **Appendix A; Figure 2-11**), unless the high voltage transmission line meets one of the allocation exception criteria outlined in **MD SSS 5.** Review Objective SSS 4 and apply MDs SSS 1 through SSS 4 when reviewing and analyzing projects and activities proposed in GRSG habitat. In OHMAs, apply MD SSS 4. | Potential change under Alternatives 3, 4, 5, and 6. |
| **MD LR 6**: PHMAs and GHMAs are designated as major pipeline (≥24-inch diameter) ROW avoidance areas (see Appendix A; Figure 2-11a). Review Objective SSS 4 and apply MDs SSS 1 through SSS 4 when reviewing and analyzing projects and activities proposed in GRSG habitat. In OHMAs, apply MD SSS 4. | **MD LR 6:** PHMAs and GHMAs are designated as major pipeline (≥24-inch diameter) ROW avoidance areas (see **Appendix A; Figure 2-11**), unless the major pipeline line meets one of the allocation exception criteria outlined in **MD SSS 5.** Review Objective SSS 4 and apply MDs SSS 1 through SSS 4 when reviewing and analyzing projects and activities proposed in GRSG habitat. In OHMAs, apply MD SSS 4. | Potential change under Alternatives 3, 4, 5, and 6. |
| **MD LR 7:** Issue ROWs only after documenting that they will not adversely affect or disrupt GRSG habitat (independent of disturbance cap), except where such limitation will make accessing valid existing rights impracticable in PHMAs and GHMAs. | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |

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| **MD LR 8:** Manage PHMAs as avoidance areas for ROWs (including permits and leases) (see Appendix A; Figure 2-11b). These do not include the wind, solar, or high-voltage transmission line and major pipeline ROW actions, above. | **MD LR 8:** Manage PHMAs as avoidance areas for ROWs (including permits and leases) (see **Appendix A; Figure 2-11)**, unless the ROW meets one of the allocation exception criteria outlined in **MD SSS 5.** These ROWs do not include the wind, solar, or high-voltage transmission line and major pipeline ROW actions, above. | Potential change under Alternatives 3, 4, 5, and 6. |
| **MD LR 9:** Manage GHMAs as open to ROWs (including for permits and leases) (see Appendix A; Figure 2-11b). These do not include the wind, solar, or high-voltage transmission line and major pipeline ROW actions, above. | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |
| **MD LR 10:** In PHMAs, bury new distribution power and communication lines in existing disturbed areas, unless it would not be technically feasible, or the cost would prohibit the proponent from providing the service. Where burying transmission lines is not feasible, locate new transmission lines next to existing linear disturbances, when possible; additional mitigation will be required. | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |
| **MD LR 11:** When renewing or amending ROWs (including permits and leases), assess the impacts of ongoing use of the ROW on GRSGs and their habitat and minimize such impacts to the extent allowed by law. | No changes made. | No change proposed. |
| **MD LR 12:** When renewing or amending ROWs that are undeveloped, work with ROW holders to bury or relocate authorized but undeveloped lines to minimize impacts on PHMAs, unless this would not be technically feasible or would be contrary to policy. Where burying transmission lines is not feasible, locate new transmission lines next to existing linear disturbances, when possible. | No changes made. | No change proposed. |

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| **MD LR 13:** In PHMAs and GHMAs where existing ROWs, permits, or leases are no longer in use, coordinate with the authorized holder to relinquish the authorization and reclaim the site by removing the infrastructure. | No changes made. | Potential change under Alternative 3. |
| **MD LR 14:** Stipulate site relinquishment and reclamation in all new, amended or renewed ROWs, permits, and leases. | No changes made. | Potential change under Alternatives 3 and 6. |
| **MD LR 15**: In PHMAs and GHMAs, site new linear features in designated corridors, as identified in Appendix A, Figure 2-10, or at a minimum, collocate with existing linear features. Construct new ROWs in designated corridors as close as technically feasible to existing linear ROW infrastructure to limit disturbance to the smallest footprint. | No changes made. | Potential change under Alternatives 3 and 6. |
| **MD LR 16:** Manage landfills and transfer stations on public lands to eliminate opportunities to attract and provide nesting, cover, or perches for predators. | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |
| **MD LR 17:** Within 4 miles of active and pending leks in GRSG habitat, require ROW, permit, and lease holders to retrofit those portions of power lines and other utility structures with nesting and perch-deterring devices. Do this during the renewal and amendment process if adverse effects, such as increased nest predation, on GRSG populations have been documented. This requirement shall be predicated on research and monitoring studies specific to power lines or other utility structures. | No changes made. | Potential change under Alternatives 3, 4, 5, and 6a. |
| **MD LR 18:** In PHMAs and subject to valid existing rights, authorize new road ROWs only when necessary for public safety or administrative access, or if it will create no new surface disturbance. | No changes made. | No change proposed. |

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| **MD LR 19:** In PHMAs and GHMAs, address access to valid existing rights to provide the minimum access necessary to exercise the right and maintain or enhance PHMAs and GHMAs. | No changes made. | Potential change under Alternative 3. |
| **MD LR 20:** Consider the likelihood of development of not-yet-constructed surface-disturbing activities – as defined in Table 2 of the Monitoring Framework (Appendix D)−under valid existing rights prior to authorizing new projects in PHMA. | No changes made. | No change proposed. |
| ***Management Decisions (MD): Land Tenure*** | ***Management Decisions (MD): Land Tenure*** | — |
| **MD LR 21**: Lands classified as PHMAs and GHMAs for GRSG will be retained in federal management, unless: (1) the agency can demonstrate that disposal of the lands, including land exchanges, will provide a net conservation gain to GRSG or (2) the agency can demonstrate that the disposal, including land exchanges, of the lands will have no direct or indirect adverse impact on conservation of the GRSG (see Appendix A; Figure 2-12). | **MD LR 21:** Exceptions to non-disposal or exchange of lands that are identified for retention in Appendix A, Figure 2-12 could be considered if (a) they are identified for disposal through previous planning efforts or address a Congressional Act (e.g., the respective Lincoln and White Pine County Conservation, Recreation, and Development Acts), (b) the agency can demonstrate that the disposal, including land exchanges, will have no adverse direct, indirect or cumulative impacts on GRSG and its habitat, or (c) adverse impacts on GRSG or its habitat will be offset, through use of voluntary compensatory mitigation, consistent with the States' mitigation policies and programs, such as the State of Nevada's Executive Order 2018-32 (and any future regulations adopted by the State of Nevada regarding compensatory mitigation, consistent with federal law). Also see allocation exception criteria in MD SSS 5. | Potential change under Alternative 3. |
| **MD LR 22:** Where significant conservation actions can be achieved in PHMAs and GHMAs, seek to acquire lands with intact subsurface mineral estate by donation, purchase, or exchange in order to best conserve, enhance, or restore GRSG habitat. | No changes made. | Potential change under Alternative 3. |

| 2015 BLM GRSG Approved RMP Amendment | 2019 BLM GRSG Approved RMP Amendment | Potential for Change in 2023 Plan |
|---|---|---|
| **MD LR 23:** Manage lands acquired by exchange, purchase or easement as either PHMAs or GHMAs, in consideration of surrounding habitat. | No changes made. | Potential change under Alternative 3. |
| ***Management Decisions (MD): Withdrawals*** | ***Management Decisions (MD): Withdrawals*** | — |
| **MD LR 24:** Recommend SFA for withdrawal from the General Mining Act of 1872, as amended; subject to valid existing rights (see Appendix A; Figure 2-5). | **MD LR 24 Removed** | Potential change under Alternatives 3, 4, 5, and 6. |
| ***Recreation and Visitor Services (REC)*** | ***Recreation and Visitor Services (REC)*** | — |
| ***Management Decisions (MD):*** | ***Management Decisions (MD):*** | — |
| **MD REC 1:** Review Objective SSS 4 and apply MDs SSS 1 through SSS 4 when analyzing projects and activities proposed in GRSG habitat. | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |
| **MD REC 2:** Allow special recreation permits in PHMAs and GHMAs only if their effects on GRSG and its habitat are neutral or result in a net conservation gain. | **MD REC 2:** Allow special recreation permits in PHMAs and GHMAs only if their effects on GRSG and its habitat are neutral or beneficial. | Potential change under Alternative 3. |
| **MD REC 3:** In PHMA, do not construct new recreation facilities (e.g., campgrounds, trails, trailheads, staging areas) unless the development will have a net conservation gain to GRSG and its habitat (such as concentrating recreation, diverting use away from critical areas, etc.), or unless the development is required for visitor health and safety or resource protection. | **MD REC 3:** In PHMA, do not construct new recreation facilities (e.g., campgrounds, trails, trailheads, staging areas) unless the facility meets one of the criteria outlined in **MD SSS 5.** | Potential change under Alternatives 3, 4, 5, and 6. |
| **MD REC 4:** Develop trail mapping and educational campaigns in PHMAs and GHMAs to reduce recreational impacts on GRSG and their habitat, including the effects of cross-country travel. | No changes made. | Potential change under Alternative 3. |
| ***Travel and Transportation Management (TTM)*** | ***Travel and Transportation Management (TTM)*** | — |
| ***Objective*** | ***Objective*** | — |
| **Objective TTM 1:** Prioritize and complete transportation planning in PHMAs and GHMAs that provides for reasonable access to public lands for administration and recreation and that minimizes proliferation of user-created routes (e.g., roads, primitive roads, and trails). | No changes made. | Potential change under Alternative 3. |

| 2015 BLM GRSG Approved RMP Amendment | 2019 BLM GRSG Approved RMP Amendment | Potential for Change in 2023 Plan |
|---|---|---|
| ***Management Decisions (MD):*** | ***Management Decisions (MD):*** | — |
| **MD TTM 1:** Review Objective SSS 4 and apply MDs SSS 1 through SSS 4 when reviewing and analyzing projects and activities proposed in GRSG habitat. | No changes made. | No change proposed. |
| **MD TTM 2:** In areas where travel planning has not been completed, limit off-highway vehicle (OHV) travel to existing routes in PHMAs and GHMAs (subject to valid existing rights, such as for a mine under a plan of operations) until subsequent implementation-level travel planning is completed and a designated route system is established. In travel management plans that have been completed and are being implemented (e.g., northeastern California plans), continue to limit OHV travel to designated routes in PHMAs and GHMAs (see Appendix A; Figure 2-13). | No changes made. | Potential change under Alternative 3. |

| 2015 BLM GRSG Approved RMP Amendment | 2019 BLM GRSG Approved RMP Amendment | Potential for Change in 2023 Plan |
|---|---|---|
| **MD TTM 3:** Allow the goals, objectives, and actions in relevant national OHV guidance to guide subsequent implementation-level travel planning efforts. In addition, the following guidelines will be considered when undertaking future implementation-level travel planning:<br>• Identify, prioritize, and update annually a timeline to complete travel planning in all relevant planning areas to accelerate data collection, route evaluation and selection, and on-the- ground implementation, including signing, monitoring, and rehabilitation.<br>• Consult with interested user groups, federal, state, county, and local agencies, local landowners, and other parties to provide an opportunity for the public to express itself and have its views considered. Consequently, incorporate a public outreach plan to fully engage all interested stakeholders into future travel management plans.<br>• Among other route evaluation criteria, incorporate criteria from 43 CFR, Part 8342.1, and specifically section (b), "areas and trails shall be located to minimize harassment of wildlife or significant disruption of wildlife habitats. Special attention will be given to protect endangered or threatened species and their habitats."<br>• Evaluate all routes to determine the purpose and need and the potential resource or user conflicts from motorized travel. Where resource or user conflicts outweigh the purpose and need for the route, consider closing the route or relocating it outside of PHMAs and GHMAs. Evaluate for administrative access only routes not required for public access or recreation against current administrative/agency purpose or need. | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |

| 2015 BLM GRSG Approved RMP Amendment | 2019 BLM GRSG Approved RMP Amendment | Potential for Change in 2023 Plan |
|---|---|---|
| Consider closing routes that are duplicative, parallel, or redundant.<br>• Consider seasonal restrictions (see Actions SSS 2 and SSS 3) on motorized travel use PHMAs and GHMAs where motorized vehicle use is a threat. Consider limiting over snow vehicles (OSVs) designed for use on a track or tracks or a ski or skis, while in use to designated routes or consider seasonal closures in GRSG wintering areas from November 1 through February 28.<br>• Consider the need for restricting motorized vehicles, including their sound levels (Actions SSS 2 and SSS 3), speed and design (e.g., motorcycles, ATVs, and UTVs).<br>• Consider scheduling road maintenance to avoid disturbance during sensitive GRSG life-cycle periods to the extent practicable. Consider using time of day, seasonal, and noise restrictions (see Actions SSS 2 and SSS 3) to reduce impacts on GRSG seasonal habitat.<br>• In PHMAs and GHMAs, close to motorized travel those roads, primitive roads, and trails not designated in travel management plans.<br>• In PHMAs and GHMAs, prioritize restoring routes not designated in a travel management plan. Obliterate and seed roads, primitive roads, and trails not designated in travel management plans, with appropriate seed mixes and transplanted sagebrush when applicable. Use fire-resistant species as fuel breaks where appropriate. Seed must be certified weed free. | *(See above.)* | *(See above.)* |

| 2015 BLM GRSG Approved RMP Amendment | 2019 BLM GRSG Approved RMP Amendment | Potential for Change in 2023 Plan |
|---|---|---|
| **MD TTM 4:** In PHMAs and GHMAs, where new roads are necessary for public safety, administration, or public need, consider limiting route construction to realignments of existing routes where possible. | No changes made. | Potential change under Alternative 3. |
| **MD TTM 5:** In PHMAs and GHMAs, work with local governments to minimize upgrading existing routes that will change route category (e.g., road, primitive road, or trail) or capacity, unless the upgrade will maintain or enhance GRSG habitat, provide a fuel break to protect native vegetation, will be necessary for public safety, or will eliminate the need to construct a new road. | No changes made. | Potential change under Alternative 3. |

| 2015 BLM GRSG Approved RMP Amendment | 2019 BLM GRSG Approved RMP Amendment | Potential for Change in 2023 Plan |
|---|---|---|
| **MD TTM 6**: In PHMAs and GHMAs, temporary closures will be considered in accordance with 43 CFR, Subpart 8364 (Closures and Restrictions), 43 CFR, Subpart 8351 (Designated National Area), 43 CFR, Subpart 6302 (Use of Wilderness Areas, Prohibited Acts, and Penalties), and 43 CFR, Subpart 8341 (Conditions of Use).<br><br>Temporary closure or restriction orders under these authorities are enacted at the discretion of the authorized officer to resolve management conflicts and protect persons, property, and public lands and resources. where an authorized officer determines that off-highway vehicles are causing or will cause considerable adverse effects upon soil, vegetation, wildlife, wildlife habitat, cultural resources, historical resources, threatened or endangered species, wilderness suitability, other authorized uses, or other resources, the affected areas shall be immediately closed to the type(s) of vehicle causing the adverse effect until the adverse effects are eliminated and measures implemented to prevent recurrence (43 CFR, Part 8341.2). A closure or restriction order shall be considered only after other management strategies and alternatives have been explored. The duration of temporary closure or restriction orders shall be limited to 24 months or less; however, certain situations may require longer closures and/or iterative temporary closures. This may include closure of routes or areas. | No changes made. | Potential change under Alternative 3. |
| **Cultural Resources (CUL)** | **Cultural Resources (CUL)** | — |
| ***Management Decisions (MD):*** | ***Management Decisions (MD):*** | — |
| **MD CUL 1:** Do not restrict tribal access to view GRSG breeding behavior for a tribe's traditional lifeways. | No changes made. | No change proposed. |

| 2015 BLM GRSG Approved RMP Amendment | 2019 BLM GRSG Approved RMP Amendment | Potential for Change in 2023 Plan |
|---|---|---|
| **MD CUL 2:** Do not prohibit tribal access to traditional locations for cultural practices in PHMAs and GHMAs. | No changes made. | Potential change under Alternative 3. |
| **MD CUL 3:** Do not prohibit tribal collection of seeds, vegetation, or medicinal plants related to traditional cultural practices in PHMAs and GHMAs. | No changes made. | Potential change under Alternative 3. |
| **Mitigation (MI)** | **Mitigation (MI)** | — |
| ***Management Decisions (MD):*** | ***Management Decisions (MD):*** | — |
| **MD MIT 1:** In Nevada, coordinate with the SETT on the application of a compensatory mitigation program, such as the Nevada Conservation Credit System (CCS) (**Appendix N**) for mitigating activities that result in habitat loss and degradation of GRSG habitat in Nevada, where the application of compensatory mitigation will occur on, or the credit will be applied to disturbance on BLM-administered lands. | **MD MIT 1:** When authorizing third-party actions in GRSG HMAs, the BLM will seek to achieve the planning-level GRSG management goals and objectives through implementation of mitigation and management actions, consistent with valid existing rights and applicable law. Management will be consistent with the GRSG goals and objectives, and in conformance with BLM Manual 6840, Special Status Species Management. In accordance with BLM Manual 6840, the BLM will undertake planning decisions, actions and authorizations "to minimize or eliminate threats affecting the status of [GRSG] or to improve the condition of [GRSG] habitat" across the planning area.<br><br>The BLM has determined that FLPMA does not explicitly mandate or authorize the BLM to require public land users to implement compensatory mitigation as a condition of obtaining authorization for the use of BLM-administered lands (IM 2019-018, Compensatory Mitigation, December 6, 2018). Consistent with that determination, compensatory mitigation must be voluntary unless required by other applicable laws, but the BLM recognizes that state authorities may also require compensatory mitigation.<br><br>To align this planning effort with the BLM's compensatory mitigation policy, IM 2019-018, the amended plans clarify that the BLM will consider compensatory mitigation | Potential change under Alternatives 3, 4, 5, and 6. |

| 2015 BLM GRSG Approved RMP Amendment | 2019 BLM GRSG Approved RMP Amendment | Potential for Change in 2023 Plan |
|---|---|---|
| *(See above.)* | only when offered voluntarily by a project proponent, when required by a law other than FLPMA; or as a component of compliance with a state mitigation plan, program, or authority, such as required by State of Nevada Executive Order 2018-32 (and any future regulations adopted by the State of Nevada regarding compensatory mitigation, consistent with federal law). In accordance with the State's goals for managing Greater Sage-Grouse, the plans modify the net conservation gain standard for compensatory mitigation to clarify that the BLM would pursue net benefit/net conservation gain as a broader planning goal and objective. This means that the BLM would continue to require avoidance, minimization, and other onsite mitigation to adequately conserve Greater Sage-Grouse and its habitat, while remaining committed to implementing beneficial habitat management actions to reduce the threats of fire and invasive species. In fiscal year 2018, the BLM funded approximately $29 million in sage-grouse management actions resulting in approximately 500,000 acres of treated sage-grouse habitat and expects to invest another $22.5 million of habitat management projects in fiscal year 2019 in the Great Basin Region. The BLM would continue to apply the mitigation hierarchy as described in the CEQ regulations at 40 CFR 1508.20; however, the BLM would focus on avoiding, minimizing, rectifying, and reducing impacts over time. Compensation, which involves replacing or providing substitute resources for the impacts (including through payments to fund such work), would be considered only when voluntarily offered by a proponent, required by a law other than FLPMA, or to meet a State requirement. The BLM commits to cooperating with the State to | *(See above.)* |

| 2015 BLM GRSG Approved RMP Amendment | 2019 BLM GRSG Approved RMP Amendment | Potential for Change in 2023 Plan |
|---|---|---|
| *(See above.)* | analyze applicant-proposed or state-imposed compensatory mitigation to offset residual impacts. The BLM remains committed to achieving the planning-level management goals and objectives identified in this ROD and the 2015 ARMPA by ensuring Greater Sage-Grouse habitat impacts are addressed through implementing mitigating actions consistent with the governing RMP.<br><br>In all GRSG habitat, before authorizing third-party actions that result in habitat loss and degradation within the State of Nevada, the BLM will complete the following steps, in alignment with the State of Nevada's Greater Sage-Grouse Conservation Plan (2014, as amended), including avoiding, minimizing, and compensating for impacts by applying beneficial mitigation actions:<br><br>1. Notify the State of Nevada's Sagebrush Ecosystem Technical Team to determine if the State requires or recommends any mitigation – including avoidance, minimization, or compensatory mitigation – under the States' regulations, policies, or programs, such as required by the State of Nevada's Executive Order 2018-32 (and any future regulations adopted by the State of Nevada regarding compensatory mitigation, consistent with federal law), related to the conservation of GRSG.<br>2. Incorporate the States' required or recommended mitigation into the BLM's NEPA decision-making process, if the State of Nevada's Sagebrush Ecosystem Technical Team determines that there are unacceptable residual impacts on GRSG or its habitat and compensatory mitigation is required as a part of the State's policy or authorization, such as required by the State of Nevada's Executive Order 2018-32 (and any future regulations adopted by the | *(See above.)* |

| 2015 BLM GRSG Approved RMP Amendment | 2019 BLM GRSG Approved RMP Amendment | Potential for Change in 2023 Plan |
|---|---|---|
| *(See above.)* | State of Nevada regarding compensatory mitigation, consistent with federal law), or if a proponent voluntarily offers mitigation.<br>3. Verify that the project proponent has coordinated with the State of Nevada's Sagebrush Ecosystem Technical Team to ensure it complies with the State of Nevada's Greater Sage-Grouse Conservation Plan (2014, as amended) and all applicable State requirements relating to its proposal.<br><br>The BLM will cooperate with the States to determine appropriate project design and alignment with the States' policies and requirements, including those regarding compensatory mitigation, such as the State of Nevada's Executive Order 2018-32 (and any future regulations adopted by the State of Nevada regarding compensatory mitigation, consistent with federal law). When the BLM is considering compensatory mitigation as a component of the project proponent's submission or based on a requirement of or recommendation from the States, the BLM's NEPA analysis will evaluate the need to avoid or minimize impacts of the proposed project and achieve the goals and objectives of this Approved RMPA. With respect to any State compensatory mitigation requirements, the BLM will defer to the appropriate State authority to quantify habitat offsets, durability, and other aspects used to determine the recommended compensatory mitigation action.<br><br>The BLM will not deny a proposed authorization in GRSG habitat solely on the grounds that the proponent has not proposed or agreed to undertake voluntary compensatory mitigation, unless required by an existing States' authority such as the | *(See above.)* |

| 2015 BLM GRSG Approved RMP Amendment | 2019 BLM GRSG Approved RMP Amendment | Potential for Change in 2023 Plan |
|---|---|---|
| *(See above.)* | State of Nevada's Executive Order 2018-32 (and any future regulations adopted by the State of Nevada regarding compensatory mitigation, consistent with federal law).<br><br>The BLM will ensure project design is aligned with the States' requirements—including compensatory mitigation—that may be necessary to comply with State's policies and programs for the conservation of GRSG. Where compensatory mitigation is required as part of a States' plan, program, or authority, such as Nevada State Executive Order 2018-32 (and any future regulations adopted by the State of Nevada regarding compensatory mitigation, consistent with federal law), the BLM will include the required mitigation in all of its action alternatives in a NEPA analysis. | *(See above.)* |
| **MD MIT 2:** Identify compensatory mitigation areas in PHMAs and GHMAs with the potential to achieve GRSG habitat objectives (**Table 2-2**), in accordance with FIAT, the SFA prioritization, and the State of Nevada Strategic Action Plan. | **MD MIT 2:** On BLM-administered lands within Nevada and California, when authorizing third-party actions that will result in direct, indirect, or cumulative impacts on GRSG or their habitat, the BLM will defer to the State of Nevada's most current version of the Habitat Quantification Tool (HQT) to quantify those impacts to ensure consistency in tracking and reporting changes to GRSG habitat quality and quantity. | Potential change under Alternatives 3, 4, 5, and 6. |

### 2.12.2 Relevant Appendices

The following table shows which appendices from the 2015 and 2019 plans have management direction that may change through this RMP amendment. If 2019 is not listed in the year, then no change was made to the appendix between the 2015 and 2019 plans. The 2015 and 2019 Appendices can be found on the Nevada and Northeastern California GRSG ePlanning website.

| ARMPA Appendix Name | Year | Potential for Change in 2023 Plan |
|---|---|---|
| A: Approved RMP Amendment Maps | 2015 | Yes |
| A: Maps | 2019 | Yes |
| B: Applying Lek Buffer-Distances When Approving Actions | 2015 | No |
| B: Lek Buffer-Distances (Evaluating Impacts on Leks) | 2019 | No |
| C: Required Design Features | 2015 | Yes (grazing BMPs) |
| C: Required Design Features Worksheet | 2019 | Yes (grazing BMPs) |
| D: Greater Sage-Grouse Monitoring Framework | 2015 | No |
| J: Monitoring Framework | 2019 | No |
| E: Greater Sage-Grouse Disturbance Cap Guidance | 2015 | Yes |
| F: Disturbance Cap Guidance | 2019 | Yes |
| G: Fluid Mineral Stipulations, Waivers, Modifications, and Exceptions | 2015 | Yes |
| E: Fluid Mineral Stipulations, Waivers, Modifications, and Exceptions | 2019 | Yes |
| H: Fire and Invasives Assessment Tool | 2015, 2019 | No |
| I: Avoid, Minimize and Apply Compensatory Mitigation | 2015 | Yes |
| F: Regional Mitigation Strategy | 2015 | Yes |
| J: Adaptive Management Plan | 2015 | Yes |
| D: Adaptive Management Plan | 2019 | Yes |
| K USFWS Biological Opinion | 2015 | No |
| L: VDDT Methodology | 2015 | No |
| I: VDDT Methodology | 2019 | No |
| M: Greater Sage-Grouse Noise Protocol | 2015 | No |
| G: Noise Protocol | 2019 | No |
| N: State of Nevada Conservation Credit System | 2015 | No |

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# Appendix 2.13
# Oregon RMPs

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## 2.13 OREGON RMPS

This appendix presents the GRSG approved RMP amendment language from the 2015 and 2019 records of decision for Oregon. Changes between 2015 and 2019 are noted. The table below notes which goals, objectives, appendices, and management decisions/actions have a potential to change as a result of the current planning effort and if so, under which alternatives changes are being considered. Note that any references to tables and appendices are to those applicable 2015 and 2019 appendices that are listed in **Section 2.13.2** of this appendix.

### 2.13.1 Existing GRSG RMP Management – Oregon RMPs

**Table 1: Changes in Management from the 2015 Approved ARMPA to the 2019 Approved ARMPA**

| Oregon 2015 GRSG ARMPA (as published text) | Oregon 2019 GRSG ARMPA (as published) | Potential for Change in 2023 Plan |
|---|---|---|
| — | Plan outcome (goal, objective, management direction (MD))<br><br>Published plan included only text provided in this column and did not reprint all text from Column A (as maintained in Column B) - Text in this column replaced text in Column A for the Goals, Objectives, and Management Directions. Other maintenance actions noted after goals, objectives, and management directions. | — |
| **Special Status Species (SSS)** | **Special Status Species (SSS)** | — |
| **Goal** | **Goal** | — |
| Goal SSS 1: Conserve, enhance, and restore the sagebrush ecosystem upon which GRSG populations depend in an effort to maintain and/or increase their abundance and distribution, in cooperation with other conservation partners. | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |
| **Objective** | **Objective** | — |
| Objective SSS 1: Protect PHMA necessary to conserve 90 percent of Oregon's Greater Sage-grouse population with emphasis on highest density and important use areas that provide for breeding, wintering, and connectivity corridors. Protect GHMA necessary to conserve occupied seasonal or year-round habitat outside of PHMA. | No changes made. | No change proposed. |
| Objective SSS 2: Maintain or improve habitat connectivity between PHMA within Oregon and adjoining states to promote Greater Sage-grouse movement and genetic diversity. | No changes made. | No change proposed. |

| Oregon 2015 GRSG ARMPA (as published text) | Oregon 2019 GRSG ARMPA (as published) | Potential for Change in 2023 Plan |
|---|---|---|
| Objective SSS 3: In addition to the net conservation gain mitigation requirement, manage Oregon PACs so that discrete anthropogenic disturbances, whether temporary or permanent, cover less than 3 percent of the total available Greater Sage-grouse habitat, regardless of ownership. | No changes made. | No change proposed. |
| Per Oregon Maintenance Action 2:<br><br>Objective SSS 4: The habitat objectives for GRSG (Table 2-2) is a list of indicators, characteristics, and values that describe GRSG seasonal habitat use areas. The BLM used indicator values derived from a synthesis of local and regional GRSG habitat research and data to describe the typical vegetation communities that sage-grouse select. While the habitat objectives are not attainable on every site or every acre within designated GRSG habitat management areas, the values reflect a range of habitat conditions that generally lead to greater survival of individuals within a population. When permitting land use activities, BLM should consider the ecological site potential within designated habitat management areas to validate the habitat conditions achievable for a specific site.<br><br>The seasonal habitat descriptions in Table 2-2 vary across the range of sage-grouse, within a subregion, and between sites. They are not land health standards but are quantitative measures that inform the Special Status Species Habitat Land Health Standard for sage-grouse. These measurable values reflect ecological potential, and may be adjusted based on local factors influencing sage-grouse habitat selection. Local data or recent science may indicate that sage-grouse select for vegetation structure and composition in seasonal habitats not characterized by the values in the habitat objectives table. In these cases, it may be appropriate to adjust the values. Habitat objectives should be evaluated in the context of annual variability in ecological conditions and should not be used singly to determine habitat suitability for sage-grouse. They may be used to demonstrate trends over time, during plan evaluations for effectiveness of sage-grouse | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |

| Oregon 2015 GRSG ARMPA (as published text) | Oregon 2019 GRSG ARMPA (as published) | Potential for Change in 2023 Plan |
|---|---|---|
| conservation, or when identify limiting habitat characteristics for a given area.<br><br>The indicators, characteristics, values and desired seasonal habitat conditions in the GRSG Plan Habitat Objectives Table are meant to inform the wildlife habitat component of the Land Health Standards evaluation process (LHS, 43 CFR 4180.2), but do not replace rangeland health assessments. Results from the LHS evaluation should be used to support BLM in land use authorization processes and during development of objectives for management actions such as vegetation treatments. BLM land use authorizations will contain terms and conditions regarding the actions needed to achieve or make progress toward achieving habitat objectives and land health standards.<br><br>The Habitat Objectives Tables are to be used:<br>• To assess habitat suitability for sage-grouse following the BLM policy on sage-grouse habitat assessments<br>• To evaluate land use plan effectiveness for sage-grouse conservation, and<br>• As a basis to develop measurable project objectives for actions in BLM-designated GRSG Habitat Management areas when considered alongside land health standards, ecological potential, and local information.<br>References: U.S. Department of the Interior, Bureau of Land Management. 2001. Rangeland health standards handbook H-4180-1. https://www.blm.gov/sites/blm.gov/files/uploads/Media_Library_BLM_Policy_h4180-1.pdf | *(See above.)* | *(See above.)* |
| Objective SSS 5: Manage anthropogenic uses and GRSG predator subsidies on public lands (landfills, transfer stations, predator perches and nest sites) to reduce the effects of predation on GRSG. | No changes made. | No change proposed. |
| Objective SSS 6: The BLM will coordinate with the State of Oregon regarding proposed management changes, the implementation of conservation measures, mitigation, and site-specific monitoring related to adaptive management and anthropogenic disturbance. | No changes made. | No change proposed. |

| Oregon 2015 GRSG ARMPA (as published text) | Oregon 2019 GRSG ARMPA (as published) | Potential for Change in 2023 Plan |
|---|---|---|
| **Management Direction** | **Management Direction** | — |
| MD SSS 1: Designate PHMA on 4,578,518 acres and designate GHMA on 5,628,628 acres. | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |
| MD SSS 2: Designate Sagebrush Focal Areas (SFA) (1,929,580 acres) as shown on Figure 1-2: Oregon Decision Area, Greater Sage-Grouse Habitat Management Areas for BLM-Administered Lands (with SFA). SFAs will be managed as PHMA, with the following additional management:A. Recommended for withdrawal from the General Mining Law of 1872, as amended, subject to valid existing rights. B. Managed as NSO, without waiver, exception, or modification, for fluid mineral leasing.C. Prioritized for vegetation management and conservation actions in these areas, including, but not limited to land health assessments, wild horse and burro management actions, review of livestock grazing permits/leases, and habitat restoration (see specific management sections). | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |
| MD SSS 3: If the 3% anthropogenic disturbance cap, not to exceed 1% increase per decade, is exceeded on lands (regardless of landownership) within GRSG Priority Habitat Management Areas in the affected Oregon PAC, then no further discrete anthropogenic disturbances (subject to applicable laws and regulations, such as the General Mining Law of 1872, as amended, valid existing rights, etc.) will be permitted by BLM within GRSG Priority Habitat Management Areas in the affected Oregon PAC until the disturbance has been reduced to less than the cap. | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |

| Oregon 2015 GRSG ARMPA (as published text) | Oregon 2019 GRSG ARMPA (as published) | Potential for Change in 2023 Plan |
|---|---|---|
| MD SSS 4: If the 3% disturbance cap, not to exceed 1% increase per decade, is exceeded on all lands (regardless of landownership) within a proposed project analysis area in Priority Habitat Management Areas, then no further anthropogenic disturbance will be permitted by BLM until disturbance in the proposed project analysis area has been reduced to maintain the area under the cap (subject to applicable laws and regulations, such as General Mining Law of 1872, as amended, valid existing rights, etc.). Within existing designated utility corridors, the 3% disturbance cap may be exceeded at the project scale if the site specific NEPA analysis indicates that a net conservation gain to the species will be achieved. This exception is limited to projects which fulfill the use for which the corridors were designated (ex., transmission lines, pipelines) and the designated width of a corridor will not be exceeded as a result of any project co-location. | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |
| MD SSS 5: Subject to applicable laws and regulations and valid existing rights, if the average density of one energy and mining facility per 640 acres (the density cap) is exceeded on all lands (regardless of land ownership) in the Priority Habitat Management Area within a proposed project analysis area, then no further disturbance from energy or mining facilities will be permitted by BLM: (1) until disturbance in the proposed project analysis area has been reduced to maintain the limit under the cap; or (2) unless the energy or mining facility is co-located into an existing disturbed area, as described in Appendix E. | No changes made. | No change proposed. |
| MD SSS-6: Using the habitat disturbance cap calculation methodology (Appendix E), in cooperation with ODFW, measure the direct area of influence of infrastructure, facilities, energy, and mining within Oregon PACs (Figure 2-2 in Appendix A) and maintain a current database of anthropogenic disturbance. | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |

| Oregon 2015 GRSG ARMPA (as published text) | Oregon 2019 GRSG ARMPA (as published) | Potential for Change in 2023 Plan |
|---|---|---|
| MD SSS 7: Verify the accuracy of Greater Sage-grouse habitat data layers at the site/project scale. Consider ecological site potential when assessing habitat suitability for Greater Sage-grouse. Periodically update PHMA and GHMA in cooperation with ODFW using the best available information. | No changes made. | No change proposed. |
| MDSSS 8: When fine and site-scale Greater Sage-grouse habitat assessment and monitoring is needed or required, (e.g., as a component of a rangeland health assessment), measure the Greater Sage-grouse habitat suitability indicators for seasonal habitats identified in Table 2-2. Site suitability values may be adjusted regionally where there is scientific justification for doing so. When using the indicators to guide management actions or during land health assessments, consider that the indicators are sensitive to the ecological processes operating at the scale of interest and that a single habitat indicator does not necessarily define habitat suitability for an area or particular scale. | No changes made. | No change proposed. |
| MD SSS 9: Apply buffers and seasonal restrictions in Table 2-4 to all occupied or pending leks in PHMA and GHMA to avoid direct disturbance to Greater Sage-grouse. In undertaking BLM management actions, and consistent with valid and existing rights and applicable law in authorizing third-party actions, the BLM will apply the lek buffer-distances identified in the USGS Report Conservation Buffer Distance Estimates for Greater Sage-Grouse—A Review (Open File Report 2014-1239) (Manier et al. 2014; Appendix B). | No changes made. | No change proposed. |
| See Table 2-3 Greater Sage-Grouse Buffers (text included in table 2-3 after this comparison table) | No changes made. | No change proposed. |

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| MD SSS 10: In undertaking BLM management actions, and, consistent with valid existing rights and applicable law, in authorizing third party actions that result in habitat loss and degradation, the BLM will require and ensure mitigation that provides a net conservation gain to the species including accounting for any uncertainty associated with the effectiveness of such mitigation. This will be achieved by avoiding, minimizing, and compensating for impacts by applying beneficial mitigation actions. | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |
| MD SSS 11: Anthropogenic disturbances or activities disruptive to GRSG (including scheduled maintenance activities) shall not occur in seasonal GRSG habitats unless the project plan and NEPA document demonstrate the project will not impair the life-cycle or behavioral needs of GRSG populations. Seasonal avoidance periods vary by GRSG seasonal habitat as follows:<br>• In breeding habitat within four (4) miles of occupied and pending leks from March 1 through June 30. Lek hourly restrictions are from two hours before sunset to two hours after sunrise at the perimeter of an occupied or pending lek.<br>• Brood-rearing habitat from July 1 to October 31<br>• Winter habitat from November 1-February 28<br>The seasonal dates may be modified due to documented local variations (e.g., higher/lower elevations) or annual climactic fluctuations (e.g., early/late spring, long and/or heavy winter) in coordination with ODFW, in order to better protect GRSG. | No changes made. | No change proposed. |
| MD SSS 12: Identify Greater Sage-grouse habitat outside of PHMA that can function as connecting habitat. Consider the habitat connectivity map developed by The Nature Conservancy and BLM for Oregon (Jones and Schindel, 2015). When conducting analysis for project level NEPA, include Greater Sage-grouse habitat and populations in adjoining states within 4 miles of leks in Oregon. | No changes made. | No change proposed. |

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| MD SSS 13: All authorized actions in Greater Sage-grouse habitat are subject to RDFs and BMPs in Appendix C and these disturbance screening criteria:<br><br>Where avoidance is not possible, disturbance will be allowed under the following conditions:<br>• Development in each Oregon PAC and PHMA does not exceed the disturbance cap at either the Oregon PAC scale or the project scale (Appendix E).<br>• New anthropogenic disturbance does not occur within 1.0 mile of an occupied or pending lek in PHMA or GHMA.<br>• Development meets noise restrictions in PHMA and GHMA.<br>• Analyze through implementation level NEPA seasonal protection and timing limitations of occupied and pending leks in PHMA and GHMA.<br>• All disturbance is subject to net conservation gain mitigation to Greater Sage-grouse and its habitat (see Appendix F, Mitigation) in PHMA and GHMA.<br>• All new permitted activities will follow Required Design Features (Appendix C) in PHMA and GHMA. | No changes made. | No change proposed. |
| • To the extent feasible, development should only occur in non-habitat areas. If this is not possible, then development must occur in the least suitable habitat for Greater Sage-grouse.<br>• Apply buffers and seasonal restrictions in Table 2-4 to all occupied or pending leks in PHMA and GHMA to avoid direct disturbance to Greater Sage-grouse.<br><br>Screening criteria and conditions will not be applicable to vegetation treatments being conducted to enhance GRSG habitat, except noise and seasonal restrictions will apply. | No changes made. | No change proposed. |
| MD SSS 14: Assist ODFW and other partners with surveillance and, where appropriate, control of West Nile virus. Report observations of dead or sick Greater Sage-grouse or other bird deaths that could be attributed to disease or parasites. | No changes made. | No change proposed. |

| Oregon 2015 GRSG ARMPA (as published text) | Oregon 2019 GRSG ARMPA (as published) | Potential for Change in 2023 Plan |
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| MD 15: Implement adaptive management responses to hard and soft triggers established in the Adaptive Management Strategy (Appendix J). Hard trigger responses will be removed, either through a plan amendment or when the criteria for recovery have been met (see Appendix J - Longevity of Responses). Removal of the hard trigger responses returns management direction in the affected Oregon PAC to the plan decisions that are in force within those Oregon PACs that have not tripped a hard trigger. | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |
| **Vegetation (VEG)** | **Vegetation (VEG)** | — |
| **Goal** | **Goal** | — |
| Goal VEG 1: Increase the resistance of Greater Sage-grouse habitat to invasive annual grasses and the resiliency of Greater Sage-grouse habitat to disturbances such as fire and climate change to reduce habitat loss and fragmentation. | No changes made. | No change proposed. |
| Goal VEG 2: Within Greater Sage-grouse habitat, re-establish sagebrush cover, native grasses, and forbs in areas where they have been reduced below desired levels or lost. Use ecological site descriptions to determine appropriate levels of sagebrush cover and appropriate native grasses and forbs. | No changes made. | No change proposed. |
| Goal VEG 3: Use integrated vegetation management to control, suppress, and eradicate invasive plant species per BLM Handbook H-1740-2. Apply ecologically based invasive plant management principles in developing responses to invasive plant species. | No changes made. | No change proposed. |
| **Objective** | **Objective** | — |
| Objective VEG 1: Within the boundaries of each Field Office establish a mix of sagebrush classes as identified in Table 2-4, Desired Mix of Sagebrush Classes by Sagebrush Type on BLM-administered lands in Greater Sage-grouse habitat. Evaluate progress toward the objective every 10 years. | No changes made. | No change proposed. |
| Table 2-4 Desired Mix of Sagebrush Classes by Sage Brush Type (text included in table 2-4 after this comparison table) | No changes made. | No change proposed. |

| Oregon 2015 GRSG ARMPA (as published text) | Oregon 2019 GRSG ARMPA (as published) | Potential for Change in 2023 Plan |
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| Objective VEG 2: Reduce encroaching conifer cover to zero within 1.0 mile of all occupied or pending leks and to less than 5 percent within 4.0 miles of such leks at a rate at least equal to the rate of encroachment. Priorities for treatment are phase I and phase II juniper, and phase III juniper with a grass-forb understory. Retain all old trees, culturally significant trees, and trees in active use by special status species (e.g. nest, den, and roost trees) and all old growth stands of juniper within 4.0 miles of occupied or pending leks. See OSU Technical Bulletin 152, or its successor, for the key characteristics of old trees. Old growth stands are those where the dominant trees in the stand meet the key characteristics for old trees. Pending occupied leks and pending unoccupied leks are hereafter collectively referred to as "pending leks" (see Glossary). | No changes made. | No change proposed. |
| Objective VEG 3: Reduce the area dominated by invasive annual grasses to no more than 5 percent within 4.0 miles of all occupied or pending leks. Manage vegetation to retain resistance to invasion where invasive annual grasses dominate less than 5 percent of the area within 4.0 miles of such leks. | No changes made. | No change proposed. |
| Objective VEG 4: Thin sagebrush stands that exceed 30 percent cover in cool-moist sagebrush and 25 percent cover warm-dry sagebrush to no less than 15 percent cover within 4.0 miles of all occupied or pending leks. | No changes made. | No change proposed. |
| Objective VEG 5: Increase native plant diversity (number of species) to at least 50 percent of the potential diversity listed for the relevant ecological site description and sagebrush cover where it is less than 15 percent in half of crested wheatgrass seedings in PHMA. If existing diversity equals or exceeds 50 percent of the potential diversity, no forb restoration is needed. | No changes made. | No change proposed. |

| Oregon 2015 GRSG ARMPA (as published text) | Oregon 2019 GRSG ARMPA (as published) | Potential for Change in 2023 Plan |
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| Objective VEG 6: Conduct vegetation treatments based on the following 10-year (decadal) acreage objectives within four miles of occupied and pending leks, using results of the fire and invasives assessment tool (FIAT; Fire and Invasive Assessment Team 2014) to establish the priority PACs and treatments within PACs: | No changes made. | No change proposed. |
| Objective VEG 7: Each Oregon PAC has at least 5 percent sagebrush cover on a minimum of 70 percent of the area within the Oregon PAC that is capable of supporting sagebrush plant communities. Use ecological site descriptions to determine which sites are capable of supporting sagebrush plant communities. | No changes made. | No change proposed. |
| Objective VEG 8: Coordinate vegetation management activities with adjoining landowners. | No changes made. | No change proposed. |
| Objective VEG 9: In all Sagebrush Focal Areas and Priority Habitat Management Areas, the desired condition is to maintain all lands ecologically capable of producing sagebrush (but no less than 70%) with a minimum of 15% sagebrush cover or as consistent with specific ecological site conditions. The attributes necessary to sustain these habitats are described in Interpreting Indicators of Rangeland Health (BLM Tech Ref 1734-6) and in Table 2-5. | No changes made. | No change proposed. |
| Table 2-5 Decadal Treatment Objectives for GRSG Habitat (text included in table 2-5 after this comparison table) | No changes made. | No change proposed. |
| **Management Direction** | **Management Direction** | — |
| Habitat Restoration: | — | — |
| MD VEG 1: Priority areas for Greater Sage-grouse habitat restoration and maintenance projects are*:<br>• Sites with a higher probability of success.<br>• Seasonal habitats thought to be limiting to Greater Sage-grouse populations.<br>• Connectivity corridors between Greater Sage-grouse populations and subpopulations.<br>• Following stand-replacing events at least 100 acres in size.<br>*Not in priority order. Incorporate these priorities in the assessments conducted using the FIAT process detailed in Appendix H. | No changes made. | No change proposed. |

| Oregon 2015 GRSG ARMPA (as published text) | Oregon 2019 GRSG ARMPA (as published) | Potential for Change in 2023 Plan |
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| MD VEG 2: Base species composition, function, and structure of sagebrush communities on ecological site descriptions. Use climate change science concerning projected changes in species ranges and changes in site capability to adjust expected and desired native species compositions as that information becomes available. | No changes made. | No change proposed. |
| MD VEG 3: Do not treat sagebrush during nesting and early brood-rearing within 4.0 miles of occupied or pending leks. Conduct pre-treatment lek surveys to determine if the lek is active. Breeding and brood-rearing typically occur from March 1 to June 30; use local information to further refine this period. | No changes made. | No change proposed. |
| MD VEG 4: Cutting of juniper can occur within 4.0 miles of an occupied or pending lek during the breeding season from two hours after sunrise and two hours before sunset. | No changes made. | No change proposed. |
| MD VEG 5: Vegetation management activities that are timing-sensitive for maximum effectiveness, such as herbicide application or seeding operations, can occur during the breeding season within 4.0 miles of occupied or pending leks. Limit operations to no more than 5 days and to the period beginning two hours after sunrise and ending two hours before sunset during the breeding and early brood rearing period. Conduct pre-treatment surveys for nests and do not damage or destroy identified nests during treatment operations. Conduct operations so as to minimize the risk of accidentally killing chicks. Breeding and early-brood-rearing typically occur from March 1 through June 30; use local information to further refine this period. | No changes made. | No change proposed. |
| MD VEG 6: Use adaptive management principles (for example, monitoring and adjusting seed mixes, planting methods or timing of planting to increase success rates) to provide for persistence of seeded or planted species important to Greater Sage-grouse. | No changes made. | No change proposed. |
| MD VEG 7: Do not use non-specific insecticides in brood-rearing habitat during the brood-rearing period. Use instar-specific insecticides to limit impacts on Greater Sage-grouse chick food sources. | No changes made. | No change proposed. |

| Oregon 2015 GRSG ARMPA (as published text) | Oregon 2019 GRSG ARMPA (as published) | Potential for Change in 2023 Plan |
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| MD VEG 8: Use native plant materials for restoration and rehabilitation based on availability, adaptive capacity, and probability of successful establishment (see Appendix I). Where native plant material availability or probability of successful establishment is low, use desirable non-native plant materials that are of a similar functional/structural group as native plant species (e.g. deep-rooted, tall perennial bunchgrass, tap-rooted perennial forb). | No changes made. | No change proposed. |
| MD VEG 9: When sufficient native plant materials are available, use native plant materials unless the area is immediately threatened by invasive plant species spread or dominance.<br>Use non-native plant materials as necessary to:<br>1. Limit or control invasive plant species spread or dominance.<br>2. Create fuel breaks along roads and ROWs.<br>3. Create defensible space within 0.5 mile of human residences. | No changes made. | No change proposed. |
| MD VEG 10: When seedings include non-native plant materials, evaluate post-planting within 10 years to determine the need to increase native species populations or compositions to be more representative of the ecological site description and capability. When existing native herbaceous diversity is less than 50 percent of the potential diversity for the applicable ecological site description, conduct treatments to increase the diversity. | No changes made. | No change proposed. |
| MD VEG 11: Do not conduct forage enhancement solely for domestic livestock in PHMA. | No changes made. | No change proposed. |
| MD VEG 12: Adjust discretionary land uses, such as active use for livestock grazing or recreational uses or seasons, as needed to facilitate attainment and persistence of vegetation restoration objectives. | No changes made. | No change proposed. |

| Oregon 2015 GRSG ARMPA (as published text) | Oregon 2019 GRSG ARMPA (as published) | Potential for Change in 2023 Plan |
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| MD VEG 13: Use provisional and established seed zones identified by the Great Basin Native Plant Project (http://www.fs.fed.us/rm/grassland-shrubland-desert/research/projects/gbnpsip/) to determine appropriate seed sources for grasses, forbs, and shrubs. Identify sagebrush seed collection areas to provide locally adapted sagebrush seed sources. | No changes made. | No change proposed. |
| MD VEG 14: Allowable methods for vegetation treatment include mechanical, biological (including targeted grazing), chemical, or wildland fire or combinations of these general treatment categories. | No changes made. | No change proposed. |
| MD VEG 15: Create mosaics of varying sagebrush density using spot treatments within the treatment area. Sagebrush density shall be equivalent to Classes 1 through 4 in cool-moist sagebrush and Classes 1 through 3 in warm-dry sagebrush (see Table 2-4). Maximum stand-replacement patch size shall not exceed 25 acres and total stand-replacement patches shall not exceed 15 percent of the treatment block. See Required Design Features for additional details. | No changes made. | No change proposed. |
| MD VEG 16: Test new potential restoration methods in areas with a sagebrush overstory and an annual grass understory. | No changes made. | No change proposed. |
| MD VEG 17: Remove conifers encroaching into sagebrush habitats, in a manner that considers tribal cultural values. Prioritize treatments closest to occupied GRSG habitats and near occupied leks, and where juniper encroachment is phase 1 or phase 2. Use site-specific analysis and tools such as VDDT and the FIAT process (Appendix H), or their successors, to refine the specific locations to be treated. | No changes made. | No change proposed. |
| MD VEG 18: Apply additional restoration treatments, such as seeding or planting, in conjunction with juniper removal in areas with more than trace amounts of invasive annual grasses or where the pre-treatment understory has less than 2 healthy bunchgrass plants per 10 square feet in cool-moist sagebrush or less than 4 healthy bunchgrass plants per 10 square feet in warm-dry sagebrush. | No changes made. | No change proposed. |

| Oregon 2015 GRSG ARMPA (as published text) | Oregon 2019 GRSG ARMPA (as published) | Potential for Change in 2023 Plan |
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| MD VEG 19: Conduct jackpot burning of cut juniper when soils are frozen or snow-covered and moisture content of felled trees is low enough to promote complete or near complete consumption of branches. Leaving the bole portion is acceptable. | No changes made. | No change proposed. |
| Integrated Invasive Species: | — | — |
| MD VEG 20: In priority treatment areas for invasive annual grasses, apply early detection-rapid response principles on*:<br>• New infestations.<br>• Satellite populations.<br>• Isolated populations.<br>• Where invasive annual grasses are still sub-dominant.<br>• Edges of large infestations<br>• Where sites are frequently or commonly used for temporary infrastructure such as incident base camps, spike camps, staging areas, and helicopter landing areas.<br>*Not in priority order. Incorporate these priorities in the assessments conducted using the process detailed in Appendix H (FIAT process). | No changes made. | No change proposed. |
| MD VEG 21: Allowable methods of invasive plant control include mechanical, chemical, biological (including targeted grazing, biocides, and bio-controls), or prescribed fire or combinations of these methods. Treat areas that contain cheatgrass and other invasive or noxious species to minimize competition and favor establishment of desired species. | No changes made. | No change proposed. |
| MD VEG 22: Use of approved herbicides, biocides, and bio-controls is allowed on all land allocations currently providing or reasonably expected to provide Greater Sage-grouse habitat. Follow the guidance in the 2010 Record of Decision for Vegetation Treatments Using Herbicides on BLM Lands in Oregon and subsequent step-down decision records, when complete, or successor/subsequent decisions governing the use of additional herbicides and biocides. | No changes made. | No change proposed. |

| Oregon 2015 GRSG ARMPA (as published text) | Oregon 2019 GRSG ARMPA (as published) | Potential for Change in 2023 Plan |
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| MD VEG 23: On Type I through Type III wildfires provide and require the use of weed washing stations and acceptable disposal of subsequent waste water and material to minimize the risk of further spread. Wash all vehicles and equipment arriving from outside the local area before initial use in the fire area and during post-fire emergency stabilization and rehabilitation operations. Wash all vehicles and equipment prior to release from the incident to reduce the probability of transporting invasive plant materials to other locations. | No changes made. | No change proposed. |
| MD VEG 24: Wash vehicles and equipment used in field operations prior to use in areas without known infestations of invasive plants. Wash vehicles and equipment used in areas with known infestations prior to use in another area to limit the further spread of invasive species to other locations. | No changes made. | No change proposed. |
| MD VEG 25: Locate base camps, spike camps, coyote camps, or other temporary infrastructure in areas that lack invasive plant populations. Where no such options are available provide for post-operation invasive plant treatments. | No changes made. | No change proposed. |
| **Fire and Fuels Management (FIRE)** | **Fire and Fuels Management (FIRE)** | — |
| **Objective** | **Objective** | — |
| Objective FIRE 1: Manage wildland fire and hazardous fuels to protect, enhance, and restore Greater Sage-grouse habitat. | No changes made. | No change proposed. |
| Objective FIRE 2: Use a combination of vegetation management and wildfire response to minimize the probability of a wildfire tripping an adaptive management trigger for habitat within an Oregon PAC. (See Appendix J for adaptive management triggers). | No changes made. | No change proposed. |
| Objective FIRE 3: Within 4.0 miles of occupied or pending leks, maintain or develop a mosaic of structure and species of sagebrush consistent with site potential and vegetation management objectives. See Vegetation Objectives section for desired outcomes and conditions. | No changes made. | No change proposed. |

| Oregon 2015 GRSG ARMPA (as published text) | Oregon 2019 GRSG ARMPA (as published) | Potential for Change in 2023 Plan |
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| **Management Direction** | **Management Direction** | — |
| MD FIRE 1: Complete an interagency landscape-scale assessment (Appendix H) to prioritize at-risk habitats and identify fuels management, preparedness, suppression, and restoration priorities based on the quality of habitat at risk as directed in the Secretarial Order for Rangeland Fire SO3336. Update these assessments as necessary or when major disturbances occur. Within Greater Sage-grouse habitat, prioritize suppression and fuels management activities based on an assessment of the quality of habitat at risk. | No changes made. | No change proposed. |
| MD FIRE 2: The protection of human life is the single, overriding priority. Setting priorities among protecting human communities and community infrastructure, other property and improvements, and natural and cultural resources will be done based on the values to be protected, human health and safety, and the costs of protection. Prioritize Greater Sage-grouse habitat commensurate with property values and other habitat to be protected, with the goal to restore, enhance, and maintain these areas. | No changes made. | No change proposed. |
| MD FIRE 3: Within PHMA and GHMA, prioritize fire management activities in order to protect and restore Greater Sage-grouse habitat and reduce the impacts of large wildfires as follows:<br>1. Habitat within 4.0 miles of an occupied or pending lek.<br>2. Greater Sage-grouse winter range. | No changes made. | No change proposed. |
| MD FIRE 4: Incorporate locations of priority Greater Sage-grouse protection areas into the dispatch system. Provide local Greater Sage-grouse habitat maps to dispatch offices and initial attack Incident Commanders for use in prioritizing wildfire suppression resources and designing suppression tactics. | No changes made. | No change proposed. |
| MD FIRE 5: During fire management operations, retain unburned areas of sagebrush, including interior islands and patches between roads and the fire perimeter unless there is a compelling safety, resource protection, or wildfire management objective at risk. | No changes made. | No change proposed. |

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| MD FIRE 6: Follow established direction in the current Interagency Standards for Fire Operations (Red Book) with respect to use of resource advisors, annual review of fire management plans for updates relevant to Greater Sage-grouse habitat, and contents of the Delegation of Authority letters. | No changes made. | No change proposed. |
| MD FIRE 7: Allow retardant and other fire suppressant chemicals use on all land allocations except where expressly prohibited by land allocation direction. Use of retardant and other fire suppressant chemicals can be specifically allowed by the authorized official when prohibited by land allocation direction. Allow retardant use on all land allocations regardless of management direction when there is imminent threat to human life. | No changes made. | No change proposed. |
| MD FIRE 8: Allow mechanical fire line except:<br>• Where prohibited by other resource direction (e.g., wilderness, soils, hydrology, and riparian management)<br>• Where inconsistent with direction for specific land allocations<br><br>The authorized official may approve exceptions. | No changes made. | No change proposed. |
| MD FIRE 9: Allow use of naturally ignited wildfires to meet resource management objectives to improve Greater Sage-grouse habitat such as reducing juniper encroachment and creating mosaics of sagebrush classes. When natural ignitions occur, utilize an interdisciplinary process (including a wildlife biologist familiar with GRSG habitat requirements) to determine if the fire could be managed to meet GRSG and vegetation objectives. | No changes made. | No change proposed. |
| MD FIRE 10: Locate base camps, spike camps, drop points, staging areas, helicopter landing areas, and other temporary wildfire infrastructure in areas where physical disturbance to Greater Sage-grouse habitat can be minimized, to the extent feasible. | No changes made. | No change proposed. |
| MD FIRE 11: Develop a system of fuel breaks to protect larger intact blocks of Greater Sage-grouse habitat. Locate these fuel breaks along existing roads and ROWs, where possible. | No changes made. | No change proposed. |

| Oregon 2015 GRSG ARMPA (as published text) | Oregon 2019 GRSG ARMPA (as published) | Potential for Change in 2023 Plan |
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| MD FIRE 12: In Greater Sage-grouse habitat, reduce hazardous fuels created by other management actions, such as establishment of new roads, trails, or ROWs within 3 years of project completion. The reduction should be sufficient to limit fire spread or undesirable fire behavior or fire effects in sagebrush ecosystems. | No changes made. | No change proposed. |
| MD FIRE 13: Use interagency- coordinated fire restrictions and public service announcements to reduce the number of human starts in or near Greater Sage-grouse habitat during periods of elevated fire danger. | No changes made. | No change proposed. |
| MD FIRE 14: Develop annual treatment and fire management programs in coordination with interagency partners and across jurisdictional boundaries based on priorities identified in the local District Landscape Wildfire and Invasive Species Assessment. | No changes made. | No change proposed. |
| MD FIRE 15: Complete an annual review of landscape assessment implementation efforts with interagency partners. | No changes made. | No change proposed. |
| MD FIRE 16: Implement appropriate fire operations and fuels management RDFs identified in Appendix C. | No changes made. | No change proposed. |
| MD FIRE 17: Include information on the resource value of Greater Sage-grouse habitat in existing prevention plans. | No changes made. | No change proposed. |

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| MD FIRE 18: If prescribed fire is used in Greater Sage-grouse habitat, the NEPA analysis for the Burn Plan will address:<br>• why alternative techniques were not selected as a viable options;<br>• how Greater Sage-grouse goals and objectives would be met by its use;<br>• how the COT Report objectives would be addressed and met;<br>• a risk assessment to address how potential threats to Greater Sage-grouse habitat would be minimized.<br><br>Prescribed fire as a vegetation or fuels treatment shall only be considered after the NEPA analysis for the Burn Plan has addressed the four bullets outlined above. Prescribed fire could be used to meet specific fuels objectives that would protect Greater Sage-grouse habitat in PHMA (e.g., creation of fuel breaks that would disrupt the fuel continuity across the landscape in stands where annual invasive grasses are a minor component in the understory, burning slash piles from conifer reduction treatments, used as a component with other treatment methods to combat annual grasses and restore native plant communities).<br><br>Prescribed fire in known winter range shall only be considered after the NEPA analysis for the Burn Plan has addressed the four bullets outlined above. Any prescribed fire in winter habitat would need to be designed to strategically reduce wildfire risk around and/or in the winter range and designed to protect winter range habitat quality. | No changes made. | No change proposed. |
| **Livestock Grazing/Range Management (LG)** | **Livestock Grazing/Range Management (LG)** | — |
| **Objective** | **Objective** | — |
| Objective LG 1: Manage livestock grazing to maintain or improve Greater Sage-grouse habitat by achieving Standards for Rangeland Health (SRH). | No changes made. | Potential change under Alternative 3. |
| Objective LG 2: On BLM-managed lands, 12,083,622 acres will continue to be available for livestock grazing in Greater Sage-grouse habitat. In key RNAs, 22,765 acres will be unavailable to livestock grazing. See Table 2-6, Key ACECs and RNAs for ARMPA. | Objective LG2: On BLM-managed lands, 12,105,581 acres will continue to be available for livestock grazing in Greater Sage-Grouse habitat. Table 2-6 is no longer applicable and is therefore deleted. | Potential change under Alternatives 3 and 6. |

| Oregon 2015 GRSG ARMPA (as published text) | Oregon 2019 GRSG ARMPA (as published) | Potential for Change in 2023 Plan |
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| Table 2-6 Key ACECs and RNAs (text included in table 2-5 after this comparison table) | Table 2-6 is no longer applicable and is therefore deleted. | Potential change under Alternatives 3 and 6. |
| Objective LG 3: Complete rangeland health assessments for grazing permits/leases that have not been renewed and prioritized by Allotment Categories I, M, and C. The priority order for completing rangeland health assessments in Greater Sage-grouse habitat is:<br>1. Allotments containing SFA that have never been evaluated.<br>2. Allotments containing SFA that have not been re-evaluated in 10 or more years.<br>3. Allotments containing PHMA that have never been evaluated.<br>4. Allotments containing PHMA that have not been re-evaluated in 10 or more years.<br>5. Allotments containing GHMA that have never been evaluated.<br>6. Allotments containing GHMA that have not been re-evaluated in 10 or more years. | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |
| **Management Direction** | **Management Direction** | — |
| MD LG 1: All or portions of key RNAs will be unavailable to grazing (Table 2-6). Determine whether to remove fences, corrals, or water storage facilities (e.g. reservoirs, catchments, ponds). | MD LG 1 is deleted.<br><br>Livestock grazing management in the 13 key RNAs returns to being governed by applicable district RMPs as amended by the 2015 Oregon Greater Sage-Grouse ROD/ARMPA goals, objectives, and management decisions. | Potential change under Alternatives 3 and 6. |

| Oregon 2015 GRSG ARMPA (as published text) | Oregon 2019 GRSG ARMPA (as published) | Potential for Change in 2023 Plan |
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| MD LG 2: When livestock management practices are determined to not be compatible with meeting or making progress towards achievable habitat objectives following appropriate consultation, cooperating and coordination, implement changes in grazing management through grazing authorization modifications, or allotment management plan implementation. Potential modifications include, but are not limited to, changes in:<br>1. Season or timing of use;<br>2. Numbers of livestock;<br>3. Distribution of livestock use;<br>4. Duration and/or level of use;<br>5. Locations of bed grounds, sheep camps, trail routes, and the like;<br>6. Extended rest or temporary closure from grazing through BLM administrative actions;<br>7. Make allotment unavailable to grazing;<br>8. Kind of livestock (e.g., cattle, sheep, horses, or goats) (Briske et al. 2011); and<br>9. Grazing schedules (including rest or deferment).<br>*Not in Priority Order<br>When SRH are being met no changes in current management or activity plans or permits/leases are required, but could occur to meet other resource management objectives. | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |
| MD LG 3: The timing and location of livestock turnout and trailing shall not contribute to livestock congregation on occupied or pending leks during the Greater Sage-grouse breeding season of March 1 through June 30. | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |

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| MD LG 4: When fine and site-scale Greater Sage-grouse habitat assessment and monitoring is needed or required, (e.g., as a component of a rangeland health assessment), measure the Greater Sage-grouse habitat suitability indicators for seasonal habitats identified in Table 2-2. Site suitability values may be adjusted regionally where there is scientific justification for doing so. When using the indicators to guide management actions or during land health assessments, consider that the indicators are sensitive to the ecological processes operating at the scale of interest and that a single habitat indicator does not necessarily define habitat suitability for an area or particular scale. | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |
| MD LG 5: During drought conditions use a recognized drought indicator, such as the Drought Monitor or Palmer Drought Severity Index, to determine when abnormally dry or drought conditions are developing, present, or easing. When such conditions are developing or present:<br>1. Conduct pre-season assessments prior to livestock turn out.<br>2. Monitor vegetation conditions during authorized livestock use periods to determine need for early removal or other changes to meet seasonal PHMA and GHMA objectives.<br><br>If livestock grazing is deferred due to drought, reevaluate vegetation and Greater Sage-grouse habitat indicators that measure Greater Sage-grouse habitat prior to reauthorization of grazing. | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |
| MD LG 6: Authorize new, relocate, or modify existing range improvements that use seeps or springs as a water source to enhance their year round functionality. Install or retrofit wildlife escape ramps in all livestock water troughs or water storage facilities (e.g., catchments, storage tanks).<br><br>Maintain, enhance, or reestablish riparian areas in PHMA and GHMA | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |

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| MD LG 7: Identify playas, wetlands, and springs that have been modified for livestock watering within PHMA and GHMA. Identify those water improvements that have Greater Sage-grouse population limiting implications, and develop projects for rehabilitation. Further actions should be instigated for development of water off site; new water should be available before existing water is eliminated. | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |
| MD LG 8: Design new and maintain existing water projects to avoid standing pools of shallow water that would spread West Nile Virus. | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |
| MD LG 9: Remove, modify, or mark fences identified as high risk for collisions, generally within 1.2 miles of occupied or pending leks. | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |
| MD LG 10: Avoid construction of livestock facilities and supplemental feeding of livestock within 1.2 mile of occupied or pending leks in Greater Sage-grouse habitat unless it is part of an approved habitat improvement project or approved by the authorized officer to improve ecological health or to create mosaics in dense sagebrush stands that are needed for optimum Greater Sage-grouse habitat. Supplemental feeding in Greater Sage-grouse habitat must be part of an approved habitat improvement plan or approved by the authorized officer. | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |
| MD LG 11: Sagebrush Focal Areas will be prioritized for management and conservation actions, including, but not limited to review of livestock grazing permits/leases. | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |
| MD LG 12: The BLM will prioritize (1) the review of grazing permits/leases, in particular to determine if modification is necessary prior to renewal, and (2) the processing of grazing permits/leases in Sagebrush Focal Areas (SFA) followed by PHMA outside of the SFA. In setting workload priorities, precedence will be given to existing permits/leases in these areas not meeting Land Health Standards, with focus on those containing riparian areas, including wet meadows. The BLM may use other criteria for prioritization to respond to urgent natural resource concerns (e.g. fire) and legal obligations. | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |

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| MD LG 13: The NEPA analysis for renewals and modifications of livestock grazing permits/leases that include lands within SFA and PHMA will include specific management thresholds based on GRSG Habitat Objectives Table 2-2, Land Health Standards (43 CFR, Part 4180.2) and ecological site potential, and one or more defined responses that will allow the authorizing officer to make adjustments to livestock grazing that have already been subjected to NEPA analysis. | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |
| MD LG 14: Allotments within SFA, followed by those within PHMA, and focusing on those containing riparian areas, including wet meadows, will be prioritized for field checks to help ensure compliance with the terms and conditions of the grazing permits. Field checks could include monitoring for actual use, utilization, and use supervision. | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |
| MD LG 15: At the time a permittee or lessee voluntarily relinquishes a permit or lease, the BLM will consider whether the public lands where that permitted use was authorized should remain available for livestock grazing or be used for other resource management objectives, such as reserve common allotments. This does not apply to or impact grazing preference transfers, which are addressed in 43 CFR, Part 4110.2-3. | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |
| **Wild Horses and Burros (WHB)** | **Wild Horses and Burros (WHB)** | — |
| **Objective** | **Objective** | — |
| Objective WHB 1: Manage wild horses and burros as components of BLM-administered lands in a manner that preserves and maintains a thriving natural ecological balance in a multiple use relationship. | No changes made. | Potential change under Alternative 3. |
| Objective WHB 2: Manage wild horse and burro population levels within established appropriate management levels (AML). | No changes made. | Potential change under Alternative 3. |
| Objective 3: Complete assessments of Greater Sage-grouse habitat indicators for HMAs containing PHMA and GHMA. The priorities for conducting evaluations are:1. HMAs containing SFA.2. HMAs containing PHMA. 3. HMAs containing GHMA. 4. HMAs without GRSG Habitat. | No changes made. | Potential change under Alternative 3. |

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| **Management Direction** | **Management Direction** | — |
| MD WHB 1: Manage herd management areas (HMAs) in GRSG habitat within established AML ranges to achieve and maintain GRSG habitat objectives (Table 2-2). | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |
| MD WHB 2: Complete rangeland health assessments for HMAs containing GRSG habitat using an interdisciplinary team of specialists (e.g. range, wildlife, and riparian). The priorities for conducting assessments are:<br>1. HMAs containing SFA;<br>2. HMAs containing PHMA;<br>3. HMAs containing only GHMA;<br>4. HMAs containing sagebrush habitat outside of PHMA and GHMA mapped habitat;<br>5. HMAs without GRSG habitat. | No changes made. | Potential change under Alternative 3. |
| MD WHB 3: Prioritize gathers and population growth suppression techniques in HMAs in GRSG habitat, unless removals are necessary in other areas to address higher priority environmental issues, including herd health impacts. Place higher priority on Herd Areas not allocated as Herd Management Areas and occupied by wild horses and burros in SFA followed by PHMA. | No changes made. | Potential change under Alternative 3. |
| MD WHB 4: In SFA and PHMA outside of SFA, assess and adjust AMLs through the NEPA process within HMAs when wild horses or burros are identified as a significant causal factor in not meeting land health standards, even if current AML is not being exceeded. | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |
| MD WHB 5: In SFA and PHMA outside of SFA, monitor the effects of WHB use in relation to GRSG seasonal habitat objectives on an annual basis to help determine future management actions. | No changes made. | Potential change under Alternative 3. |
| MD WHB 6: Develop or amend herd management area plans (HMAPs) to incorporate GRSG habitat objectives and management considerations for all HMAs within GRSG habitat, with emphasis placed on SFA and other PHMA. | No changes made. | Potential change under Alternative 3. |

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| MD WHB 7: Consider removals or exclusion of WHB during or immediately following emergency situations (such as fire, floods, and drought) to facilitate meeting GRSG habitat objectives where HMAs overlap with GRSG habitat. | No changes made. | Potential change under Alternative 3. |
| MD WHB 8: When conducting NEPA analysis for wild horse/burro management activities, water developments, or other rangeland improvements for wild horses, address the direct and indirect effects on GRSG populations and habitat. Implement any water developments or rangeland improvements using the criteria identified for domestic livestock. | No changes made. | Potential change under Alternative 3. |
| MD WHB 9: Coordinate with professionals from other federal and state agencies, researchers at universities, and others to utilize and evaluate new management tools (e.g., population growth suppression, inventory techniques, and telemetry) for implementing the WHB program. | No changes made. | Potential change under Alternative 3. |
| MD WHB 10: When WHB are a factor in not meeting Greater Sage-grouse habitat objectives or influence declining Greater Sage-grouse populations in PHMA, Oregon's gather priority for consideration by the Washington Office is as follows:<br>1. Response to an emergency. (e.g., fire, insect infestation, disease or other events of unanticipated nature).<br>2. Greater Sage-grouse habitat.<br>3. Maintain a thriving natural ecological balance. | No changes made. | Potential change under Alternative 3. |
| MD WHB 11: In PHMA, design any new and modify existing structural WHB improvements to conserve, enhance, or restore Greater Sage-grouse habitat. | No changes made. | Potential change under Alternative 3. |

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| **Mineral Resources (MR)** | — | — |
| **Objective** | — | — |
| Leasable Minerals | — | — |
| Objective MR 1: Priority will be given to leasing and development of fluid mineral resources, including geothermal, outside of PHMA and GHMA. When analyzing leasing and authorizing development of fluid mineral resources, including geothermal, in PHMA and GHMA, and subject to applicable stipulations for the conservation of Greater Sage-grouse, priority will be given to development in non-habitat areas first and then in the least suitable habitat for Greater Sage-grouse. The implementation of these priorities will be subject to valid existing rights and any applicable law or regulation, including, but not limited to, 30 USC 226(p) and 43 CFR 3162.3-1(h). | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |
| Objective MR 2: Where a proposed fluid mineral development project on an existing lease could adversely affect GRSG populations or habitat, the BLM will work with the lessees, operators, or other project proponents to avoid, minimize, and provide compensatory mitigation to reduce adverse impacts on GRSG to the extent compatible with lessees' rights to drill and produce fluid mineral resources. The BLM will work with the lessee, operator, or project proponent in developing an Application for Permit to Drill (APD) or Geothermal Drilling Permit (GDP) on the lease to avoid and minimize impacts on GRSG or its habitat and will ensure that the best information about the GRSG and its habitat informs and helps to guide development of such Federal leases. | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |

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| **Management Direction** | **Management Direction** | — |
| Unleased Fluid Minerals: | — | — |
| MD MR 1: Stipulate all leases within PHMA as NSO. No waivers or modifications to a fluid mineral lease no-surface-occupancy stipulation will be granted. The authorized officer may grant an exception to a fluid mineral lease no-surface-occupancy stipulation only where the proposed action:<br><br>i. Would not have direct, indirect, or cumulative effects on Greater Sage-grouse or its habitat; or<br><br>ii. Is proposed to be undertaken as an alternative to a similar action occurring on a nearby parcel, and would provide a clear conservation gain to GRSG.<br><br>Exceptions based on conservation gain (ii) may only be considered in (a) PHMA of mixed ownership where federal minerals underlie less than fifty percent of the total surface, or (b) areas of the public lands where the proposed exception is an alternative to an action occurring on a nearby parcel subject to a valid Federal fluid mineral lease existing as of the date of this RMP amendment. Exceptions based on conservation gain must also include measures, such as enforceable institutional controls and buffers, sufficient to allow the BLM to conclude that such benefits will endure for the duration of the proposed action's impacts.<br><br>Any exceptions to this lease stipulation may be approved by the Authorized Officer only with the concurrence of the State Director. The Authorized Officer may not grant an exception unless the applicable state wildlife agency, the USFWS, and the BLM unanimously find that the proposed action satisfies (i) or (ii). Such finding shall initially be made by a team of one field biologist or other GRSG expert from each respective agency. In the event the initial finding is not unanimous, the finding may be elevated to the appropriate BLM State Director, USFWS State Ecological Services Director, and state wildlife agency head for final resolution. In the event their finding is not unanimous, the exception will not be granted. Approved exceptions will be made publicly available at least quarterly. | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |

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| MD MR 2: Stipulate all leases within Sagebrush Focal Areas as NSO, without waiver, exception, or modification. | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |
| MD MR 3: GHMA is considered open for unleased fluid minerals with moderate constraints, including CSU and TL. Areas within 1.0 mile of an occupied or pending lek within GHMA will be open to leasing fluid minerals subject to NSO stipulations. Apply Fluid Mineral Stipulations, identified in Appendix G. | No changes made. | Potential change under Alternative 3. |
| MD MR 4: Allow geophysical exploration within PHMA and GHMA subject to seasonal restrictions, see Appendix G. | No changes made. | Potential change under Alternative 3. |
| Leased Fluid Minerals: | — | — |
| MD MR 5: In PHMA, apply the conservation measures through RMP implementation decisions (e.g., approval of a Geothermal Drilling Permit (GDP)) and upon completion of the environmental record of review (43 CFR, Part 3162.5), including appropriate documentation of compliance with NEPA. In this process evaluate, among other things:<br>1. Whether the conservation measure is "reasonable" (43 CFR, Part 3101.1-2) with the valid existing rights.<br>2. Whether the action is in conformance with the approved RMP.<br><br>Additionally, apply the 3 percent disturbance cap for development within Oregon PACs and PHMA (see Appendix E).<br><br>Issue written orders of the authorized office requiring reasonable protective measures consistent with the lease terms where necessary to avoid or minimize impacts on Greater Sage-grouse populations and its habitat in accordance with the project habitat mitigation plan. | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |
| MD MR 6: Implement RDFs in PHMA and GHMA as detailed in Appendix C, as allowed by law for existing leases. | No changes made. | No change proposed. |
| MD MR 7: Complete Master Leasing Plans in lieu of APD/GDP by APD/GDP or Operations/Utilization plans for fluid mineral lease development processing within PHMA. | No changes made. | No change proposed. |

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| MD MR 8: Within an Oregon PAC, when permitting APDs or GDPs on existing leases that are not yet developed, the proposed anthropogenic disturbance must be under the 3 percent cap for that area, to the extent allowed by law. | No changes made. | No change proposed. |
| MD MR 9: Require unitization when the BLM determines it is necessary for proper development and operation of an area according to the Federal Lease Form, 3100-11 Sections 4 and 6. Where 10 percent or less of the land is federal, encourage rather than require unitization to minimize adverse impacts on Greater sage-grouse. | No changes made. | No change proposed. |
| MD MR 10: Identify areas where land acquisitions including mineral rights or conservation easements would benefit Greater Sage-grouse habitat. Proceed with acquisition process where appropriate. | No changes made. | No change proposed. |
| Locatable Minerals: | — | — |
| MD MR 11: To the extent consistent with the rights of a mining claimant under existing laws and regulations, limit surface disturbance, and provide recommendations for net conservation gain of Greater Sage-grouse habitat. | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |
| MD MR 12: If a 3809 Plan of Operation is filed on mining claims in PHMA or GHMA, identify and evaluate mitigation measures to avoid or minimize adverse effects on PHMA and GHMA, through the Plan of Operation NEPA process, as appropriate and to the extent allowable by law. For notice and casual use levels of activity, apply RDFs (to the extent consistent with applicable law) in Appendix C. | No changes made. | Potential change under Alternative 3. |
| MD MR 13: ~~Sagebrush Focal Areas are recommended for withdrawal from the General Mining Law of 1872, as amended, subject to valid existing rights.~~<br><br>Per Oregon maintenance action 3 of May 2018:<br><br>The recommendation for withdrawal of Sagebrush Focal Areas was analyzed and removed. It was determined through an assessment process that the BLM proposal to withdraw 10 million acres was unreasonable in light of data that showed that current and 20 years of anticipated mining would affect less than 0. I percent of occupied sage-grouse range." | No changes made. | Potential change under Alternative 3. |

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| Salable Minerals: | — | — |
| MD MR 14: PHMA are closed to new mineral material sales. However, these areas remain "open" to free use permits and the expansion of existing active pits, only if the following criteria are met:<br>• The activity is within the Oregon PAC (also called BSU, and is the same footprint as PHMA) and project area disturbance cap.<br>• The activity is subject to the provisions set forth in the mitigation framework in Appendix F.<br>• All applicable required design features are applied and the activity is permissible under screening criteria (see SSS 13).<br><br>Federal Highway Act material sites are a ROW and not subject to mineral sale requirements. See ROW section for management (MD LR 7). | No changes made. | Potential change under Alternatives 3 and 6. |
| MD MR 15: GHMA remains open subject to stipulations that will protect Greater Sage-grouse and its habitat; see RDFs and BMPs in Appendix C. | No changes made. | Potential change under Alternatives 3 and 6. |
| Nonenergy Leasable Minerals: | — | — |
| MD MR 16: Close PHMA to new leases and permits. Consider expansion of existing operations if the disturbance is within the cap and subject to compensatory mitigation. | No changes made. | Potential change under Alternatives 3 and 6. |
| MD MR 17: GHMA remains open to new leases subject to stipulations that would protect Greater Sage-grouse and its habitat; see RDFs and BMPs in Appendix C. | No changes made. | Potential change under Alternatives 3 and 6. |
| Mineral Split Estate: | — | — |
| MD MR 18: Where the federal government owns the mineral estate in PHMA and GHMA, and the surface is in non-federal ownership, apply the same stipulations, COAs, and/or conservation measures and RDFs as applied if the mineral estate is developed on BLM-administered lands in that management area, to the maximum extent permissible under existing authorities, and in coordination with the landowner. | No changes made. | No change proposed. |

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| MD MR 19: Where the federal government owns the surface and the mineral estate is in non-federal ownership in PHMA and GHMA, apply appropriate surface use COAs, stipulations, and mineral RDFs through ROW grants or other surface management instruments, to the maximum extent permissible under existing authorities, in coordination with the mineral estate owner/lessee. | No changes made. | No change proposed. |
| **Renewable Energy (Wind and Solar) (RE)** | **Renewable Energy (Wind and Solar) (RE)** | — |
| **Management Direction** | **Management Direction** | — |
| MD RE 1: Designate PHMA as an exclusion area for new utility/commercial scale development of wind or solar ROWs, except in Lake, Harney, and Malheur Counties. | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |
| MD RE 2: Designate PHMA outside of sagebrush focal areas (SFA) in Lake, Harney, and Malheur Counties as an avoidance area for new utility/commercial scale wind or solar ROWs. In Harney, Lake and Malheur counties, priority would be placed on locating commercial scale wind and solar energy development in non-habitat areas first (i.e., outside of PHMA and GHMA) before approving development in PHMA. Where an Oregon PAC (PHMA) occurs in more than one county, the allocation for each Oregon PAC is determined by the county in which it occurs. For example, the Cow Valley PAC is located in Malheur and Baker Counties; the Baker County portion would be exclusion, and the Malheur portion would be avoidance. | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |
| MD RE 3: Designate Sagebrush Focal Areas as exclusion areas for new utility/commercial scale wind or solar ROWs development. | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |

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| MD RE 4: Designate GHMA as an avoidance area for new utility/commercial scale wind or solar rights-of-way. If new utility/commercial scale wind or solar development in GHMA is unavoidable apply the following measures:<br>1. If possible, construct meteorological towers without guy wires.<br>2. If guy wires are necessary, mark with anti-strike devices.<br>3. Analyze potential alternative site locations with known wind or solar potential outside of Greater Sage-grouse habitat in NEPA documents for ROW applications. | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |
| **Lands and Realty (LR)** | **Lands and Realty (LR)** | — |
| **Objective** | **Objective** | — |
| Objective LR 1: Effects of infrastructure projects, including siting, will be minimized using the best available science, updated as monitoring information on current infrastructure projects becomes available. | No changes made. | No change proposed. |
| **Management Direction** | **Management Direction** | — |
| Utility Corridors and Communications Sites: | — | — |
| MD LR 1: All Lands and Realty actions shall comport with SSS 13 disturbance screening criteria. | No changes made. | No change proposed. |
| MD LR 2: Designated existing utility corridors will remain open in PHMA and GHMA to utility rights-of-way. | No changes made. | No change proposed. |

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| MD LR 3: Designate other ROWs (including permits and leases) in PHMA as avoidance areas:<br><br>Road ROWs:<br>• New road ROWs will be authorized only when necessary for public safety, administrative access, or subject to valid existing rights. If the new ROW is necessary for public safety, administrative access, or subject to valid existing rights and creates new surface disturbance, mitigate the impacts on protect the Greater Sage-grouse or their habitat. New road ROWs will be allowed if the ROW applicant is pursuing a Title V FLPMA ROW grant and will create no new surface disturbance.<br>• Only allow use of existing roads, or realignment of existing roads, when renewing or amending existing authorizations.<br>• Co-locate new ROWs as close as technically possible to existing ROWs or where the ROW best minimize Greater Sage-grouse impacts. Use existing roads, or realignments, to access valid existing rights that are not yet developed. If valid existing rights cannot be accessed via existing roads, then construct any new road to the minimum standard necessary.<br>• Existing Federal Highway Act (FHWA) appropriation ROWs are valid existing rights and new FHWA ROWs will continue to be considered subject to all disturbance screening criteria. See disturbance screening criteria in SSS 13.<br><br>New proposals for power lines, access roads, pump storage, and other hydroelectric facilities licensed by FERC will be subject to all Greater Sage-grouse ROW screening criteria.<br><br>Communication Sites:<br><br>Locate new communication towers within an existing communication site where technically feasible. If not feasible, new sites will be considered where necessary for public safety but shall adhere to the ROW disturbance screening criteria as listed in SSS 13. | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |

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| MD LR 4: Renewing, Amending or Terminating ROW Grants in PHMA and GHMA:<br>• Conduct rehabilitation when FLPMA ROW grant expires, is relinquished, or terminated, rehabilitation is required in compliance with 43 CFR, Part 2805.12(i).<br>• Remove overhead lines and other infrastructure to eliminate existing avian predator nesting opportunities (e.g. remove power line and communication facilities no longer in service) when a ROW grant expires or is relinquished or terminated.<br>• Add additional stipulations, if necessary, when renewal or amendment of existing ROW grants.<br><br>Mitigate impacts on GRSG or their habitats during amendment of an existing ROW grant. Mitigation could include the disturbance screening criteria. | No changes made. | No change proposed. |
| MD LR 5: Designated ROW Corridors in PHMA and GHMA:<br>• Manage existing designated ROW corridors as open.<br>• Allow placement of new ROWs in existing designated corridors. Construct new ROWs as close as technically feasible to existing linear ROW infrastructure to limit disturbance to the smallest footprint.<br>• Within existing designated utility corridors, the 3% disturbance cap may be exceeded at the project scale if the site specific NEPA analysis indicates that a net conservation gain to the species will be achieved. This exception is limited to projects which fulfill the use for which the corridors were designated (ex., transmission lines, pipelines) and the designated width of a corridor will not be exceeded as a result of any project co-location. | No changes made. | No change proposed. |
| MD LR 10: Consider the likelihood of development of not-yet-constructed surface-disturbing activities – as defined in Table 2 of the Monitoring Framework (Appendix D) − under valid existing rights prior to authorizing new projects in PHMA. | No changes made. | No change proposed. |

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| Land Use Authorizations: | — | — |
| MD LR 6: Priority Habitat Management Areas (PHMA) and General Habitat Management Areas (GHMA) are designated as avoidance areas for high voltage (100kV or greater) transmission lines and major pipelines (24" or greater in diameter) ROWs (including permits and leases). All authorizations in these areas, other than the following identified projects, shall comply with the conservation measures outlined in this Approved Plan, including the RDFs (Appendix C) and screening criteria (see SSS 13) of this document. The BLM is currently processing an application for Boardman to Hemingway Transmission Line Project and the NEPA review for this project is well underway. Conservation measures for GRSG are being analyzed through the project's NEPA review process, which should achieve a net conservation benefit for the GRSG.<br><br>Place new high voltage transmission lines in designated utility corridors where technically feasible; where not technically feasible, locate lines adjacent to existing infrastructure.<br><br>If an existing transmission line is upgraded to a higher voltage the following is required:<br>• The existing transmission line shall be removed within a reasonable amount of time after the new line is installed and energized.<br>• The new line shall be constructed in the same alignment (ROW boundary) as the existing line unless an alternate route would benefit Greater Sage-grouse or its habitat.<br><br>Outside of designated corridors, bury new transmission lines where technically and financially feasible.<br>• Where burying transmission lines is not technically and financially feasible, locate new transmission lines adjacent to existing transmission lines, and would be subject to Greater Sage-grouse ROW screening criteria.<br>• Where determined to have a negative impact on Greater Sage-grouse or its | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |

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| habitat, remove existing guy wires or mark with bird flight diverters to make them more visible to Greater Sage-grouse in flight.<br><br>Outside of designated corridors, bury new pipelines where technically and financially feasible. Pipelines should be located adjacent to existing infrastructure. | | |
| MD LR 7: GHMA is open to other ROWs/Land Use Authorization/Permits but must adhere to screening criteria in SSS 13.<br>• Existing Federal Highway Act (FHWA) Appropriation ROWs are valid existing rights. New FHWA ROWs will be subject to all Greater Sage-grouse screening criteria.<br>• Construct new high-voltage transmission lines and new pipelines in GHMA as close as technically feasible to existing infrastructure (e.g. roads, distribution/transmission lines and pipelines) to limit disturbance to the smallest footprint. | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |
| Land Tenure: | — | — |
| MD LR 8: Designate PHMA and GHMA as Z-1 and retain public ownership. Lands classified as priority habitat and general habitat for Greater Sage-grouse will be retained in federal management. Exception: (1) the agency can demonstrate that disposal of the lands, including land exchanges, will provide a net conservation gain to the Greater Sage-grouse or (2) the agency can demonstrate that the disposal, including land exchanges, of the lands will have no direct or indirect adverse impact on conservation of the Greater Sage-grouse. | No changes made. | No change proposed. |
| Withdrawals: | — | — |
| Per Oregon maintenance action 3 in May of 2018 MD LR 9 from the 2015 plan was deleted.<br><br>(MD LR 9: Recommend SFAs for withdrawal from the General Mining Act of 1872, as amended; subject to valid existing rights.) | No changes made. | Potential change under Alternative 3. |

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| **Recreation and Visitor Services (REC)** | **Recreation and Visitor Services (REC)** | — |
| **Management Direction** | **Management Direction** | — |
| MD REC 1: Do not issue new non-motorized special recreation permits (SRPs) in PHMA or GHMA within 3.0 miles of occupied or pending leks from March 1 to June 30. Limited exceptions (e.g. river permits) are allowed and shall be based on site-specific rationale that biological impacts on Greater Sage-grouse are being avoided.<br><br>Evaluate and modify existing SRPs lacking Greater Sage-grouse stipulations in PHMA. | No changes made. | No change proposed. |
| MD REC 2: Do not issue motorized and/or race SRPs or competitive SRPs within 4.0 miles of occupied or pending leks during breeding season from March 1 to June 30. | No changes made. | No change proposed. |
| MD REC 3: Evaluate and modify, if necessary, recreation sites in PHMA and GHMA to reduce avian predator perch sites. | No changes made. | No change proposed. |
| MD REC 4: In PHMA, do not construct new recreation facilities (e.g., campgrounds, trails, trailheads, staging areas) unless the development will have a net conservation gain to GRSG habitat (such as concentrating recreation, diverting use away from important areas, etc.), or unless the development is required for visitor health and safety or resource protection. | No changes made. | No change proposed. |
| MD REC 5: Evaluate recreation SRMAs for consistency with the Adaptive Management Strategy (Appendix J).<br><br>For existing SRMAs, recreation facilities or sites in all PHMA and GHMA, apply one or more of the following to get a neutral or positive response from Greater Sage-grouse populations using the adaptive management actions. Potential actions include, but are not limited to:<br>• Seasonally close areas from March 1 to June 30 annually, and limit to existing roads, primitive roads, and trails, then designated routes upon completion of travel management plans.<br>• Re-locate SRMAs in whole or in part, through land use plan amendments, in order to reduce negative effects on GRSG. | No changes made. | No change proposed. |

| Oregon 2015 GRSG ARMPA (as published text) | Oregon 2019 GRSG ARMPA (as published) | Potential for Change in 2023 Plan |
|---|---|---|
| MD REC 6: Promote and encourage education and outreach regarding Greater Sage-grouse at kiosks and other public education sites. Promote, publish and engage public regarding the American Birding Association Principles of Birding Ethics. | No changes made. | No change proposed. |
| **Travel and Transportation (TTM)** | **Travel and Transportation (TTM)** | — |
| **Objective** | **Objective** | — |
| Objective TTM 1: Manage OHV/ORV designations (open, limited, and closed) to conserve Greater Sage-grouse habitat and populations by taking actions that create neutral or positive responses. | No changes made. | No change proposed. |
| Objective TTM 2: Reduce disturbance to Greater Sage-grouse by evaluating or modifying OHV/ORV designations and route selection in accordance with minimization criteria. | No changes made. | No change proposed. |
| **Management Direction** | **Management Direction** | — |
| MD TTM 1: Unless already designated limited or closed all PHMA and GHMA shall be designated as limited to existing roads, primitive roads, and trails, including existing SRMAs. Where areas are currently designated "closed" under existing applicable RMPs the closed designations shall be maintained.<br><br>Travel management planning will be deferred to future implementation/activity level planning or concurrent with future RMP planning.<br><br>In addition to the minimization criteria, districts will adopt the following Greater Sage-grouse specific planning elements only for BLM administered roads during implementation level planning.<br>• During travel management planning, avoid designating roads, primitive roads, and motorized trails within 1.0 mile of occupied or pending leks when road traffic volume is greater than 8 vehicle trips per 24 hour period in accordance with the ODFW mitigation framework.<br>• When existing high traffic roads and primitive roads are closer than 1.0 mile to an occupied or pending lek, and are the only access, consider a seasonal restriction from March 1 to June 30.<br>• When an existing road or primitive road is found to have an effect on Greater | No changes made. | No change proposed. |

| Oregon 2015 GRSG ARMPA (as published text) | Oregon 2019 GRSG ARMPA (as published) | Potential for Change in 2023 Plan |
|---|---|---|
| Sage-grouse population trends, work with the interdisciplinary team and ODFW to determine the best reroute or closure point for a section of an existing road.<br><br>In addition, implementation level travel planning efforts will be guided by the goals, objectives and guidelines outlined in the SSS section, relevant National and Oregon specific guidance, and the following:<br>• A timeline to complete travel planning efforts will be identified, prioritized and updated annually in all relevant planning areas to accelerate the accomplishment of: data collection, route evaluation and selection, and on the ground implementation efforts including signing, monitoring and rehabilitation.<br>• During subsequent travel management planning, consultation "with interested user groups, Federal, State, county and local agencies, local landowners, and other parties in a manner that provides an opportunity for the public to express itself and have its views given consideration." Consequently, a public outreach plan to fully engage all interested stakeholders will be incorporated into future travel management plans.<br>• Among other designation criteria from "areas and trails shall be located to minimize harassment of wildlife or significant disruption of wildlife habitats. Special attention would be given to protect endangered or threatened species and their habitats."<br>• During subsequent travel management planning, all routes will undergo a route evaluation to determine its purpose and need and the potential resource and/or user conflicts from motorized travel. Where resource and/or user conflicts outweigh the purpose and need for the route, the route will be considered for closure or considered for relocation outside of sensitive GRSG habitat.<br>• During subsequent travel planning, threats to GRSG and their habitat will be considered when evaluating route designations and/or closures. | *(See above.)* | *(See above.)* |

| Oregon 2015 GRSG ARMPA (as published text) | Oregon 2019 GRSG ARMPA (as published) | Potential for Change in 2023 Plan |
|---|---|---|
| • During subsequent travel management planning, routes that do not have a purpose or need would be considered for closure.<br>• During subsequent travel management planning, routes that are duplicative, parallel, or redundant will be considered for closure.<br>• During subsequent travel management planning, seasonal restrictions on OHV use will be considered in important seasonal habitats where OHV use is a threat. During subsequent travel management planning, consider limiting over snow vehicles (OSV) designed for use over snow and that runs on a track or tracks and/or a ski or skis, while in use over snow to designated routes or consider seasonal closures in GRSG wintering areas from November 1 through March 31.<br>• During subsequent travel management planning, routes not required for public access or recreation with a current administrative/agency purpose or need will be evaluated for administrative access only.<br>• During subsequent travel management planning, consider prioritizing restoration of routes not designated in a Travel Management Plan.<br>• During subsequent travel management plan implementation, consider using seed mixes or transplant techniques that will maintain or enhance GRSG habitat when rehabilitating linear disturbances.<br><br>During subsequent travel management plan implementation, consider scheduling road maintenance to avoid disturbance during sensitive periods and times to the extent practicable. Consider using time of day limits (exclude activities from 2 hours before sunset to 2 hours after sunrise) to reduce impacts on GRSG during breeding periods. | No changes made. | No change proposed. |

| Oregon 2015 GRSG ARMPA (as published text) | Oregon 2019 GRSG ARMPA (as published) | Potential for Change in 2023 Plan |
|---|---|---|
| MD TTM 2: ORV-OHV designations that are "closed" will be maintained as closed to motorized vehicles. OHV Areas designated as "limited to existing" within PHMA and GHMA will be managed as "limited to existing roads, primitive roads, and trails" until the completion of an implementation level travel planning (travel management planning).<br><br>Individual route designations will occur during subsequent implementation level travel management planning efforts. Upon the completion of implementation level travel management plans OHV areas designated as "Limited" will transition to "limited to designated roads, primitive roads and trails." | No changes made. | No change proposed. |
| MD TTM 3: Avoid upgrading existing roads or construction of new roads that are found to contribute to Greater Sage-grouse mortality or lek abandonment. | No changes made. | No change proposed. |
| MD TTM 4: In PHMA and GHMA complete transportation plans in accordance with National BLM Travel Management guidance, requiring the BLM to maintain a current action plan and planning schedule to most effectively target available resources. The following GRSG population areas are Oregon's top priority areas to designate comprehensive travel management plans:<br>1. In Oregon PACs with declining population trends.<br>2. In all other Oregon PACs.<br>3. In all GHMA.<br><br>In PHMA and GHMA, travel systems will be managed with an emphasis on improving the sustainability of the travel network in a comprehensive manner to minimize impacts on GRSG, maintain motorist safety, and prevent unauthorized cross country travel while meeting access needs. To do so, it may be necessary to improve portions of existing routes, close existing routes or create new routes that meet user group needs, thereby reducing the potential for pioneering unauthorized routes. The emphasis of the comprehensive travel and transportation planning will be placed on having a neutral or positive effect on GRSG habitat. | No changes made. | No change proposed. |

| Oregon 2015 GRSG ARMPA (as published text) | Oregon 2019 GRSG ARMPA (as published) | Potential for Change in 2023 Plan |
|---|---|---|
| MD TTM 5: Initiate travel management planning within 5 years of RMP revisions. | No changes made. | No change proposed. |
| MD TTM 6: In PHMA and GHMA, limit route construction or realignment of existing designated routes to result in net conservation gain for PHMA and GHMA. | No changes made. | No change proposed. |
| MD TTM 7: Eliminate parallel roads travelling to the same destination when the destination can be accessed from the same direction and topography in PHMA and GHMA. | No changes made. | No change proposed. |
| MD TTM 8: Within 4.0 miles of occupied or pending leks, do not allow any upgrading of primitive roads that would change the maintenance level except for public safety, administrative use, and valid existing rights. | No changes made. | No change proposed. |
| MD TTM 9: Use proactive methods when necessary to reclaim roads. See BMPs in Appendix C. | No changes made. | No change proposed. |

| Oregon 2015 GRSG ARMPA (as published text) | Oregon 2019 GRSG ARMPA (as published) | Potential for Change in 2023 Plan |
|---|---|---|
| MD TTM 10: In PHMA and GHMA, temporary closures will be considered in accordance with 43 CFR, Part 8364 (Closures and Restrictions); 43 CFR, Part 8351 (Designated National Area); 43 CFR, Part 6302 (Use of Wilderness Areas, Prohibited Acts, and Penalties); 43 CFR, Part 8341 (Conditions of Use).<br><br>Temporary closure or restriction orders under these authorities are enacted at the discretion of the authorized officer to resolve management conflicts and protect persons, property, and public lands and resources. Where an authorized officer determines that off-highway vehicles are causing or will cause considerable adverse effects upon soil, vegetation, wildlife, wildlife habitat, cultural resources, historical resources, threatened or endangered species, wilderness suitability, other authorized uses, or other resources, the affected areas shall be immediately closed to the type(s) of vehicle causing the adverse effect until the adverse effects are eliminated and measures implemented to prevent recurrence. (43 CFR, Part 8341.2) A closure or restriction order shall be considered only after other management strategies and alternatives have been explored. The duration of temporary closure or restriction orders shall be limited to 24 months or less; however, certain situations may require longer closures and/or iterative temporary closures. This may include closure of routes or areas. | No changes made. | No change proposed. |
| **Special Designations - Areas of Critical Environmental Concern (SD)** | **Special Designations - Areas of Critical Environmental Concern (SD)** | — |
| **Objective** | **Objective** | — |
| Objective SD 1: Provide for Conservation of Greater Sage-grouse within Key Existing Areas of Critical Environmental Concern (ACECs) (Table 2-6) and Research Natural Areas (RNAs). | No changes made. | Potential change under Alternatives 3 and 5. |
| Objective SD 2: Manage all ACECs and RNAs for the values for which they were designated, per district resource management plans, following existing management actions, and consistent with proposed actions for PHMA and GHMA. | No changes made. | Potential change under Alternatives 3 and 5. |

| Oregon 2015 GRSG ARMPA (as published text) | Oregon 2019 GRSG ARMPA (as published) | Potential for Change in 2023 Plan |
|---|---|---|
| Objective SD 3: Manage habitat maintenance and restoration, and conservation actions in key ACECs for Greater Sage-grouse consistent with the values the areas were designated. | No changes made. | Potential change under Alternatives 3 and 6. |
| Objective SD 4: Manage key RNAs, or large areas within the RNAs, as undisturbed baseline reference areas for the sagebrush plant communities they represent that are important for Greater Sage-grouse. Manage key RNAs for minimum human disturbance allowing natural succession to proceed. | Objective SD 4: Manage the Foster Flat and Guano Creek–Sink Lakes RNAs as undisturbed baseline reference areas for the sagebrush plant communities they represent that are important for Greater Sage Grouse. Minimize human disturbance in all 15 key RNAs, allowing natural ecological processes to proceed. | Potential change under Alternatives 3 and 6. |

**Table 2: Oregon Plan Maintenance Actions**

| Plan Maintenance – Not a Management Direction, Objective or Goal | Plan Maintenance – Not a Management Direction, Objective or Goal | Potential for Change in 2023 Plan |
|---|---|---|
| **Maintenance Actions** | **Maintenance Actions** | — |
| Table 1-6: Key Components of the Oregon GRSG ARMPA Addressing COT Report Threats:<br>SFA - Open to mineral entry and location.<br>(per Maintenance Action 3) | No change made. | Potential change under Alternative 3. |
| Table 2-1. Summary of Allocation Decisions by GRSG Habitat Management Areas.<br>Locatable Minerals: SFA = Open<br>(per Maintenance Action 3) | No change made. | Potential change under Alternative 3. |
| Appendix A: Map 2-13<br>(per Maintenance Action 1 – Map included after tables below) | No change made. | No change proposed. |

Note for **Tables 3, 4, 5,** and **6** below: Text did not change between 2015 ARMPA and 2019 RMPA.

## Table 3. Habitat Objectives for Greater Sage-grouse

| Attribute | Indicators | Desired Condition (Habitat Objectives) | Reference |
|---|---|---|---|
| **Breeding Including Lekking, Pre-nesting, Nesting, and Early Brood Rearing (Seasonal Use Period March 1 – June 30** | | | |
| Lek Security | Proximity of trees or other tall structures | No conifers or tall structures within 1.0 mile of lek center, and conifer cover less than 5% within 4.0 miles of lek, excluding old trees, culturally significant, actively used by special status species, and old growth juniper stands. | Connelly et al. 2000; Fresse 2009; Baruch-Mordo et al. 2013; Knick et al. 2013 |
| | Proximity of sagebrush to leks | Lek has adjacent sagebrush cover | Connelly et al. 2000 |
| Cover | Sagebrush cover (%) | 10 to 25 | Doescher et al. 1986; Gregg et al. 1994; Hanf et al. 1994; Coggins 1998; Crawford and Carver 2000; Bates and Davies 2014; BLM 2016 |
| — | Sagebrush height (inches) Arid sites (warm-dry) Mesic sites (cool-moist) | 11 to 31<br>15 to 31 | Gregg et al. 1994; Hanf et al. 1994; Coggins 1998; Crawford and Carver 2000; Freese 2009. |
| — | Predominant sagebrush shape | Spreading | Connelly et al. 2000 |
| — | Perennial grass cover (such as bunchgrass) (%) | 10 to 30 | Gregg at al. 1994; Coggins 1998; Crawford and Carver 2000; Freese 2009; NRCS 2015; Bates and Davies 2014; Jon Bates, USDA ARS, pers.comm. 2/10/2015; BLM 2016; BLM 2015b |
| | Arid sagebrush | | |
| | Warm-dry | | |
| | Shallow-dry | 10 to 25 | |
| | Mesic sagebrush | — | |
| | Cool-moist | 20 to 45 | |
| | Warm-moist | 20 to 50 | |
| — | Perennial grass and forb height (inches, including residual grasses) – most important and appropriately measured in nest areas; excludes shallow-dry sites[1] | ≥ 7 | Gregg et al. 1994; Hanf et al. 1994; Crawford and Carver 2000; Hagen et al. 2007; Jon Bates, USDA ARS, pers. comm. 2/10/2015 |
| | Arid sites (warm-dry) | | |
| | Mesic sites (cool-moist) | ≥ 9 | |
| — | Perennial forb cover (%)[2] Arid sagebrush<br>Warm-dry Shallow-dry<br>Mesic sagebrush<br>Cool-moist<br>Warm-moist | 2 to 10<br>2 to 10<br>6 to 12<br>5 to 15 | Drut 1992; Drut et al. 1994; Crawford and Carver 2000; Freese 2009; NRCS 2015; Bates and Davies 2014; BLM 2016; Jon Bates, USDA ARS, pers.comm. 2/10/2015; BLM 2015b |

| Attribute | Indicators | Desired Condition (Habitat Objectives) | Reference |
|---|---|---|---|
| Food | Preferred forb diversity and availability | Preferred forbs are common with 5 to 10 species present[2] | Hanf et al. 1994; Crawford and Carver 2000; Freese 2009; Bates and Davies 2014; BLM 2016; Jon Bates, USDA ARS, pers.comm. 2/10/2015 |
| Available Suitable Habitat (Landscape Context) | % of seasonal habitat within 4.0 miles of leks meeting a majority of the desired conditions<br>Arid sagebrush<br>Mesic sagebrush | <br>70 (55-85)<br>75 (60-90) | Connelly et al. 2000; Karl and Sadowski 2005; Evers 2010; Hagen 2011; NRCS 2015 |
| **Brood-rearing/Summer Including Late-brood Rearing, Summering, and Early Autumn (Seasonal Use Period July 1- October 31)** | | | |
| Cover | Sagebrush cover (%) | 10 to 25 | Doescher et al. 1986; Drut et al. 1994; Connelly et al. 2000; Crawford and Carver 2000; Bates and Davies 2014; Jon Bates, USDA ARS, pers.comm. 2/10/2015 |
| — | Sagebrush height (inches) | 15 to 31 | Gregg et al. 1994; Hanf et al. 1994; Crawford and Carver 2000; Freese 2009 |
| — | Perennial herbaceous (grass | — | Drut et al. 1994; Bates and |
| | and forbs) cover (%) | — | Davies 2014; NRCS 2015; |
| | Arid sagebrush | — | BLM 2015b; Jon Bates, |
| | Warm-dry | 15 to 30 | USDA ARS, pers.comm. |
| | Shallow-dry | 10 to 25 | 2/10/2015 |
| | Mesic sagebrush | — | |
| | Cool-moist | 20 to 45 | |
| | Warm-moist | 30 to 55 | |
| | Riparian[3] | ≥ 50 | |
| — | Riparian areas/mesic meadows | Majority of areas are in PFC | Stiver et al. 2010, or as updated |
| Food | Upland and riparian perennial forb availability | Preferred forbs are common with 5 to 10 species present[4] | Hanf et al. 1994; Freese 2009; Bates and Davies 2014; BLM 2015b; Jon Bates, USDA ARS, pers.comm. 2/10/2015 |
| Available Suitable Habitat (Landscape Context) | % of seasonal habitat within 4.0 miles of leks meeting a majority of the desired conditions<br>Arid sagebrush<br>Mesic sagebrush | <br>70 (55-85)<br>75 (60-90) | Connelly et al. 2000; Karl and Sadowski 2005; Evers 2010; Hagen 2011; NRCS 2015 |

| Attribute | Indicators | Desired Condition (Habitat Objectives) | Reference |
|---|---|---|---|
| **Winter Including Late Autumn and Winter (Seasonal Use Period November 1 – February 28)** | | | |
| Cover and Food | Sagebrush cover above snow (%) | ≥10 | Willis 1990 (in Hagen 2011); Bruce 2011 |
| | Sagebrush height above snow (inches) | ≥10 | Willis 1990 (in Hagen 2011); Bruce 2011 |
| Available Suitable Habitat (Landscape Context) | % of wintering habitat meeting a majority of the desired conditions<br>Arid sagebrush<br>Mesic sagebrush | <br><br><br>70 (55-85)<br>85 (68-100) | Connelly et al. 2000; Karl and Sadowski 2005; Evers 2010; NRCS 2015 |

[1]Perennial grass and forb minimum height may not be achievable in years with below normal precipitation. Other indicators of desired condition may still render the site suitable, however.
[2] In very dry years, forb cover and availability may not be at the desired condition, and in certain plant associations such as Wyoming big sagebrush/Needle and Thread, these indicators may rarely be achieved even in years with normal precipitation.
[3] Riparian includes swales, wet meadows, and intermittent/ephemeral streams.
[4]Sage-grouse preferred forbs are listed in Appendix I.

## Table 4. Greater Sage-Grouse Buffers

| Resource Program | Activity | Temporal Buffer | Spatial Buffer Miles from Lek PHMA | GHMA |
|---|---|---|---|---|
| Vegetation - Habitat Restoration<br><br>MD Veg 3 | Sagebrush cutting or removal | Nesting and early brood-rearing (March 1 through June 30) | 4 | 4 |
| Vegetation - Habitat Restoration<br><br>MD Veg 4 | Juniper cutting | Breeding season (March 1 through June 30) - two hours before and after sunrise and sunset. | 4 | 4 |
| Vegetation - Habitat Restoration<br><br>MD Veg 5 | Vegetation management activities that are timing- sensitive for maximum effectiveness | No more than 5 days during the breeding and early brood-rearing period (Mar 1 –June 30; use local information to further refine this period) | 4 | 4 |
| Livestock Grazing and Range Management<br><br>MD LG 9 | Reduce collision risk through fence removal, modification, or marking in areas with "high" collision risk | NA | 1.2 | 1.2 |
| Livestock Grazing and Range Management<br><br>MD LG 10 | Livestock facilities and placement of livestock supplements | NA | 1.2 | 1.2 |

| Resource Program | Activity | Temporal Buffer | Spatial Buffer Miles from Lek PHMA | GHMA |
|---|---|---|---|---|
| Special Status Species<br><br>MD SSS 13 | Infrastructure: New anthropogenic disturbance | NA | 1 | 1 |
| Leasable Minerals – Unleased Federal Fluid Mineral Estate (MLS)<br>MD MR 3 | Fluid minerals development in GHMA | NA | NA | 1 |
| Recreation<br>MD REC 1 | New non-motorized SRPs | Breeding season (March 1 to June 30) | 3 | 3 |
| Recreation<br><br>MD REC2 | Motorized and/or race SRPs, or competitive SRPs | Breeding season (March 1 to June 30) | 4 | 4 |
| Travel Management<br>MD TM 8 | Upgrading primitive roads | NA | 4 | 4 |

**Table 5. Desired Mix of Sagebrush Classes by Sagebrush Type**

| Sagebrush Type | General Description | Characteristic Plant Community | Class 1(A)[2] | Class 2(A)[2] | Class 3 (A, B)[2] | Class 4 (A, B)[2] | Class 5(A)[2] |
|---|---|---|---|---|---|---|---|
| Shallow-Dry | Very shallow soils and very dry sites not capable of producing at least 600 lb/ac of grass on any sites or in any type of year[1]. | Low sagebrush/ Sandberg's bluegrass. Includes the driest Wyoming big sagebrush types. | 15% (0-25%) | 15% (0-25%) | 70% (50-90%) | N/A3 | N/A[3] |
| Warm-Dry | Shallow to moderately deep soils and dry sites capable of producing at least 600 lb/ac of grass only on best sites or wet years[1]. | Wyoming big sagebrush/bluebunch wheatgrass-Thurber's needlegrass. Includes some moderately productive low sagebrush sites and dry mountain big sagebrush sites. | 15% (0-25%) | 15% (0-25%) | 25% (10-40%) | 45% (25-70%) | N/A[3] |
| Cool-Moist | Moderately deep to deep soils and moist sites capable of producing at least 600 lb/ac of grass on average and high productivity sites or average and wet years[1]. | Mountain big sagebrush-Idaho fescue. Includes productive low sagebrush communities and highly productive Wyoming big sagebrush sites. May include antelope bitterbrush as a co-dominant with big sagebrush. | 15% (0-25%) | 15% (0-25%) | 20% (10-30%) | 35% (20-60%) | 15% (5-25%) |

[1]Based on Ecological Site Descriptions
[2]Median value and range
[3] Site not capable of producing this class

**Table 5. Decadal Treatment Objectives for Greater Sage-grouse Habitat**

| Treatment Objective | Average Annual Acres | Average Decadal Acres |
|---|---|---|
| Conifer reduction | 40,250 | 402,500 |
| Sagebrush thinning | 53,217 | 532,170 |
| Invasive plant control* | 12,700 | 127,000 |
| Crested wheatgrass restoration | 1,844 | 18,440 |

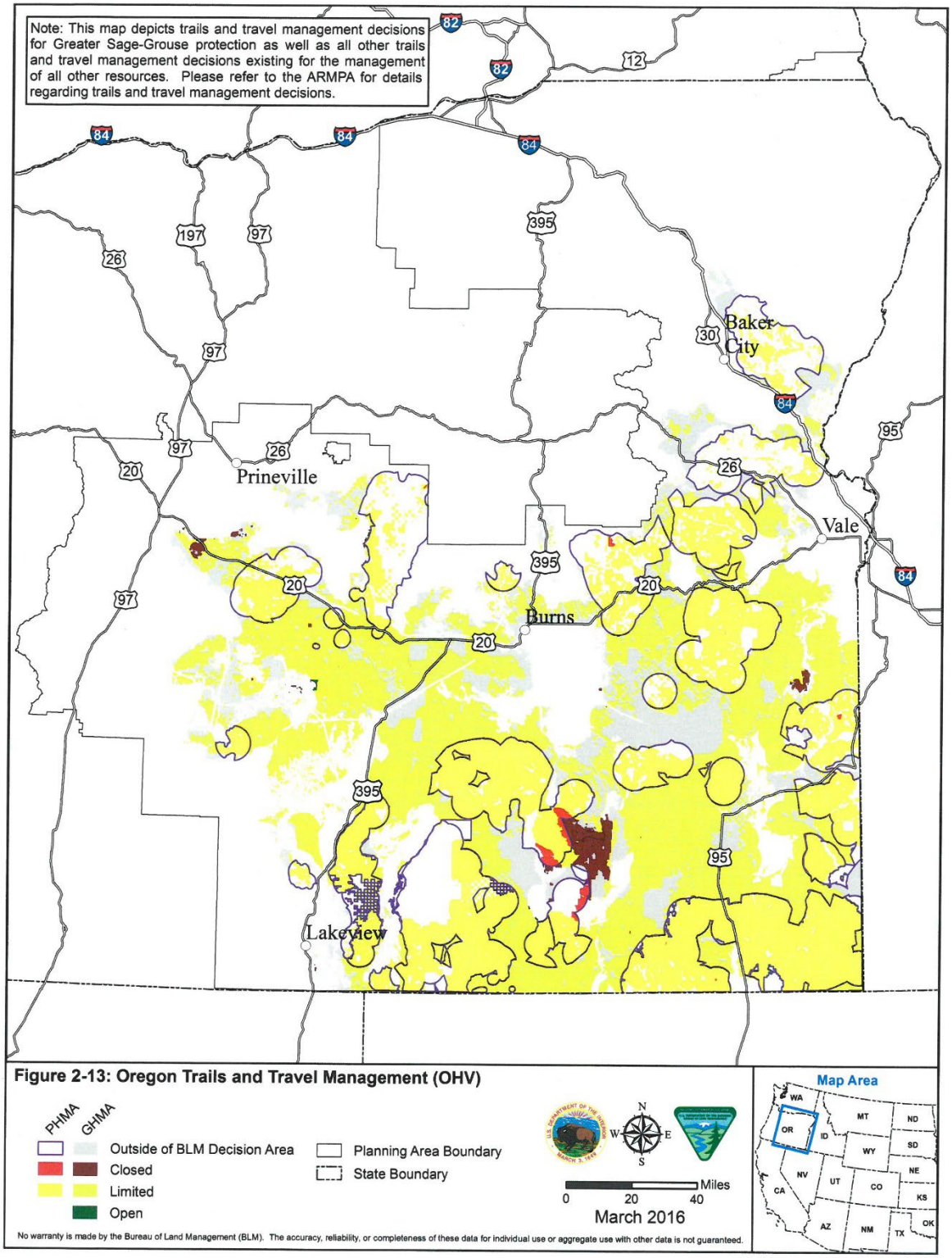
*Principally annual grasses
These acreage estimates represent an objective for treatment over a ten-year (decadal) period to support achievement or progress toward GRSG habitat objectives. These estimates account for variability in funding and do not reflect a maximum or minimum acreage for any one treatment objective should funding and site-specific conditions allow for more or less treatment acreage than described in order to meet habitat objectives.

## Table 6. From 2015 ARMPA - Key ACECs and RNAs for ARMPA

| ACEC/RNA Name | Type | District | ACEC/RNA | | |
|---|---|---|---|---|---|
| | | | ACEC/RNA Acres | RNA Acres Unavailable to Grazing | Estimated Reduction of AUMs |
| Abert Rim | ACEC | Lakeview | 18,039 | 0 | 0 |
| High Lakes | ACEC | Lakeview | 38,952 | 0 | 0 |
| Red Knoll | ACEC | Lakeview | 11,119 | 0 | 0 |
| **TOTAL KEY ACEC** | — | — | **68,110** | **0** | **0** |
| Black Canyon | RNA | Vale | 2,639 | 2,640 | 225 |
| Dry Creek Bench | RNA | Vale | 1,637 | 622 | 101 |
| East Fork Trout Creek | RNA | Burns | 361 | 304 | 47 |
| Fish Creek Rim | RNA | Lakeview | 8,718 | 2,750 | 110 |
| Foley Lake | RNA | Lakeview | 2,228 | 1,269 | 51 |
| Foster Flat * | RNA | Burns | 2,687 | 0 | 0 |
| Guano Creek—Sink Lakes * | RNA | Lakeview | 11,185 | 0 | 0 |
| Lake Ridge | RNA | Vale | 3,860 | 769 | 229 |
| Mahogany Ridge | RNA | Vale | 682 | 155 | 22 |
| North Ridge Bully Creek | RNA | Vale | 1,569 | 164 | 46 |
| Rahilly-Gravelly | RNA | Lakeview | 18,678 | 8,282 | 630 |
| South Bull Canyon | RNA | Vale | 790 | 747 | 89 |
| South Ridge Bully Creek | RNA | Vale | 621 | 397 | 166 |
| Spring Mountain | RNA | Vale | 996 | 995 | 137 |
| Toppin Creek Butte | RNA | Vale | 3,998 | 2,865 | 504 |
| **TOTAL KEY RNA** | — | — | **60,652** | **21,957** | **2,388** |

(NOTE: The 2019 FEIS and RMPA showed 21,959 acres in 13 key RNAs (corrected math error in the 2015 ARMPA)

## Appendix A: Map 2-13 (from Maintenance Action 1)



### 2.13.2 Relevant Appendices

The following table shows which appendices from the 2015 and 2019 have management direction that may change through this RMP amendment. Note that if 2019 is not listed in the year, then no change was made to the appendix between the 2015 and 2019 plans. The appendices can be found on the Oregon GRSG ePlanning website.

| ARMPA Appendix Name | Year | Potential for Change in 2023 Plan |
|---|---|---|
| A: Approved RMP Amendment Maps | 2015 | Yes |
| B: Lek Buffer Distances | 2015 | No |
| C: Required Design Features and Best Management Practices | 2015 | Yes |
| D: Greater Sage-Grouse Monitoring Framework | 2015 | No |
| E: Disturbance Cap Calculation Method | 2015 | Yes |
| F: Mitigation | 2015 | Yes |
| G: Fluid Mineral Leasing Stipulations | 2015 | Yes |
| H: Fire and Invasives Assessment Tool | 2015 | No |
| I: Sage-grouse Plant List | 2015 | No |
| J: Adaptive Management Strategy | 2015 | Yes |
| K Biological Assessment Summary | 2015 | No |
| L: Greater Sage-Grouse Noise Protocol | 2015 | No |
| A: Additional RNA Information | 2019 | No |
| B: Cumulative Effects Supporting Information | 2019 | No |
| C: Responses to Substantive Public Comments on the Draft EIS | 2019 | No |

# Appendix 2.14
# South Dakota RMP Amendment

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## 2.14 SOUTH DAKOTA RMP AMENDMENT

This appendix presents the GRSG approved RMP amendment language from the 2015 record of decision for the South Dakota RMP Amendment. The South Dakota RMP was not amended in 2019. The table below notes which goals, objectives, appendices, and management decisions/actions have a potential to change as a result of the current planning effort and if so, under which alternatives changes are being considered. Note that any references to tables and appendices are to those applicable 2015 appendices that are listed in **Section 2.14.2** of this appendix.

### 2.14.1 Existing GRSG RMP Management – South Dakota RMP Amendment

**Table 1. Summary of Goals, Objectives, and Management Actions in South Dakota 2015 ARMP**

| South Dakota RMP Revision | Potential Change in 2023 Plan |
|---|---|
| ***Management Decisions: Vegetation Communities*** | |
| Goal: In all PHMA, the desired condition is to maintain all lands ecologically capable of producing sagebrush (but no less than 70%) with a minimum of 15% sagebrush canopy cover or as consistent with specific ecological site conditions. The attributes necessary to sustain these habitats are described in Interpreting Indicators of Rangeland Health (BLM Tech Ref 1734-6). | Potential change under Alternatives 3, 4, 5, and 6. |
| MD-28 Weed Treatments: TL: Spot weed treatments only, using IPM methods within all suitable nesting or brood rearing habitat of known sage-grouse leks from March 1-June 30. | No change proposed. |
| MD-19 Weed Treatments: Timing Limit (TL): Herbicide treatments limited to spot weed treatments only within a 3 mile buffer zone, of known sage-grouse leks from March 1-June 30. Exceptions to treatment types and dates of treatments may be allowed to address aggressively spreading weeds or invasive plants that require aggressive and timely treatment during this period following consultation with necessary specialists to minimize impacts on sage-grouse. | No change proposed. |
| MD-31 Seasonal Habitat Objectives: Seasonal habitat objectives identified in Table 2-5 will be incorporated into all project designs, as appropriate, based on site conditions and ecological potential.<br><br>Habitat objectives include metrics for sagebrush height, cover, and other vegetation characteristics typical of sage-grouse habitat at the eastern edge of the species' distribution. | Potential change under Alternatives 3, 4, 5, and 6. |
| ***Management Decisions: Terrestrial and Aquatic Wildlife Resources*** | |
| Goal SSS-1: Maintain and/or increase GRSG abundance and distribution by conserving, enhancing, or restoring the sagebrush ecosystem upon which populations depend, in cooperation with other conservation partners. | Potential change under Alternatives 3, 4, 5, and 6. |
| Goal: Within GRSG habitat areas, the BLM will maintain habitat for viable GRSG populations. | Potential change under Alternatives 3, 4, 5, and 6. |

| South Dakota RMP Revision | Potential Change in 2023 Plan |
|---|---|
| Goal: Provide suitable habitat condition to allow for movement between large blocks of habitat and seasonal and specialized habitats on a local and landscape scale. | Potential change under Alternatives 3, 4, 5, and 6. |
| Goal: Across the planning area, maintain greater sagebrush cover at levels at or near the full potential for the each ecological site. | Potential change under Alternatives 3, 4, 5, and 6. |
| MD-21 Greater Sage-Grouse PHMA: PHMA will be the same as the State of South Dakota Sage-grouse Core Areas (SDGFP 2014); which includes 127,735 surface and 412,822 subsurface oil and gas minerals acres. See Figure 1-2 and 1-3. Adaptive management for sage-grouse is described in Chapter 2 Narrative section under Greater Sage-Grouse. BLM will apply the lek buffer-distances in the USGS Report "Conservation Buffer Distance Estimates for Greater Sage-Grouse-A Review (Open File Report 2014-1239)" in both GHMA and PHMA as detailed in Appendix B, Applying Lek Buffer-Distances When Approving Actions. | Potential change under Alternatives 3, 4, 5, and 6. |
| MD-10 Greater Sage-Grouse GHMA: includes 23,684 surface and 247,771 subsurface oil and gas minerals acres. | Potential change under Alternatives 3, 4, 5, and 6. |
| Monitoring Framework for Greater Sage-Grouse Habitat Management<br>The BLM's planning regulations, specifically 43 CFR, Part 1610.4-9, require that land use plans establish intervals and standards for monitoring based on the sensitivity of the resource decisions. Land use plan monitoring is the process of tracking the implementation of land use plan decisions (implementation monitoring) and collecting data/information necessary to evaluate the effectiveness of land use plan decisions (effectiveness monitoring). For GRSG, these types of monitoring are also described in the criteria found in the Policy for Evaluation of Conservation Efforts When Making Listing Decisions (50 CFR Vol. 68, No. 60). One of the Policy for Evaluation of Conservation Efforts When Making Listing Decisions criteria evaluates whether provisions for monitoring and reporting progress on implementation (based on compliance with the implementation schedule) and effectiveness (based on evaluation of quantifiable parameters) of the conservation effort are provided. The Monitoring Framework is located in Appendix D. | No change proposed. |
| ***Management Decisions: Habitat Objectives*** | |
| **[Original language updated through plan maintenance action in 2018]**<br><br>The habitat objectives for GRSG (Table 2.3-2) is a list of indicators, characteristics, and values that describe GRSG seasonal habitat use areas. The BLM used indicator values derived from a synthesis of local and regional GRSG habitat research and data to describe the typical vegetation communities that sage-grouse select. While the habitat objectives are not attainable on every site or every acre within designated GRSG habitat management areas, | Potential change under Alternatives 3, 4, 5, and 6. |

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| the values reflect a range of habitat conditions that generally lead to greater survival of individuals within a population. When permitting land use activities, BLM should consider the ecological site potential within designated habitat management areas to validate the habitat conditions achievable for a specific site.<br><br>The seasonal habitat descriptions in Table 2.3-2 vary across the range of sage-grouse, within a subregion, and between sites. They are not land health standards but are quantitative measures that inform the Special Status Species Habitat Land Health Standard for sage-grouse. These measurable values reflect ecological potential, and may be adjusted based on local factors influencing sage-grouse habitat selection. Local data or recent science may indicate that sage-grouse select for vegetation structure and composition in seasonal habitats not characterized by the values in the habitat objectives table. In these cases, it may be appropriate to adjust the values. Habitat objectives should be evaluated in the context of annual variability in ecological conditions and should not be used singly to determine habitat suitability for sage-grouse. They may be used to demonstrate trends over time, during plan evaluations for effectiveness of sage-grouse conservation, or when identify limiting habitat characteristics for a given area.<br><br>The indicators, characteristics, values and desired seasonal habitat conditions in the GRSG Plan Habitat Objectives Table are meant to inform the wildlife habitat component of the Land Health Standards evaluation process (LHS, 43 CFR 4180.2), but do not replace rangeland health assessments. Results from the LHS evaluation should be used to support BLM in land use authorization processes and during development of objectives for management actions such as vegetation treatments. BLM land use authorizations will contain terms and conditions regarding the actions needed to achieve or make progress toward achieving habitat objectives and land health standards. The Habitat Objectives Tables are to be used:<br>• To assess habitat suitability for sage-grouse following the BLM policy on sage-grouse habitat assessments<br>• To evaluate land use plan effectiveness for sage-grouse conservation, and<br>• As a basis to develop measurable project objectives for actions in BLM-designated GRSG Habitat Management areas when considered alongside land health standards, ecological potential and local information.<br><br>References: U.S. Department of the Interior, Bureau of Land Management. 2001. Rangeland health standards handbook H-4180-1. https://www.blm.gov/sites/blm.gov/files/uploads/Media_Library_BLM_Policy_h4180-1.pdf | *(See above.)* |

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| ***Management Decisions: Disturbance*** | |
| Goal: Manage PHMA so that discrete anthropogenic (human-caused) disturbances do not adversely impact GRSG distribution or abundance. | Potential change under Alternatives 3, 4, 5, and 6. |
| MD-20 Greater Sage-Grouse PHMA: Manage PHMA so that discrete anthropogenic (human-caused) disturbances do not adversely impact GRSG distribution or abundance. | No change proposed. |
| MD-24 Other Resources Uses: Other resource uses within PHMA may be allowed pending project level environmental review provided that Mitigation, BMPs Guidelines, standard operating procedures (SOP), and RDFs are implemented, Impacts are evaluated as described in the GRSG Effects Analysis Process (Appendix I) and the project does not exceed the disturbance cap (Appendix E) and the goals for sage-grouse and sage-grouse habitat are not compromised. Categorical Exclusions (CXs) including those under the Energy Policy Act of 2005, Section 390 will not be used in priority sage-grouse habitats due to resource conflicts. | No change proposed. |
| Management Direction SSS-1.3: If the 3% anthropogenic disturbance cap is exceeded on lands (regardless of land ownership) or if anthropogenic disturbance and habitat loss associated with conversion to agricultural tillage or fire exceed 5% within a project analysis area in PHMA, then no further discrete anthropogenic disturbances (subject to applicable laws and regulations, such as the 1872 Mining Law, valid existing rights, etc.) will be permitted by BLM within PHMA in a project analysis area until the disturbance has been reduced to less than the cap. | Potential change under Alternatives 3, 4, 5, and 6. |

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| MD-22 (part) Surface Disturbing and Disruptive Activities and Fluid Minerals: Surface disturbing and disruptive activities may be allowed if the project proponent can clearly demonstrate that adverse impacts on sage-grouse can be adequately mitigated through BMPs, guidelines (Appendix J), disturbance is within the 3% disturbance cap limit (Appendix E) and RDFs (Appendix C) are included and the goals for sage-grouse not compromised. If the 3% anthropogenic disturbance cap is exceeded on lands (regardless of land ownership) within GRSG PHMA in any given BSU, then no further discrete anthropogenic disturbances (subject to applicable laws and regulations, such as the 1872 hard rock mining law, valid existing rights, etc.) will be permitted by BLM within PHMA in any given BSU until the disturbance has been reduced to less than the cap.<br><br>If the 3% anthropogenic disturbance cap is exceeded on lands (regardless of land ownership) or if anthropogenic disturbance and habitat loss associated with conversion to agricultural tillage or fire exceed 5% within a project analysis area in PHMA, then no further discrete anthropogenic disturbances (subject to applicable laws and regulations, such as the 1872 Mining Law, valid existing rights, etc.) will be permitted by BLM within PHMA in a project analysis area until the disturbance has been reduced to less than the cap. Within existing designated utility corridors, the 3% disturbance cap may be exceeded at the project scale if the site specific NEPA analysis indicates that a net conservation gain to the species will be achieved. This exception is limited to projects which fulfill the use for which the corridors were designated (ex., transmission lines, pipelines) and the designated width of a corridor will not be exceeded as a result of any project co-location. | Potential change under Alternatives 3, 4, 5, and 6. |

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| MD-22 (part) Surface Disturbing and Disruptive Activities and Fluid Minerals: Subject to applicable laws and regulations and valid existing rights, if the average density of one energy and mining facility per 640 acres (the density cap) is exceeded on all lands (regardless of land ownership) in PHMA within a proposed project analysis area, then no further disturbance from energy or mining facilities will be permitted by BLM: (1) until disturbance in the proposed project analysis area has been reduced to maintain the limit under the cap; or (2) unless the energy or mining facility is co-located into an existing disturbed area. This direction applies to the following: oil and gas wells and development facilities, coal mines, wind towers, solar fields, geothermal, and mining (active locatable, leasable, and saleable developments). Appendix E provides specific details about how calculations are determined for disturbance caps. Prior to approving any surface disturbance and disruptive activities, the project proponent will be required to provide a plan approved by BLM to maintain suitability of habitat and avoid or minimize habitat loss and disturbance. | No change proposed. |

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| Mitigation for Sage-Grouse Management<br>Consistent with the Plan's goal, the intent of the South Dakota ARMP is to provide a net conservation gain to the species. In all sage-grouse habitat, in undertaking BLM management actions, and, consistent with valid existing rights and applicable law, in authorizing third-party actions that result in sage-grouse habitat loss and degradation, the BLM will require and ensure mitigation that provides a net conservation gain to the species, including accounting for any uncertainty associated with the effectiveness of such mitigation. This will be achieved by avoiding, minimizing, and compensating for impacts by applying beneficial mitigation actions.<br><br>Actions that result in habitat loss and degradation including those identified as threats which contribute to Greater Sage-Grouse disturbance as identified by the USFWS in its 2010 listing decision (75 FR 13910) and shown in Table 2 in the attached Monitoring Framework (Appendix D). This is also consistent with BLM Manual 6840 – Special Status Species Management, Section .02B, which directs BLM "to initiate proactive conservation measures that reduce or eliminate threats to Bureau sensitive species to minimize the likelihood of the need for listing of these species under the ESA."<br><br>Mitigation Standards. In undertaking BLM management actions, and, consistent with valid existing rights and applicable law, in authorizing-third party actions that result in habitat loss and degradation, the BLM will require and ensure mitigation that provides a net conservation gain to the species, including accounting for any uncertainty associated with the effectiveness of such mitigation. This will be achieved by avoiding, minimizing, and compensating for impacts by applying beneficial mitigation actions. Mitigation will follow the regulations from the CEQ (40 CFR, Part 1508.20; e.g., avoid, minimize, and compensate), hereafter referred to as the mitigation hierarchy. If impacts from BLM management actions and authorized third-party actions that result in habitat loss and degradation remain after applying avoidance and minimization measures (i.e., residual impacts), then compensatory mitigation projects will be used to provide a net conservation gain to the species. Any compensatory mitigation will be durable, timely, and in addition to that which would have resulted without the compensatory mitigation. | Potential change under Alternatives 3, 4, 5, and 6. |

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| Greater Sage-Grouse Conservation Team. The BLM will establish a WAFWA Management Zone Greater Sage-Grouse Conservation Team (hereafter, Team) to help guide the conservation of Greater Sage-Grouse, within 90 days of the issuance of the ROD. This Team will develop a WAFWA Management Zone Regional Mitigation Strategy (hereafter, Regional Mitigation Strategy). The Team will also compile and report on monitoring data (including data on habitat condition, population trends, and mitigation effectiveness) from States across the WAFWA Management Zone (see Monitoring section). Subsequently, the Team will use these data to either modify the appropriate Regional Mitigation Strategy or recommend adaptive management actions (see Adaptive Management section).<br><br>The BLM will invite governmental and Tribal partners to participate in this Team, including the SDGFP and USFWS, in compliance with the exemptions provided for committees defined in the Federal Advisory Committee Act and the regulations that implement that act. The BLM will strive for a collaborative and unified approach between Federal agencies, Tribal governments, state and local government(s), and other stakeholders for Greater Sage-Grouse conservation. The Team will provide advice, and will not make any decisions that impact Federal lands. The BLM will remain responsible for making decisions that affect Federal lands. | No change proposed. |
| Developing a Regional Mitigation Strategy. The Team will develop a Regional Mitigation Strategy to inform the mitigation components of NEPA analyses for BLM management actions and third-party actions that result in habitat loss and degradation. The Strategy will be developed within one year of the issuance of the ROD. The BLM's Regional Mitigation Manual MS-1794 will serve as a framework for developing the Regional Mitigation Strategy. The Regional Mitigation Strategy will be applicable to the States/Field Offices within the WAFWA Management Zone's boundaries.<br><br>Regional mitigation is a landscape-scale approach to mitigating impacts on resources. This involves anticipating future mitigation needs and strategically identifying mitigation sites and measures that can provide a net conservation gain to the species. The Regional Mitigation Strategy developed by the Team will elaborate on the components identified above (i.e., avoidance, minimization, and compensation; additionality, timeliness, and durability). | Potential change under Alternatives 3, 4, 5, and 6. |
| In the time period before the Strategy is developed, BLM will consider regional conditions, trends, and sites, to the greatest extent possible, when applying the mitigation hierarchy and will ensure that mitigation is consistent with the standards set forth in the first paragraph of this section. | Potential change under Alternatives 3, 4, 5, and 6. |

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| Incorporating the Regional Mitigation Strategy into NEPA Analyses. The BLM will include the avoidance, minimization, and compensatory recommendations from the Regional Mitigation Strategy in one or more of the NEPA analysis' alternatives for BLM management actions and third-party actions that result in habitat loss and degradation, and the appropriate mitigation actions will be carried forward into the decision.<br><br>Implementing a Compensatory Mitigation Program. Consistent with the principles identified above, the BLM needs to ensure that compensatory mitigation is strategically implemented to provide a net conservation gain to the species, as identified in the Regional Mitigation Strategy. To align with existing compensatory mitigation efforts, this compensatory mitigation program will be implemented at a State level (as opposed to a WAFWA Management Zone, a Field Office, or a Forest), in collaboration with our partners (e.g., Federal, Tribal, and State agencies).<br><br>To ensure transparent and effective management of the compensatory mitigation funds, the BLM will enter into a contract or agreement with a third-party to help manage the State-level compensatory mitigation funds, within one year of the issuance of the ROD. The selection of the third-party compensatory mitigation administrator will conform to all relevant laws, regulations, and policies. The BLM will remain responsible for making decisions that affect Federal lands. Information on BMPs, Guidelines and SOPs can be found in Appendix J. RDFs are described in Appendix C. | Potential change under Alternatives 3, 4, 5, and 6. |

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| 2.3.3 Adaptive Management Strategy for Greater Sage-Grouse Habitat Management<br>Decisions: Adaptive Management is a decision process that promotes flexible resource management decision-making that can be adjusted in the face of uncertainties as outcomes from management actions and other events become better understood. Careful monitoring of these outcomes both advances scientific understanding and helps with adjusting resource management directions as part of an iterative learning process. Adaptive management also recognizes the importance of natural variability in contributing to ecological resilience and productivity. Adaptive management does not represent an end in itself, but rather a means to more effective decisions and enhanced benefits. On February 1, 2008, the USDI published its Adaptive Management Implementation Policy (522 DM 1). The adaptive management strategy presented within this EIS complies with this policy and direction. The GRSG Monitoring Framework will be used to inform adaptive management; the GRSG Monitoring Framework can be found in Appendix D. The following provides the BLM adaptive management strategy for the South Dakota ARMP. | Potential change under Alternatives 3, 4, 5, and 6. |
| Adaptive Management Triggers<br>Adaptive management triggers are essential for identifying when potential management changes are needed in order to continue meeting Greater Sage-Grouse conservation objectives. The BLM will use soft and hard triggers.<br><br>Soft Triggers are indicators that management or specific activities may not be achieving the intended results of conservation actions. The soft trigger is any negative deviation from normal trends in habitat or population in any given year, or if observed across two to three consecutive years. Metrics include, but are not limited to, annual lek counts, wing counts, aerial surveys, habitat monitoring, and Density and Disturbance Calculation Tool (DDCT) evaluations. BLM field offices, local SDGFP offices, and sage-grouse working groups will evaluate the metrics. The purpose of these strategies is to address localized Greater Sage-Grouse population and habitat changes by providing the framework in which management will change if monitoring identifies negative population trends and habitat anomalies.<br><br>Each major project (EIS level) will include adaptive management strategies in support of the population management objectives for Greater Sage-Grouse set by the State of South Dakota, and will be consistent with this Greater Sage-Grouse Adaptive Management Plan. These adaptive management strategies will be developed in partnership with the State of South Dakota, project proponents, partners, and stakeholders, incorporating the best available science. | Potential change under Alternatives 3, 4, 5, and 6. |

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| Soft Triggers Response - Soft triggers require immediate monitoring and surveillance to determine causal factors and may require curtailment of activities in the short or long term, as allowed by law. The project-level adaptive management strategies will identify appropriate responses where the project's activities are identified as the causal factor. The management agency and the adaptive management group will implement an appropriate response strategy to address causal factors not addressed by specific project adaptive management strategies, not attributable to a specific project, or to make adjustments at a larger regional or state-wide level.<br><br>Hard Triggers are indicators that management is not achieving desired conservation results. Hard triggers would be considered a catastrophic indicator that the species is not responding to conservation actions, or that a larger-scale impact is having a negative effect. Hard triggers are focused on three metrics: 1) number of active leks, 2) acres of available habitat, and 3) population trends based on annual lek counts. Within the context of normal population variables, hard triggers shall be determined to take effect when two of the three metrics exceeds 60% of normal variability for the BSU in a single year, or when any of the three metrics exceeds 40% of normal variability for a three-year time period within a five-year range of analysis. A minimum of three years is used to determine trends, with a five-year period preferred to allow determination of three actual time periods (i.e., Y1-2-3, Y2-3-4, Y3-4-5). Baseline population estimates are established by pre-disturbance surveys, reference surveys, and account for regional and statewide trends in population levels. Population count data in South Dakota are maintained by SDGFP. Estimates of population are determined based upon survey protocols determined by SDGFP, and are implemented consistently throughout the state. Population counts are tracked for individual leks and are then summarized by county and for the state.<br><br>Hard Trigger Response - Hard triggers represent a threshold indicating that immediate action is necessary to stop a severe deviation from Greater Sage-Grouse conservation objectives set forth in the BLM plans. As such, the ARMP includes a "hard-wired" plan-level response; that is, it provides that, upon reaching the trigger, a more restrictive alternative, or an appropriate component of a more restrictive alternative analyzed in the Proposed RMP and Final EIS, will be implemented without further action by the BLM. Specific "hard-wired" changes in management are identified in Table 2-7, Specific Management Responses, below. In addition to the specific changes identified in Table 2-7, the BLM will review available and pertinent data, in coordination with Greater Sage-Grouse biologists and managers from multiple | *(See above.)* |

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| agencies, including the USFWS, NRCS, and the State of South Dakota, to determine the causal factor(s) and implement a corrective strategy. The corrective strategy would include the changes identified in Table 2-7 and could also include the need to amend or revise the ARMP to address the situation and modify management accordingly.<br><br>Upon determination that a hard trigger has been tripped, the BLM will immediately defer issuance of discretionary authorizations for new actions within the BSU for a period of 90 days. When a hard trigger is hit in a BSU, including those that cross state lines, the WAFWA Management Zone Greater Sage-Grouse Conservation Team will convene to determine the casual factor(s), put project level responses in place, as appropriate, and discuss further appropriate actions to be applied.<br><br>In addition to implementing the hard wired plan-level response, in the event that new scientific information becomes available demonstrating that the hard-wired response would be insufficient to stop a severe deviation from sage-grouse conservation objectives set forth in the BLM plans, the BLM will immediately implement a formal directive to protect GRSG and its habitat and to ensure that conservation options are not foreclosed. To the extent that it is supported scientifically, this formal directive will be drawn from the range of alternatives analyzed in the RMP Amendments/Revisions. | *(See above.)* |
| Adaptive Management and Monitoring<br>This EIS contains a monitoring framework plan (Appendix D) that includes an effectiveness monitoring component. The agencies intend to use the data collected from the effectiveness monitoring to identify any changes in habitat conditions related to the goals and objectives of the plan and other range-wide conservation strategies BLM 2004; Stiver et al. 2006; USFWS 2013). The information collected through the Monitoring Framework Plan (Appendix D) will be used by the BLM to determine when adaptive management hard and soft triggers (discussed below) are met. Adaptive management responses at the RMP level were included as part of the assumptions when impacts were analyzed in Chapter 4 of the Proposed RMP. In making amendments to this plan, the BLM will coordinate with the FWS as BLM continues to meet its objective of conserving, enhancing and restoring GRSG habitat by reducing, minimizing or eliminating threats to that habitat. The GRSG adaptive management plan provides a means of addressing and responding to unintended negative impacts on GRSG and its habitat before consequences become severe or irreversible.<br><br>The hard and soft trigger data will be analyzed as soon as it becomes available after the signing of the ROD and then at a minimum, analyzed annually thereafter. | Potential change under Alternatives 3, 4, 5, and 6. |

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| ***Management Decisions: Wildland Fire Ecology and Management*** | |
| MD-33 Prescribed Fire: Prescribed fire may be allowed in PHMA and general habitat if it is done solely for the purposes of improving or maintaining sage-grouse habitat. If prescribed fire is used in Greater Sage-Grouse habitat, the NEPA analysis for the Burn Plan will address the following:<br>• Why alternative techniques were not selected as a viable options;<br>• How Greater Sage-Grouse goals and objectives would be met by its use;<br>• How the COT report objectives would be addressed and met;<br>• Develop a risk assessment to address how potential threats to Greater Sage-Grouse habitat would be minimized.<br><br>Prescribed fire as a vegetation or fuels treatment shall only be considered after the NEPA analysis for the Burn Plan has addressed the four bullets outlined above. Prescribed fire could be used to meet specific fuels objectives that would protect Greater Sage-Grouse habitat in PHMA (e.g., creation of fuel breaks that would disrupt the fuel continuity across the landscape in stands where annual invasive grasses are a minor component in the understory, and burning slash piles from conifer reduction treatments, used as a component with other treatment methods to combat annual grasses and restore native plant communities).<br><br>Prescribed fire in known winter range shall only be considered after the NEPA analysis for the Burn Plan has addressed the four bullets outlined above. Any prescribed fire in winter habitat would be designed to strategically reduce wildfire risk around and/or in the winter range and designed to protect winter range habitat quality. Secretarial order SO3336 will be applied to protect GRSG habitat from fire: http://www.forestsandrangelands.gov/rangeland/index.shtml. | Potential change under Alternatives 3, 4, 5, and 6. |

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| ***Management Decisions: Lands and Realty*** | |
| MD-27 Lands and Realty: PHMA and GHMA within the Center of the Nation will be Class 2 land retention areas (Appendix A2, Map E and Figure 1-3). Any land disposals will be limited and subject to specialist review. Refer to the Land Tenure subsection of the Lands section of this table for additional details about Class 2 retention criteria.<br><br>BLM could also dispose of land in PHMA and GHMA within the Center of the Nation areas in cases where there is mixed ownership, and land exchanges will allow for additional or more contiguous federal ownership patterns.<br><br>Under sage-grouse habitat areas with minority federal ownership, BLM will develop an additional, effective mitigation agreement for any disposal of federal land. As a final preservation measure, consideration will be given to pursuing a permanent conservation easement. Lands classified as PHMA and GHMA for GRSG will be retained in federal management unless: (1) the agency can demonstrate that disposal of the lands, including land exchanges, will provide a net conservation gain to the GRSG or (2) the agency can demonstrate that the disposal, including land exchanges, of the lands will have no direct or indirect adverse impact on conservation of the GRSG.<br><br>The agency can demonstrate that disposal of the lands will provide a net conservation gain to Greater Sage-Grouse; or the agency can demonstrate that the disposal of the lands will have no direct or indirect adverse impact on conservation of Greater Sage-Grouse. | No change proposed. |
| MD-12 Renewable Energy ROWs: Renewable Energy ROWs: 1 mile from leks will be an exclusion area, the rest of the GHMA will be an avoidance area.<br><br>Other types of ROWs: Major ROWs (power lines 100 kilovolt (kV) and pipelines 24 inches and over) will be avoided. Minor ROWs within 2 miles of a lek will be avoidance, the rest of the GHMA will be open.<br><br>Where new ROWs are necessary, ROWs will be co-located within existing ROWs where possible.<br><br>GHMA and PHMA within the Center of the Nation will be Class 2 land retention areas (Appendix A1: Figure 2-10). | Potential change under Alternatives 3, 4, 5, and 6. |

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| MD-18 Utility and Power lines: All new utility and power lines (overhead lines) that can be safely buried will be buried within 2 miles of GRSG leks and within GRSG winter range.<br><br>When burial of power lines is not possible, above ground lines will be located and designed to minimize impacts of predation, collision and other associated stressors to GRSG.<br><br>Existing overhead lines within 2 miles of leks and within GRSG winter range will be evaluated for threats to GRSG and if necessary, modified to reduce the threat. If modification is not likely to be effective, the overhead line may be relocated. Any requirements for modification or relocation of existing overhead lines will be subject to valid existing rights.<br><br>Oil and Gas (O&G) - CSU: All new utility and power lines that can be safely buried will be buried within 2 miles of sage-grouse leks and within sage-grouse winter range.<br><br>When burial of power lines is not possible, above ground lines will be located and designed to minimize impacts of predation, collision and other associated stressors to sage-grouse.<br><br>Existing overhead lines within 2 miles of leks and within sage-grouse winter range will be evaluated for threats to sage-grouse and if necessary, modified to reduce the threat. If modification will not likely be effective, the overhead line may be relocated. Any requirements for modification or relocation of existing overhead lines will be subject to valid existing rights. | No change proposed. |
| MD-15 Renewable Energy/Winter Range: GRSG winter range will be an exclusion area.<br><br>Within GHMA, major ROWs are avoidance and minor ROWs are avoidance within two miles of leks with GHMA. The rest of the GHMA is open to minor ROWs. GRSG winter range will be an avoidance area. In cases where avoidance is not possible, BLM may require design features to mitigate impacts or co-location of new ROWs with existing ROWs where possible. | Potential change under Alternatives 3, 4, 5, and 6. |
| MD-25 Renewable Energy ROWs: PHMA will be exclusion areas. Other types of ROWs: PHMA will be avoidance areas. Winter range is an exclusion areas for renewable energy ROWs. | Potential change under Alternatives 3, 4, 5, and 6. |

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| MD-26 General ROWs: PHMA are defined as avoidance areas for all General ROWs (major and minor). Renewable ROWs are addressed in MD-25 above. Sage-Grouse winter range is treated the same in PHMA and GHMA: These areas are avoidance areas for general ROWs.<br><br>If a proposed project cannot be avoided, the following actions will apply:<br>*Within PHMA all new power and utility lines (overhead lines) that can be safely buried will be buried.<br>*When burial of power lines is not possible, above ground lines will be located and designed to minimize impacts of predation, collision and other associated stressors to sage-grouse.<br>*Existing overhead lines within PHMA and within sage-grouse winter range will be evaluated for threats to sage-grouse and if necessary, modified to reduce the threat. If modification is not likely to be effective, the overhead line may be relocated.<br>*Any requirements for modification or relocation of existing overhead lines will be subject to valid existing rights.<br>*Consider the likelihood of development of not-yet-constructed surface-disturbing activities – as defined in Table 2 of the Monitoring Framework (Appendix D)−under valid existing rights prior to authorizing new projects in PHMA. | Potential change under Alternatives 3, 4, 5, and 6. |
| MD-30 Rights of Ways (ROWs): Winter range in PHMA will be treated the same as winter range in GHMA: Renewable Energy ROWs in sage-grouse winter range will be an exclusion area.<br><br>Other types of ROWs in sage-grouse winter range will be an avoidance area. In cases where avoidance is not possible, BLM may require co-location of new ROWs with existing ROWs where possible.<br><br>ROWs are defined for sage-grouse management in terms of major and minor ROWs. Major ROWs include transmission lines 100kV and greater and pipelines 24 inches in width and greater. Minor ROWs include utilities under these design descriptions, as well as communication sites and towers.<br><br>Greater Sage-Grouse PHMA are avoidance areas for major and minor ROWs.<br><br>Within GHMA, major ROWs are avoidance and minor ROWs are avoidance within two miles of leks with GHMA. The rest of the GHMA is open to minor ROWs.<br><br>Sage-Grouse winter range is treated the same in PHMA and GHMA: These areas are avoidance areas for general ROWs and exclusion areas for renewable energy ROWs. | Potential change under Alternatives 3, 4, 5, and 6. |

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| ***Management Decisions: Fluid Mineral Resources*** | |
| MD-22 (part): Where the federal government owns the surface and the mineral estate is in non-federal ownership in PHMA and GHMA, the federal government will apply appropriate surface use COAs, stipulations, and mineral RDFs through ROW grants or other surface management instruments, to the maximum extent permissible under existing authorities, in coordination with the mineral estate owner/lessee. | No change proposed. |
| MD 22 (part): Where the federal government owns the mineral estate in PHMA and GHMA, and the surface is in non-federal ownership, the federal government will apply the same stipulations, Conditions of Approval (COAs), and/or conservation measures and mineral RDFs if the mineral estate is developed on BLM-administered lands in that management area, to the maximum extent permissible under existing authorities, and in coordination with the landowner. | No change proposed. |
| MD-11 Surface Disturbing and Disruptive Activities and Fluid Minerals: Surface disturbing and disruptive activities will be avoided within 6/10 of a mile of sage-grouse leks. BLM will apply the lek buffer-distances in the US Geological Survey (USGS) Report "Conservation Buffer Distance Estimates for Greater Sage-Grouse-A Review (Open File Report 2014-1239)" in both GHMA and PHMA as detailed in Appendix B, Applying Lek Buffer-Distances When Approving Actions. | Potential change under Alternatives 3, 4, 5, and 6. |
| MD-14 Surface Disturbing and Disruptive Activities and Fluid Minerals (part): Surface disturbing and disruptive activities will be avoided in winter range for sage-grouse unless the project proponent can clearly demonstrate that the impacts can be adequately mitigated, Conservation Actions, Guidelines or needed design features (Appendices C and F) are included and the goals for sage-grouse are not compromised. Prior to approving any surface disturbance and disruptive activities, the project proponent will be required to provide a plan approved by BLM to maintain suitability of habitat and avoid or minimize habitat loss and disturbance. | Potential change under Alternatives 3, 4, 5, and 6. |
| MD-29 Surface Disturbance and Disruptive Activities and Fluid Minerals in Winter Range (part): Winter range in PHMA will be treated the same as winter range in GHMA: Surface disturbing and disruptive activities will not be allowed in winter range for sage-grouse unless the project proponent can clearly demonstrate that the impacts can be adequately mitigated, conservation actions or needed design features are included and the goals of this plan are not compromised. Prior to approving any surface disturbance and disruptive activities, the project proponent will be required to provide a plan approved by BLM to maintain suitability of habitat and avoid or minimize habitat loss and disturbance. | Potential change under Alternatives 3, 4, 5, and 6. |

| South Dakota RMP Revision | Potential Change in 2023 Plan |
|---|---|
| MD-22 (part) Surface Disturbing and Disruptive Activities and Fluid Minerals: Oil and gas stipulations will also apply to geothermal resources. | No change proposed. |
| Goal: Priority will be given to leasing and development of fluid mineral resources, including geothermal, outside of PHMA and GHMA.<br><br>MD-22 (part) Surface Disturbing and Disruptive Activities and Fluid Minerals: Priority will be given to leasing and development of fluid mineral resources, including geothermal, outside of PHMA and GHMA. | Potential change under Alternatives 3, 4, 5, and 6. |
| MD-22 (part) Surface Disturbing and Disruptive Activities and Fluid Minerals: Fluid Minerals - NSO: PHMA will be managed as NSO and Use (127,735 surface and 412,822 oil and gas subsurface minerals acres). These areas will be open to oil and gas leasing with a NSO stipulation. All sage-grouse habitat that is not part of PHMA will be managed as GHMA as noted in Figure 1-2. | Potential change under Alternatives 3, 4, 5, and 6. |
| MD-11 (Second Part): Fluid Minerals - NSO: NSO or use within 6/10 of a mile from leks. The Authorized Officer (AO) ay waive this stipulation if no portion of the leasehold is within 6/10 mile of the perimeter of an active lek. | Potential change under Alternatives 3, 4, 5, and 6. |
| MD-14 Surface Disturbing and Disruptive Activities and Fluid Minerals (part): Fluid Minerals - NSO: GRSG crucial winter range will be managed as a NSO for oil and gas development and exploration. | No change proposed. |
| MD-29 Surface Disturbance and Disruptive Activities and Fluid Minerals in Winter Range (part): Fluid Minerals - NSO: Sage-grouse winter range will be managed as a NSO for oil and gas development and exploration. Waivers or modifications to a fluid minerals lease no-surface-occupancy stipulation will not be granted for NSO stipulations in PHMA. | Potential change under Alternatives 3, 4, 5, and 6. |
| MD-16 Surface Disturbing and Disruptive Activities and Fluid Minerals: Fluid Minerals - A CSU stipulation will apply within 2 miles of leks [GHMA]. The AO may waive this stipulation if no portion of the leasehold is within 2 miles of the perimeter of an active lek.<br><br>Fluid Minerals: A CSU stipulation will apply within 2 miles of leks [GHMA]. The AO may waive this stipulation if no portion of the leasehold is within 2 miles of the perimeter of an active lek. | Potential change under Alternatives 3, 4, 5, and 6. |

| South Dakota RMP Revision | Potential Change in 2023 Plan |
|---|---|
| MD-22 (part): Waivers or modifications to a fluid minerals lease NSO stipulation will not be granted. The AO may grant an exception to a fluid mineral lease NSO stipulation in certain cases. Exceptions based on conservation gain (ii) may only be considered in (A) PHMA of mixed ownership where federal minerals underlie less than fifty percent of the total surface, or (b) area of the public lands where the proposed exception is an alternative to an action occurring on a nearby parcel subject to a valid Federal fluid mineral lease existing as of the date of this RMP. See Appendix G. | Potential change under Alternatives 3, 4, 5, and 6. |
| ***Management Decisions: Solid Leasable Minerals*** | |
| MD-22 (part): At the time an application for a new coal lease or lease modification is submitted to the BLM, the BLM will determine whether the lease application area is "unsuitable" for all or certain coal mining methods pursuant to 43 CFR, Part 3461.5. PHMA is essential habitat for maintaining GRSG for purposes of the suitability criteria set forth at 43 CFR, Part 3461.5(o)(1). | Potential change under Alternatives 3, 4, 5, and 6. |
| ***Management Decisions: Locatable Materials*** | |
| MD-22 (part) Surface Disturbing and Disruptive Activities and Fluid Minerals: Locatable minerals will be open. RDFs (Appendix C) and other applicable BMPs and Guidelines (Appendix J) will be applied as BMPs or Guidelines for locatable minerals, subject to valid existing rights and the mining laws. | Potential change under Alternative 3. |
| ***Management Decisions: Mineral Materials*** | |
| MD-22 (part) Surface Disturbing and Disruptive Activities and Fluid Minerals: Non-energy leasable minerals and salable minerals will be closed except for the following exception: PHMA are closed to new mineral material sales. However, these areas remain "open" to free use permits and the expansion of existing active pits, only if the following criteria are met:<br><br>The activity is within the BSU and project area disturbance cap; the activity is subject to the provisions set forth in the mitigation measures (Appendix F) BMPs and Guidelines (Appendix J), and RDFs for Greater Sage-Grouse Habitat (Appendix C) are applied, and the activity is permissible under the subregional screening criteria. | Potential change under Alternatives 3 and 6. |
| ***Management Decisions: Recreation*** | |
| Management Direction REC-38: In PHMA, do not construct new recreation facilities (e.g., campgrounds, trails, trailheads, and staging areas) unless the development will have a net conservation gain to GRSG habitat (such as concentrating recreation, diverting use away from important areas, etc.), or unless the development is required for visitor health and safety or resource protection. | No change proposed. |

| South Dakota RMP Revision | Potential Change in 2023 Plan |
|---|---|
| ***Management Decisions: Comprehensive Trails and Travel Management*** | |
| MD-20 Temporary Travel Closures: Temporary travel closures will be considered in accordance with 43 CFR subpart 8364 (Closures and Restrictions); 43 CFR subpart 8351 (Designated National Area); 43 CFR subpart 6302 (Use of Wilderness Areas, Prohibited Acts, and Penalties); and 43 CFR subpart 8341 (Conditions of Use).<br><br>Temporary closure or restriction orders under these authorities are enacted at the discretion of the AO to resolve management conflicts and protect persons, property, and public lands and resources.<br><br>Where an AO determines that off-highway vehicles (OHV) are causing or will cause considerable adverse effects upon soil, vegetation, wildlife, wildlife habitat, cultural resources, historical resources, threatened or endangered species, wilderness suitability, other authorized uses, or other resources, the affected areas shall be immediately closed to the type(s) of vehicle causing the adverse effect until the adverse effects are eliminated and measures are implemented to prevent recurrence (43 CFR, Part 8341.2).<br><br>A closure or restriction order will be considered only after other management strategies and alternatives have been explored. The duration of temporary closure or restriction orders will be limited to 24 months or less; however, certain situations may require longer closures and/or iterative temporary closures. This may include closure of routes or areas. | No change proposed. |
| ***Management Decisions: Livestock Grazing*** | |
| MD 34: The NEPA analysis for renewals and modifications of livestock grazing permits/leases that include lands within PHMA will include specific management thresholds based on GRSG Habitat Objectives Table and Land Health Standards (43 CFR, Part4180.2) and one or more defined responses that will allow the authorizing officer to make adjustments to livestock grazing that have already been subjected to NEPA analysis. | Potential change under Alternatives 3, 4, 5, and 6. |
| MD-32 Land Health Standards: BLM will prioritize grazing leases in PHMA to determine if modifications are necessary prior to renewals or if the allotment does not meet Land Health Standards. | Potential change under Alternatives 3, 4, 5, and 6. |

| South Dakota RMP Revision | Potential Change in 2023 Plan |
|---|---|
| Management Direction 36: The BLM will prioritize (1) the review of grazing permits/leases, in particular to determine if modification is necessary prior to renewal, and (2) the processing of grazing permits/leases in PHMA. In setting workload priorities, precedence will be given to existing permits/leases in these areas not meeting Land Health Standards, with focus on those containing riparian areas, including wet meadows. The BLM may use other criteria for prioritization to respond to urgent natural resource concerns (such as fire) and legal obligations.<br><br>The NEPA analysis for renewals and modifications of livestock grazing permits/leases that include lands within PHMA will include specific management thresholds, based on GRSG Habitat Objectives (Table 2-3), Habitat Objectives for GRSG and ecological site potential, and one or more defined responses that will allow the authorizing officer to make adjustments to livestock grazing that have already been subjected to NEPA analysis. | Potential change under Alternatives 3, 4, 5, and 6. |
| MD-35-Grazing: Allotments within SFA, followed by those within PHMA, and focusing on those containing riparian areas, including wet meadows, will be prioritized for field checks to help ensure compliance with the terms and conditions of the grazing permits. Field checks can include monitoring for actual use, utilization, and use supervision. (also see MD-36). | Potential change under Alternatives 3, 4, 5, and 6. |
| MD-37: Range Improvements: Range improvements in PHMA would be allowed if the improvements would not impact GRSG, improvements would provide a conservation benefit to GRSG such as fences for protecting important seasonal habitats, or if improvements would meet the lek buffer requirement. Refer to Appendix B for a discussion about GRSG lek buffers. | Potential change under Alternatives 3, 4, 5, and 6. |
| MD-23: At the time a permittee or lessee voluntarily relinquishes a permit or lease, the BLM will consider whether the public lands where that permitted use was authorized should remain available for livestock grazing or be used for other resource management objectives, such as reserve common allotments or fire breaks. This does not apply to or impact grazing preference transfers, which are addressed in 43 CFR 4110.2-3. | Potential change under Alternatives 3, 4, 5, and 6. |

**Table 2. South Dakota Habitat Objectives for GRSG**

| Attribute | Indicators | Habitat Conditions | Reference |
|---|---|---|---|
| **BREEDING HABITAT (LEK AND NESTING/EARLY BROOD REARING)** | | | |
| Lek Security | Proximity of trees | Trees absent or rare. When present trees consist of rocky mountain juniper and ponderosa pine >328 feet (100 meters) from lek. | Baruch-Mordo et al. 2013<br>Stiver et al. 2015 |
| | Proximity of sagebrush to leks | Adjacent protective sagebrush cover within 328 feet (100 m) of an occupied lek | Stiver et al. 2015 |
| **NESTING/EARLY BROOD REARING** | | | |
| Cover | Sagebrush canopy cover [2] | 2-20% | Connelly et al. 2000<br>Connelly et al. 2003<br>Hagen et al. 2011 |
| | Sagebrush height | 4-12 inches (10.16-30.48 cm) | Connelly et al. 2000 |
| | Predominant sagebrush shape | Predominantly spreading shape5 | Stiver et al. 2015 |
| | Perennial grass cover (such as native rhizomatous and bunchgrasses) 2 | >10% | Stiver et al. 2015<br>Connelly et al. 2000 |
| | Perennial grass height (includes residual grasses) | Adequate nest cover based on ecological site potential and seasonal precipitation.[15] | Connelly et al. 2000<br>Stiver et al. 2015<br>Connelly et al. 2003<br>Hagen et al. 2011 |
| | Perennial forb cover [2] | >3%, Based on ecological site potential and seasonal precipitation | Connelly et al. 2000 |
| | Perennial forb availability | Preferred forbs are common with several species present[6] | Stiver et al. 2015 |
| **LATE BROOD-REARING/SUMMER1 (July-October) (Apply to all habitat outside of nesting/breeding and winter)** | | | |
| Cover | Sagebrush canopy cover[2] | 2-20% | Connelly et al. 2000 |
| | Sagebrush height | 4 - 12 inches (10.16-30.48 cm) | Connelly et al. 2000 |
| | Perennial grass canopy cover [2] | >10% | Connelly et al. 2000 |
| | Upland and riparian perennial forb availability [2] | Preferred forbs are common with several preferred species present,6, | Stiver et al. 2015 |
| | Riparian meadow habitat condition | Proper Functioning Condition (PFC)13 | |
| **WINTER1 November-March1 (Apply to areas of known or likely winter-use)** | | | |
| Cover and Food | Seasonal habitat extent | Winter habitat is managed to optimize its potential within the constraints of ecological site potential | Connelly et al. 2000<br>Stiver et al. 2015 |
| | Sagebrush canopy cover | 2-20% | Connelly et al. 2000<br>Stiver et al. 2015 |
| | Sagebrush height above snow | Winter habitat is managed to optimize its potential within the constraints of ecological site potential | Connelly et al. 2000 |

NOTES

1 Seasonal dates can be adjusted by local unit according to geographic region.

2 Absolute cover is the actual recorded cover and can exceed 100% when recorded across all species and all layers. It is not relative cover, which is the proportions of each species, and equals 100%. Note that cover is reported for only those species (e.g., sagebrush, preferred forbs) that are sampled to determine suitability of habitat for sage-grouse. Overall cover at the site

will be greater than that sampled for sage-grouse habitat, due to other species present. Percent cover refers to foliar cover, measured using the HAF protocol line-point intercept method.
3 Arid corresponds to the 10 – 12 inch precipitation zone; *Artemisia tridentata wyomingensis* is a common big sagebrush subspecies for this type site (Stiver et al. 2015 In press).
4 Mesic corresponds to the >12 inch precipitation zone.
5 Collectively the indicators for sagebrush (cover, height, and shape), perennial grass and perennial forb (cover, height and/or availability) represent the desired condition range for nesting/early brood rearing habitat characteristics, consistent with the breeding habitat suitability matrix identified in Stiver et al. 2015 In press. Sagebrush plants that are more tree or columnar shaped provide less protective cover near the ground than sagebrush plants with a spreading shape (Stiver et al. 2015 In press). Some sagebrush plants are naturally columnar (e.g., Great Basin big sagebrush), and a natural part of the plant community. However, a predominance of columnar shape arising from animal impacts may warrant management investigation or adjustments at site specific scales.
6 Preferred forbs are listed in Stiver et al. 2015 In press. Overall total forb cover may be greater than that of preferred for cover since not all forb species are listed as preferred.
15 Specific height requirements needed to meet the objective will be set when project level planning is completed.

### 2.14.2 Relevant Appendices

The following table shows which appendices from the 2015 and 2019 plans have management direction that may change through this RMP amendment. The appendices can be found on the South Dakota RMP ePlanning website.

| ARMPA Appendix Name | Potential for Change in 2023 Plan |
|---|---|
| A: Approved RMP Amendment Maps | Yes |
| B: Applying GRSG Lek Buffer-Distances When Approving Decisions | Yes |
| C: GRSG Required Design Features | Yes |
| D: GRSG Monitoring Framework | Yes |
| E: GRSG Disturbance Caps | Yes |
| F: GRSG Regional Mitigation Strategy | Yes |
| G: Fluid Mineral Stipulations | Yes |
| H: Biological Opinion | No |
| I: Greater Sage-Grouse Effects Analysis Process | Yes |
| J: Summary of Mitigation Measures, Best Management Practices (BMPs), Standards, Guidelines, and Standard Operating Procedures (SOPs) | Yes |
| K: South Dakota Field Office Soil, Water and Reclamation Mitigation Guidelines | No |
| L: South Dakota Field Office Reclamation Guidelines and Abandoned Mine Actions | No |
| M: South Dakota Field Office Grazing Allotment Allocations | No |
| N: Land Ownership Adjustment Criteria | No |
| O: Soil Monitoring | No |
| P: Cultural Resource Stipulation for Grazing Leases | No |
| Q: South Dakota Field Office Air Resource Management Plan: Adaptive Management Strategy for Oil and Gas Resources | No |
| R: Rights-of-Way and Renewable Energy Avoidance or Exclusion Areas | No |
| S: Summary of Restrictions Table | No |

# Appendix 2.15
# Utah RMPs

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## 2.15 UTAH RMPS

This appendix presents the GRSG approved RMP amendment language from the 2015 and 2019 records of decision for Utah. Changes between 2015 and 2019 are noted. The table below notes which goals, objectives, appendices, and management decisions/actions have a potential to change as a result of the current planning effort and if so, under which alternatives changes are being considered. Note that any references to tables and appendices are to those applicable 2015 and 2019 appendices that are listed in **Section 2.15.2** of this appendix.

### 2.15.1 Existing GRSG RMP Management – Utah RMPs

**Table 1: Changes in Management from the 2015 Approved RMPA to the 2019 Approved RMPA**

| 2015 BLM GRSG Approved RMP Amendment | Changes between 2015 and 2019 GRSG Management | Potential for Change in 2023 Plan |
|---|---|---|
| ***SPECIAL STATUS SPECIES (SSS)*** | ***SPECIAL STATUS SPECIES (SSS)*** | — |
| **GOAL:** | **GOAL:** | — |
| **Goal SSS-1:** Maintain and/or increase GRSG abundance and distribution by conserving, enhancing or restoring the sagebrush ecosystem upon which populations depend in collaboration with other conservation partners. | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |
| **Objectives:** | **Objectives:** | — |
| **Objective SSS-1:** Designate PHMA that are large enough to stabilize populations in the short-term and enhance populations over the long-term.<br><br>Protect PHMA from anthropogenic disturbances that will reduce distribution or abundance of GRSG. Enhance or improve GRSG habitat (e.g., through restoration or rehabilitation activities) within PHMA that has been impaired or altered. | No changes made. | No change proposed. |
| **Objective SSS-2:** In all GRSG habitat, manage activities that result in habitat loss and degradation to provide a net conservation gain of GRSG habitat. Exceptions to net conservation gain for GRSG shall be made for vegetation treatments to benefit Utah prairie dog. | **Objective SSS-2:** In PHMA, manage activities that result in habitat loss and degradation to improve the condition of GRSG habitat across the planning area. Exceptions to this mitigation standard for GRSG shall be made for vegetation treatments to benefit Utah prairie dog. | No change proposed. |

| 2015 BLM GRSG Approved RMP Amendment | Changes between 2015 and 2019 GRSG Management | Potential for Change in 2023 Plan |
|---|---|---|
| **Objective SSS-3:** In all GRSG habitat, where sagebrush is the current or potential dominant vegetation type or is a primary species within the various states of the ecological site description, maintain or restore vegetation to provide habitat for lekking, nesting, brood rearing, and winter habitats.<br><br>The habitat objectives for GRSG (**Table 2**) is a list of indicators, characteristics, and values that describe GRSG seasonal habitat use areas. The BLM used indicator values derived from a synthesis of local and regional GRSG habitat research and data to describe the typical vegetation communities that sage-grouse select. While the habitat objectives are not attainable on every site or every acre within designated GRSG habitat management areas, the values reflect a range of habitat conditions that generally lead to greater survival of individuals within a population. When permitting land use activities, BLM should consider the ecological site potential within designated habitat management areas to validate the habitat conditions achievable for a specific site. In addition, areas where PHMA and GHMA overlap mapped Utah prairie dog habitat will be managed for both species; accomplishing this shall include coordination with species specific experts to develop conservation and recovery objectives that will benefit both species.<br><br>The seasonal habitat descriptions in **Table 2** vary across the range of sage-grouse, within a subregion, and between sites. They are not land health standards but are quantitative measures that inform the Special Status Species Habitat Land Health Standard for sage-grouse. These measurable values reflect ecological potential, and may be adjusted based on local factors influencing sage-grouse habitat selection. Local data or recent science may indicate that sage-grouse select for vegetation structure and composition in seasonal habitats not characterized by the values in the habitat objectives table. In these cases, it may be appropriate to adjust the values. Habitat objectives should be evaluated in the | **Objective SSS-3:** In PHMA, where sagebrush is the current or potential dominant vegetation type or is a primary species within the various states of the ecological site description, maintain or restore vegetation to provide habitat for lekking, nesting, brood rearing, and winter habitats.<br><br>The habitat objectives for GRSG (**Table 3**) is a list of indicators, characteristics, and values that describe GRSG seasonal habitat use areas. The BLM used indicator values derived from a synthesis of local and regional GRSG habitat research and data to describe the typical vegetation communities that sage-grouse select. While the habitat objectives are not attainable on every site or every acre within designated GRSG habitat management areas, the values reflect a range of habitat conditions that generally lead to greater survival of individuals within a population. When permitting land use activities, BLM should consider the ecological site potential within designated habitat management areas to validate the habitat conditions achievable for a specific site. In addition, areas where PHMA and GHMA overlap mapped Utah prairie dog habitat will be managed for both species; accomplishing this shall include coordination with species specific experts to develop conservation and recovery objectives that will benefit both species.<br><br>The seasonal habitat descriptions in **Table 3** vary across the range of sage-grouse, within a subregion, and between sites. They are not land health standards but are quantitative measures that inform the Special Status Species Habitat Land Health Standard for sage-grouse. These measurable values reflect ecological potential, and may be adjusted based on local factors influencing sage-grouse habitat selection. Local data or recent science may indicate that sage-grouse select for vegetation structure and composition in seasonal habitats not characterized by the values in the habitat objectives table. In these cases, it may be appropriate to adjust the values. Habitat objectives should be evaluated in the context of annual variability in ecological conditions and should not be used singly to | Potential change under Alternatives 3, 4, 5, and 6. |

| 2015 BLM GRSG Approved RMP Amendment | Changes between 2015 and 2019 GRSG Management | Potential for Change in 2023 Plan |
|---|---|---|
| context of annual variability in ecological conditions and should not be used singly to determine habitat suitability for sage-grouse. They may be used to demonstrate trends over time, during plan evaluations for effectiveness of sage-grouse conservation, or when identify limiting habitat characteristics for a given area.<br><br>The indicators, characteristics, values and desired seasonal habitat conditions in the GRSG Plan Habitat Objectives Table are meant to inform the wildlife habitat component of the Land Health Standards evaluation process (LHS, 43 CFR 4180.2), but do not replace rangeland health assessments. Results from the LHS evaluation should be used to support BLM in land use authorization processes and during development of objectives for management actions such as vegetation treatments. BLM land use authorizations will contain terms and conditions regarding the actions needed to achieve or make progress toward achieving habitat objectives and land health standards.<br><br>The Habitat Objectives Tables are to be used:<br>• To assess habitat suitability for sage-grouse following the BLM policy on sage-grouse habitat assessments<br>• To evaluate land use plan effectiveness for sage-grouse conservation, and<br>• As a basis to develop measurable project objectives for actions in BLM-designated GRSG Habitat Management areas when considered alongside land health standards, ecological potential and local information. | determine habitat suitability for sage-grouse. They may be used to demonstrate trends over time, during plan evaluations for effectiveness of sage-grouse conservation, or when identify limiting habitat characteristics for a given area.<br><br>The indicators, characteristics, values and desired seasonal habitat conditions in the GRSG Plan Habitat Objectives Table are meant to inform the wildlife habitat component of the Land Health Standards evaluation process (LHS, 43 CFR 4180.2), but do not replace rangeland health assessments. Results from the LHS evaluation should be used to support BLM in land use authorization processes and during development of objectives for management actions such as vegetation treatments. BLM land use authorizations will contain terms and conditions regarding the actions needed to achieve or make progress toward achieving habitat objectives and land health standards.<br><br>The Habitat Objectives Tables are to be used:<br>• To assess habitat suitability for sage-grouse following the BLM policy on sage-grouse habitat assessments<br>• To evaluate land use plan effectiveness for sage-grouse conservation, and<br>• As a basis to develop measurable project objectives for actions in BLM-designated GRSG Habitat Management areas when considered alongside land health standards, ecological potential and local information. | *(See above.)* |
| **Objective SSS-4:** Within PHMA, increase the amount and functionality of seasonal habitats by:<br>• Maintaining or increasing sagebrush in perennial grasslands, where needed to meet the Habitat Objectives for Greater Sage-Grouse (**Table 2**), unless there is a conflict with Utah prairie dog.<br>• Reducing conifer (e.g., pinyon/juniper) from areas that are most likely to support GRSG at a rate that is at least equal to the rate of encroachment.<br>• Reducing the extent of annual grasslands. | **Objective SSS-4:** Within PHMA, increase the amount and functionality of seasonal habitats by:<br>• Maintaining or increasing sagebrush in perennial grasslands, where needed to meet the Habitat Objectives for Greater Sage-Grouse (**Table 3**), unless there is a conflict with Utah prairie dog.<br>• Reducing conifer (e.g., pinyon/juniper) from areas that are most likely to support GRSG at a rate that is at least equal to the rate of encroachment.<br>• Reducing the extent of invasive annual grasslands. | No change proposed. |

<table>
<tr><th>2015 BLM GRSG Approved RMP Amendment</th><th>Changes between 2015 and 2019 GRSG Management</th><th>Potential for Change in 2023 Plan</th></tr>
<tr>
<td>
<ul>
<li>Maintaining or improving corridors for migration or movement between seasonal habitats, as well as for long-term genetic connections between populations.</li>
<li>Maintaining or improving understory (grass, forb) and/or riparian condition within breeding and late brood-rearing habitats.</li>
<li>Conducting vegetation treatments based on the following 10-year (decadal) acreage objectives:</li>
</ul>
Table 1a. Vegetation Treatments per 10-year (decadal) Acreage Objectives (2015)
<table>
<tr><th>Population Areas</th><th>Mechanical Treatment [1]</th><th>Annual Grass Treatment[1]</th></tr>
<tr><td>Box Elder</td><td>9,300</td><td>17,800</td></tr>
<tr><td>Ibapah; Hamlin Valley</td><td>17,900</td><td>2,100</td></tr>
<tr><td>Rich; Uintah</td><td>40,700</td><td>6,800</td></tr>
<tr><td>Carbon</td><td>2,600</td><td>200</td></tr>
<tr><td>Bald Hills; Panguitch</td><td>43,900</td><td>8,900</td></tr>
<tr><td>Parker Mountain</td><td>32,800</td><td>2,200</td></tr>
<tr><td>Sheeprocks</td><td>33,700</td><td>10,000</td></tr>
<tr><td>Statewide</td><td>180,900</td><td>48,000</td></tr>
</table>
[1] These acreage figures, based on Vegetation Dynamics Development Tool modeling, represent an objective for treatment on BLM-administered lands over a 10-year (decadal) time frame to support achievement or progress toward GRSG habitat objectives (see Final EIS Appendix V, Great Basin Vegetation Modeling using Vegetation Dynamics Development Tool). This accounts for variations in yearly funding availability and does not reflect a maximum or minimum acreage for any one treatment type or total treatment acreage, should funding and site specific conditions allow for more or less treatment acreage than described in order to meet habitat objectives.
<br><br>
Outside PHMA (in adjacent opportunity areas) improve and restore historical GRSG habitat to support GRSG populations and to maintain or enhance connectivity. Statewide, complete a decadal average of 170,200 acres of mechanical treatments and 33,000 acres of annual grass treatments. Prioritization is for completion of treatments within PHMA before treating areas outside.
</td>
<td>
<ul>
<li>Maintaining or improving corridors for migration or movement between seasonal habitats, as well as for long-term genetic connections between populations.</li>
<li>Maintaining or improving understory (grass, forb) and/or riparian condition within breeding and late brood-rearing habitats.</li>
<li>Conducting vegetation treatments based on the following 10-year (decadal) acreage objectives:</li>
</ul>
Table 1b. Vegetation Treatments per 10-year (decadal) Acreage Objectives (2019)
<table>
<tr><th>Population Areas</th><th>Mechanical Treatment [1]</th><th>Annual Grass Treatment[1]</th></tr>
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<br><br>
Outside PHMA (in adjacent opportunity areas) improve and restore historical GRSG habitat to support GRSG populations and to maintain or enhance connectivity. Statewide, complete a decadal average of 170,200 acres of mechanical treatments and 33,000 acres of annual grass treatments. Prioritization is for completion of treatments within PHMA before treating areas outside.
</td>
<td>(See above.)</td>
</tr>
</table>

| 2015 BLM GRSG Approved RMP Amendment | Changes between 2015 and 2019 GRSG Management | Potential for Change in 2023 Plan |
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| **Objective SSS-5:** Participate in local GRSG conservation efforts (e.g., the appropriate State of Utah agency, Natural Resources Conservation Service (NRCS), and local working groups) to implement landscape-scale habitat conservation, to implement consistent management to benefit GRSG, and to gather and use local research and monitoring to promote the conservation of GRSG. | No changes made. | No change proposed. |
| **Management Actions (MA):** | **Management Actions (MA):** | **Management Actions (MA):** |
| **MA-SSS-1**: Identify PHMA and GHMA as identified in **Table 4** below (Figure 2-1, Habitat Management Areas [Appendix A, Approved RMP Amendment Maps]):<br><br>The BLM will apply these the goals, objectives, and management actions where the agency has discretion to implement them; the actions do not apply in areas where the BLM does not administer the surface or mineral estate.<br><br>Minor adjustments to PHMA/GHMA external boundaries can be made if BLM biologists, in coordination with the appropriate State of Utah agency, determine site-specific conditions warrant such changes to more accurately depict existing or potential GRSG habitat. The appropriate planning process (i.e., plan maintenance or plan amendment) will be used, as determined on a case-by-case basis considering site-specific issues. See additional information and protocol on adjusting occupied habitat and PHMA/GHMA boundaries in Appendix K, Greater Sage-Grouse Habitat Baseline and Habitat Update Protocol.<br><br>The PHMA and GHMA objectives and management actions would apply to existing sagebrush areas and areas with ecological sagebrush potential within the respective PHMA and GHMA polygons. In the mapped PHMA and GHMA there may be areas that lack the principle habitat components necessary for GRSG, including but not limited to rock outcrops, alkaline flats, and pinyon-juniper ecological sites. These are areas that do not have existing sagebrush or ecological potential to contain sagebrush. These areas of non-habitat may be identified during site- | Identify PHMA as follows in **Table 5** below (Figure 2-1, Habitat Management Areas [Appendix A, 2015 ROD/ Approved RMPA Maps]):<br><br>The BLM will apply these the goals, objectives, and management actions where the agency has discretion to implement them; the actions do not apply in areas where the BLM does not administer the surface or mineral estate.<br><br>The PHMA boundaries are not intended to represent a survey-grade boundary and are not expected to be used exclusively at a project-level. In accordance with the adaptive management framework and existing law, regulation and policy, inventories will continue to be conducted to provide information on GRSG habitat and distribution (FLPMA, 43 USC 1701 Sec. 201 (a), BLM Manual 6840 .04 D 3; BLM-M-6840 .04 E 2). Prior to considering proposed actions within PHMA, a field investigation should be conducted by a qualified biologist in collaboration with federal and state biologists. To this end, additional site-specific information associated with local surveys could result in a more precise delineation of habitat management areas. If in the review of a proposed action, there are discrepancies between the PHMA maps and the on-the-ground conditions, the on-the-ground information should be used to determine where the management would be applied.<br><br>Minor adjustments to PHMA external boundaries (increases or decreases) can be made if BLM biologists, in coordination with the appropriate State of Utah agency, determine site-specific conditions warrant such changes to more accurately depict | Potential change under Alternatives 3, 4, 5, and 6. |

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| specific project review by agency biologists, in discussion with the appropriate State of Utah agency.<br><br>Because of the importance of PHMA to conserve, enhance and restore GRSG and its habitat, objectives and management actions will apply to all the areas within the respective PHMA polygons. The GHMA objectives and management actions will apply to the areas of identified non-habitat within the GHMA polygons unless **all** the following conditions are met:<br>• the non-habitat does not provide important connectivity between areas with existing or potential habitat;<br>• all direct and indirect impacts that impair the function of adjacent seasonal habitats or the life-history or behavioral needs of the GRSG population are eliminated through project design (e.g., minimize sound, preclude tall structures, require perch deterrents), as demonstrated in the project's NEPA document.<br><br>Exceptions in non-habitat may be approved by the Authorized Officer, but only with the concurrence of one level of delegated authority above the Authorized Officer.<br><br>Any exception granted based on the above criteria would only apply to the specific project-level authorization. Proposed projects in the same area would need to undergo individual analysis to confirm the criteria are met prior to subsequent authorizations. Excepting a site-specific project from compliance with GRSG management in an area of non-habitat would not change the boundaries of PHMA or GHMA. | existing or potential GRSG habitat. The appropriate planning process (i.e., plan maintenance or plan amendment) will be used, as determined on a case-by-case basis considering site-specific issues. See additional information and protocol on adjusting seasonal habitat and PHMA boundaries in Appendix K, Greater Sage-Grouse Habitat Baseline and Habitat Update Protocol.<br><br>The PHMA objectives and management actions apply to ecological sites that currently provide GRSG habitat within the respective PHMA polygons, as well as areas with ecological potential for GRSG habitat that have not cross an ecological threshold to a different stable non-GRSG habitat vegetation community.<br><br>Mapped PHMA may also include areas that lack the principle habitat components necessary for GRSG, including but not limited to rock outcrops, alkaline flats, pinyon-juniper ecological sites, and areas that have crossed an ecological threshold to a different stable non-GRSG habitat vegetation community, such as cheatgrass monocultures or pinyon/juniper woodlands (phase 3, absent sagebrush understory) (Chambers et al. 2014; Bestelmeyer et al. 2010; Bestelmeyer, et al. 2011). These are areas that do not contain sagebrush or other vegetation necessary for the various GRSG seasonal habitats. These areas of non-habitat may be identified during site-specific project review by agency biologists, in discussion with the appropriate State of Utah agency.<br><br>The PHMA objectives and management actions will apply to the areas identified as habitat, as well as non-habitat within the PHMA polygons unless **both** of the following conditions are met:<br>• the non-habitat does not provide important connectivity between seasonal habitats; and<br>• direct and indirect impacts on adjacent seasonal habitats (disturbance to or disruption of) that would impair their biological function of providing the life-history or behavioral needs of the GRSG population are eliminated through project design (e.g., minimize sound, preclude tall | *(See above.)* |

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| *(See above.)* | structures, require perch deterrents), as demonstrated in the project's NEPA document.<br><br>Any exception granted based on the above criteria would only apply to the specific project-level authorization. Proposed projects in the same area would need to undergo individual analysis to confirm the criteria are met prior to subsequent authorizations. Excepting a site-specific project from compliance with GRSG management in an area of non-habitat would not change the boundaries of PHMA. | *(See above.)* |
| **MA-SSS-2**: Designate SFA as shown on Figure 2-1 (181,100 acres of BLM surface estate; 52,200 acres split-estate federal minerals). SFA will be managed as PHMA, with the following additional management:<br>• Recommended for withdrawal from the Mining Law of 1872 (as amended), subject to valid existing rights.<br>• Managed as NSO, without waiver, exception, or modification, for fluid mineral leasing.<br>• Prioritized for vegetation management and conservation actions in these areas, including, but not limited to land health assessments, wild horse and burro management actions, review of livestock grazing permits/leases, and habitat restoration (see specific management sections). | No similar action. | Potential change under Alternatives 3, 4, 5, and 6. |

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| **MA-SSS-3:** In PHMA, apply the following management to discretionary disturbances or activities that are not otherwise excluded or closed to minimize and mitigate effects on GRSG and its habitat from the project/activity:<br><br>A- Net Conservation Gain:<br>In all GRSG habitat, in undertaking BLM management actions, and, consistent with valid existing rights and applicable law, in authorizing third-party actions that result in habitat loss and degradation, the BLM will require and ensure mitigation that provides a net conservation gain to the species, including accounting for any uncertainty associated with the effectiveness of such mitigation. This will be achieved by avoiding, minimizing, and compensating for impacts by applying beneficial mitigation actions. Exceptions to net conservation gain for GRSG shall be made for vegetation treatments to benefit Utah prairie dog.<br><br>Mitigation will be conducted according to the mitigation framework contained in Appendix F, Mitigation Strategy: Utah Greater Sage-Grouse RMPA.<br>Consider the likelihood of development of not-yet-constructed surface-disturbing activities – as defined in Table D.2 of the Monitoring Framework (Appendix D)−under valid existing rights prior to authorizing new projects in PHMA.<br><br>B- Disturbance Cap<br>In PHMA, manage discrete anthropogenic disturbances, whether temporary or permanent, so they cover less than 3 percent of 1) PHMA associated with a GRSG population area and 2) within a proposed project analysis area. See Appendix E, Greater Sage-Grouse Disturbance Cap Guidance, for additional information on implementing the disturbance cap, including what is and is not considered disturbance and how to calculate the proposed project analysis area.<br><br>If the 3 percent anthropogenic disturbance cap is exceeded on all lands (regardless of land ownership) within GRSG PHMA in any given population area (BSU), then no | **MA-SSS-3:** In PHMA, apply the following management to discretionary disturbances or activities that are not otherwise excluded or closed to minimize and mitigate effects on GRSG and its habitat from the project/activity:<br><br>A- Mitigation Strategy:<br>In PHMA, when undertaking BLM management actions, and, consistent with valid existing rights and applicable law, when authorizing third-party actions that result in habitat loss and degradation, the BLM will achieve the planning-level GRSG management goals and objectives through implementation of mitigation and management actions. Under this Proposed Plan Amendment, management would be consistent with the GRSG goals and objectives, and in conformance with BLM Manual 6840, Special Status Species Management. In accordance with BLM Manual 6840, the BLM will undertake planning decisions, actions and authorizations "to minimize or eliminate threats affecting the status of [GRSG] or to improve the condition of [GRSG] habitat" across the planning area. Exceptions to this mitigation strategy for GRSG shall be made for vegetation treatments to benefit Utah prairie dog.<br><br>Compensation, which involves replacing or providing substitute resources for the impacts (including through payments to fund such work), would be considered only when voluntarily offered by a proponent, required by a law other than FLPMA, or to meet a State recommendation or requirement. Therefore, consistent with valid existing rights and applicable law, when considering third-party actions that result in habitat loss and degradation, the BLM will consider compensatory mitigation actions only as a component of compliance with a State mitigation plan, program, or authority; when required by a federal law other than FLPMA; or when offered voluntarily by a project proponent. Accordingly, before authorizing third-party actions that result in habitat loss and degradation in PHMA or State of Utah SGMAs, the BLM will complete the following steps: | Potential change under Alternatives 3, 4, 5, and 6. |

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| further discrete anthropogenic disturbances (subject to applicable laws and regulations, such as the Mining Law of 1872 [as amended], valid existing rights, etc.) will be permitted by the BLM within GRSG PHMA in any given population area (BSU) until the disturbance has been reduced to less than the cap.<br><br>If the 3 percent disturbance cap is exceeded on all lands (regardless of land ownership) within a proposed project analysis area in PHMA, then no further anthropogenic disturbance will be permitted by the BLM until disturbance in the proposed project analysis area has been reduced to maintain the area under the cap (subject to applicable laws and regulations, such as the Mining Law of 1872 [as amended], valid existing rights, etc.). Within designated utility corridors, the 3 percent disturbance cap may be exceeded at the project scale if the site specific NEPA analysis indicates that a net conservation gain to the species will be achieved. This exception is limited to projects which fulfill the use for which the corridors were designated (ex., transmission lines, pipelines) and the designated width of a corridor will not be exceeded as a result of any project co-location.<br><br>An area with disturbance is not excluded from the 3 percent until it has been restored to provide GRSG habitat. The objective of successful restoration is to provide for the needs of GRSG, as evidenced by one of the following:<br>• Vegetative cover is consistent with the GRSG habitat objectives and the ecological site description (Objective SSS-3), or<br>• Monitoring indicates the area is regularly used by GRSG to sustain one or more seasonal habitat requirements (nesting, brood-rearing, winter).<br><br>Final restoration success and approval for abandonment for disturbances will be subject to an interdisciplinary review of available monitoring data and final monitoring reports. | 1) Notify the appropriate State of Utah agency to determine if the State of Utah requires or recommends any additional mitigation – including compensatory mitigation – under State regulations, policies, or programs related to the conservation of GRSG;<br>2) Recommend to the project proponent that it coordinate with the appropriate State of Utah agency to ensure it complies with all applicable State requirements relating to its proposal;<br>3) Consider the State's recommendations – if the State of Utah determines that there are unacceptable residual impacts on GRSG or its habitat and compensatory mitigation is required as a part of State policy or authorization, or if a proponent voluntarily offers mitigation, the BLM will incorporate that mitigation into the BLM's NEPA and decision-making process;<br>4) The BLM will ensure mitigation outcomes are consistent with the State of Utah's mitigation strategy and principles outlined in the State's Conservation Plan for Greater Sage-Grouse, including, but not limited to:<br>a) Creating, restoring and/or protecting functional habitat or habitat corridors to offset the impacts of unavoidable disturbance to GRSG habitat,<br>b) In most cases, compensatory mitigation projects should be completed before the project triggering mitigation occurs,<br>c) Compensatory mitigation projects should account for the risk that the mitigation may fail or not persist for the full duration of the project it is intended to offset,<br>d) Compensatory mitigation projects should provide habitat that is in place for at least the duration of the project it is intended to offset.<br><br>Project-specific analysis will be necessary to determine how a compensatory mitigation proposal addresses impacts from a proposed action. The BLM will cooperate with the State to determine appropriate project design and alignment with State policies and requirements, including those regarding compensatory mitigation. The | *(See above.)* |

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| C- Density of Energy/Mining Facilities<br>Subject to applicable laws and regulations and valid existing rights, if the average density of one energy and mining facility per 640 acres (the density cap) is exceeded on all lands (regardless of land ownership) in PHMA within a proposed project analysis area, then no further disturbance from energy or mining facilities will be permitted by BLM: (1) until disturbance in the proposed project analysis area has been reduced to maintain the limit under the cap; or (2) unless the energy or mining facility is collocated into an existing disturbed area (subject to applicable laws and regulations, such as the Mining Law of 1872 [as amended], valid existing rights, etc.). Energy and mining facilities to which this action applies are:<br>• Oil and gas wells and development facilities,<br>• Coal mines,<br>• Wind towers,<br>• Solar fields,<br>• Geothermal wells/developments, and<br>• Active locatable, leasable, and saleable developments.<br><br>D- Predation<br>In PHMA, eliminate or minimize external food sources for corvids, particularly dumps, or waste transfer facilities. Apply best management practices (BMP) to development activities to reduce opportunities for GRSG predators (e.g., limiting food sources, nest/perches deterrents, and road kill).<br><br>Apply habitat management practices (e.g. grazing management and vegetation treatments) that decrease the effectiveness of predators.<br><br>Collaborate with applicable government entities to implement programs to control predator populations of GRSG (e.g., ravens, red fox, badgers, and raccoons).<br><br>E- Noise Restrictions:<br>In PHMA, limit noise from discrete anthropogenic disturbances, whether during construction, operation, or maintenance, to not exceed 10 decibels above ambient sound levels (as available at the signing of the GRSG RMPA ROD or as | BLM will defer to the appropriate State authority to quantify habitat offsets, durability, and other aspects used to determine the recommended compensatory mitigation action.<br><br>The BLM will not deny a proposed authorization in GRSG habitat solely on the grounds that the proponent has not proposed or agreed to undertake voluntary compensatory mitigation. In cases where waivers, exceptions, or modification may be granted for projects with a residual impact, voluntary compensatory mitigation consistent with the State's management goals can be one mechanism by which a proponent achieves the RMPA goals, objectives, and waiver, exception, or modification criteria. When a proponent volunteers compensatory mitigation as their chosen approach to address residual impacts, the BLM can incorporate those actions into the rationale used to grant a waiver, exception, or modification. The final decision to grant a waiver, exception, or modification will be based, in part, on criteria consistent with the State's GRSG management plans and policies.<br><br>In short, the BLM would continue to apply the mitigation hierarchy as described in the CEQ regulations at 40 CFR 1508.20; however, the BLM would focus on avoiding, minimizing, rectifying, and reducing impacts over time. Compensation would be considered only when voluntarily offered by a proponent, required by a law other than FLPMA, or to meet a State recommendation or requirement. The BLM commits to cooperating with the State to analyze applicant-proposed, state-recommended, or state-imposed compensatory mitigation to offset residual impacts. The BLM remains committed to achieving the planning-level management goals and objectives identified in this ROD and the 2015 ARMPA by ensuring GRSG habitat impacts are addressed through implementing mitigating actions consistent with the governing RMP.<br><br>B- Disturbance Cap<br>In PHMA, manage discrete anthropogenic disturbances so they cover less than 3 percent of 1) PHMA associated with a GRSG population area and 2) within a | *(See above.)* |

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| first measured thereafter) at occupied leks from 2 hours before to 2 hours after official sunrise and sunset during breeding season (e.g., while males are strutting). Support the establishment of ambient baseline noise levels for PHMA habitat area leks.<br><br>Limit project related noise in other PHMA habitats and seasons where it will be expected to reduce functionality of habitats that support associated GRSG populations.<br><br>As additional research and information emerges, specific new limitations appropriate to the type of projects being considered will be evaluated and appropriate measures will be implemented where necessary to minimize potential for noise impacts on PHMA GRSG population behavioral cycles.<br><br><u>F- Tall Structure Restrictions:</u><br>In PHMA, limit the placement of permanent tall structures within GRSG breeding and nesting habitats.<br><br>For the purposes of this restriction, a tall structure is any man-made structure that provides for perching/nesting opportunities for predators (e.g., raptors and ravens) that are naturally absent, or that decreases the use of an area by GRSG. A determination as to whether something is considered a tall structure will be made based on local conditions such as existing vegetation or topography.<br><br><u>G- Seasonal Restrictions:</u><br>In PHMA, in coordination with the appropriate State of Utah agency, apply seasonal restrictions during the period specified below to manage discretionary discrete anthropogenic disturbances and uses on public lands to prevent disturbance to GRSG populations and habitat during seasonal life cycle periods as follows:<br>• In breeding (leks), nesting and early brood-rearing habitat from Feb 15 – Jun 15<br>• In brood rearing habitat from Apr 15 – Aug 15<br>• In winter habitat from Nov 15 – Mar 15 | proposed project analysis area. See Appendix E, Greater Sage-Grouse Disturbance Cap Guidance, for additional information on implementing the disturbance cap, including what is and is not considered disturbance and how to calculate the proposed project analysis area.<br><br>If the 3 percent disturbance cap is exceeded on all lands (regardless of land ownership) within GRSG PHMA in any given population area (BSU) or within a proposed project analysis area in PHMA, then no further discrete anthropogenic disturbances (subject to applicable laws and regulations, such as the Mining Law of 1872 [as amended], valid existing rights, etc.) will be permitted by the BLM within GRSG PHMA in any given population area (BSU) or the proposed project analysis area until the disturbance has been reduced to less than the cap.<br><br>However, the 3 percent cap may be exceeded at either scale if a technical team determines that site-specific Greater Sage-Grouse habitat and population information, combined with project design elements indicates the project will improve the condition of Greater Sage-Grouse habitat within the proposed project analysis area or within the PHMA in the population area where the project is located.<br><br>Factors considered by the team will include Greater Sage-Grouse abundance and trends, movement patterns, habitat amount and quality, extent and alignment of project disturbance, location and density of existing disturbance, project design options and other biological factors. Such exceptions to the 3 percent disturbance cap may only be approved by the BLM Authorized Officer with the concurrence of the State Director.<br><br>The finding and recommendation shall be made by the technical team, which should consist of, at least, a BLM field biologist, other local Greater Sage-Grouse experts, and biologists and other representatives from the appropriate State of Utah agency.<br><br>Within designated utility corridors, the 3 percent disturbance cap may be exceeded at the project scale if the site specific NEPA analysis indicates that doing so will improve the condition of Greater Sage-Grouse | *(See above.)* |

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| Specific time and distance determinations will be based on site-specific conditions and may be modified due to documented local variations (e.g., higher/lower elevations) or annual climactic fluctuations (e.g., early/late spring and long and/or heavy winter) in order to better protect GRSG, in coordination with the appropriate State of Utah agency.<br><br>H- Buffers:<br>In undertaking BLM management actions, and consistent with valid and existing rights and applicable law in authorizing third-party actions, the BLM will apply the lek buffer-distances identified in the US Geological Survey Report Conservation Buffer Distance Estimates for Greater Sage-Grouse – A Review (Open File Report 2014-1239; Manier et al. 2014) in accordance with Appendix B, Applying Lek-Buffer Distances.<br><br>I- Required Design Features/Best Management Practices:<br>In PHMA, apply the RDFs from the applicable sections identified in Appendix C, Required Design Features, when authorizing/permitting site-specific activities/projects for wildland fire management actions, travel and transportation, lands and realty, fluid minerals, nonenergy leasable minerals, coal, mineral materials, and locatable minerals (consistent with applicable law).<br><br>The applicability and overall effectiveness of each RDF cannot be fully assessed until the project level when the project location and design are known. Because of site-specific circumstances, some RDFs may not apply to some projects and/or may require slight variations. All variations in RDFs will require that at least one of the following be demonstrated in the NEPA analysis associated with the project/activity:<br>• A specific RDF is documented to not be applicable to the site-specific conditions of the project/activity (e.g. due to site limitations or engineering considerations). Economic considerations, such as increased costs, do not necessarily require that an RDF be varied or rendered inapplicable; | habitat in comparison to siting a project outside the designated corridor. This exception is limited to projects which fulfill the use for which the corridors were designated (ex., transmission lines, pipelines) and the designated width of a corridor will not be exceeded as a result of any project co-location.<br><br>An area with disturbance within GRSG habitat is not excluded from the 3 percent cap until it provides GRSG habitat. The objective of successful restoration of disturbed GRSG seasonal habitats is to provide for the needs of GRSG, which could be evidenced by one of the following:<br>• Vegetative cover is consistent with the GRSG habitat objectives and the ecological site description (Objective SSS-3), or<br>• Monitoring indicates the area is regularly used by GRSG to sustain one or more seasonal habitat requirements (nesting, brood-rearing, winter).<br><br>Include a schedule in project authorizations for monitoring the status of restoration efforts (e.g., areas of disturbance that meet the restoration criteria). Areas where disturbance would exceed 3 percent after project construction should include annual assessments to prioritize restoration efforts and determine what areas have been restored.<br><br>Areas of PHMA that were not Greater Sage-Grouse habitat at project initiation would be excluded from the 3 percent cap calculation upon project completion and reclamation, as outlined in the applicable lease or permit.<br><br>Final restoration success and approval for abandonment for disturbances will be subject to an interdisciplinary review of available monitoring data and final monitoring reports.<br><br>Consider the likelihood of development of not-yet-constructed surface-disturbing activities—as defined in Table D.2 of the Monitoring Framework (Appendix D of the 2015 ROD/ Approved RMPA)—under valid existing rights prior to authorizing new projects in PHMA. | *(See above.)* |

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| • An alternative RDF, state-implemented conservation measure, or plan-level protection is determined to provide equal or better protection for GRSG or its habitat;<br>• A specific RDF will provide no additional protection to GRSG or its habitat. | C- Density of Energy/Mining Facilities<br>Subject to applicable laws, including the Mining Law of 1872, and applicable regulations, and valid existing rights , if the average density of one energy and mining facility per 640 acres (the density cap) is exceeded on all lands (regardless of land ownership) in PHMA within a proposed project analysis area, then no further disturbance from energy or mining facilities will be permitted by BLM: (1) until disturbance in the proposed project analysis area has been reduced to maintain the limit under the cap; or (2) unless the energy or mining facility is collocated into an existing disturbed area (subject to applicable laws and regulations, such as the Mining Law of 1872 [as amended], valid existing rights, etc.); however, the density cap may be exceeded if a project is on non-habitat (see MA-SSS-1 language related to placement of development in non-habitat portions of PHMA), or if the process identified in MA-SSS-3B determines the project will improve the condition of GRSG habitat at the proposed project analysis area or within the PHMA where the project is located through analysis of site-specific GRSG habitat and population information and project design elements. Energy and mining facilities to which this action applies are:<br>• Oil and gas wells and development facilities,<br>• Coal mines,<br>• Wind towers,<br>• Solar fields,<br>• Geothermal wells/developments, and<br>• Active locatable, leasable, and saleable developments.<br><br>D- Predation<br>In PHMA, eliminate or minimize external food sources for corvids, particularly dumps, or waste transfer facilities. Apply best management practices (BMP) to development activities to reduce opportunities for GRSG predators (e.g., limiting food sources, nest/perches deterrents, and road kill).<br><br>Apply habitat management practices (e.g. grazing management and vegetation treatments) that decrease the effectiveness of predators. | *(See above.)* |

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| *(See above.)* | When conducting habitat treatments, remove trees that have corvid nests that could impact PHMA nesting and brood-rearing habitat when in compliance with the Migratory Bird Treaty Act (e.g., when the nest is unoccupied and outside of migratory bird nesting season).<br><br>Efforts by other agencies to minimize impacts from predators on the GRSG should be supported and encouraged where needs have been documented. Collaborate with applicable government entities to implement programs to control predator populations of GRSG (e.g., ravens, red fox, badgers, and raccoons).<br><br><u>E- Noise Restrictions:</u><br>In PHMA, limit noise from discrete anthropogenic disturbances, whether during construction, operation, or maintenance, to not exceed 10 decibels above ambient sound levels (as available at the signing of the GRSG RMPA ROD or as first measured thereafter) at occupied leks from 2 hours before to 2 hours after official sunrise and sunset during breeding season (e.g., while males are strutting). Support the establishment of ambient baseline noise levels for PHMA habitat area leks.<br><br>Limit project related noise in other PHMA habitats and seasons where it will be expected to reduce functionality of habitats that support associated GRSG populations.<br><br>As additional research and information emerges, specific new limitations appropriate to the type of projects being considered will be evaluated and appropriate measures will be implemented where necessary to minimize potential for noise impacts on PHMA GRSG population behavioral cycles.<br><br><u>F- Tall Structure Restrictions:</u><br>In PHMA, limit the placement of permanent tall structures within GRSG breeding and nesting habitats.<br><br>For the purposes of this restriction, a tall structure is any man-made structure that provides for perching/nesting opportunities for predators (e.g., raptors and ravens) that are naturally absent, or that decreases the use of an area by GRSG. A determination as | *(See above.)* |

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| *(See above.)* | to whether something is considered a tall structure will be made based on local conditions such as existing vegetation or topography.<br><br><u>G- Seasonal Restrictions:</u><br>In PHMA, in coordination with the appropriate State of Utah agency, apply seasonal restrictions during the period specified below to manage discretionary discrete anthropogenic disturbances and uses on public lands to prevent disturbance to GRSG populations and habitat during seasonal life cycle periods as follows:<br>• In breeding (leks), nesting and early brood-rearing habitat from Feb 15 – Jun 15<br>• In brood rearing habitat from Apr 15 – Aug 15<br>• In winter habitat from Nov 15 – Mar 15<br><br>Specific time and distance determinations will be based on site-specific conditions and may be modified due to documented local variations (e.g., higher/lower elevations) or annual climactic fluctuations (e.g., early/late spring and long and/or heavy winter) in order to better protect GRSG, in coordination with the appropriate State of Utah agency.<br><br><u>H- Buffers:</u><br>In undertaking BLM management actions, and consistent with valid and existing rights and applicable law in authorizing third-party actions, the BLM will assess and address impacts within the lek buffer-distances identified in the US Geological Survey Report Conservation Buffer Distance Estimates for Greater Sage-Grouse – A Review (Open File Report 2014-1239; Manier et al. 2014) in accordance with Appendix B, Applying Lek-Buffer Distances.<br><br><u>I- Required Design Features/Best Management Practices:</u><br>In PHMA, apply the RDFs from the applicable sections identified in Appendix C, Required Design Features, when authorizing/permitting site-specific activities/projects for wildland fire management actions, travel and transportation, lands and realty, fluid minerals, nonenergy leasable minerals, coal, | *(See above.)* |

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| *(See above.)* | mineral materials, and locatable minerals (consistent with applicable law).<br><br>The applicability and overall effectiveness of each RDF cannot be fully assessed until the project level when the project location and design are known. Because of site-specific circumstances, some RDFs may not apply to some projects and/or may require slight variations. All variations in RDFs will require that at least one of the following be demonstrated in the NEPA analysis associated with the project/activity:<br>• A specific RDF is documented to not be applicable to the site-specific conditions of the project/activity (e.g. due to site limitations or engineering considerations). Economic considerations, such as increased costs, do not necessarily require that an RDF be varied or rendered inapplicable;<br>• An alternative RDF, state-implemented conservation measure, or plan-level protection is determined to provide equal or better protection for GRSG or its habitat;<br>A specific RDF will provide no additional protection to GRSG or its habitat. | *(See above.)* |
| **MA-SSS-4**: In PHMA and in adjacent opportunity areas, maintain, improve and restore GRSG habitat to support GRSG populations and to maintain or enhance connectivity. Vegetation treatments will be applied to meet GRSG habitat objectives and provide additional GRSG habitat, unless there is a conflict with Utah prairie dog, where the landscape will be managed for both species.<br><br>PHMA boundaries may be adjusted to include additional restored GRSG habitat and habitat identified during survey or inventory work. Changes to maps and associated management will occur through the appropriate BLM planning processes (e.g., plan maintenance or plan amendment), as described in Appendix K. | No changes made. | No change proposed. |

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| **MA-SSS-5:** In GHMA, apply the following management to meet the objective of a net conservation gain for discretionary actions that can result in habitat loss and degradation:<br><br>A- Existing Management:<br>Implement GRSG management actions included in the existing RMPs and project-specific mitigation measures associated with existing decisions.<br><br>B- Net Conservation Gain:<br>In all GRSG habitat, in undertaking BLM management actions, and, consistent with valid existing rights and applicable law, in authorizing third-party actions that result in habitat loss and degradation, the BLM will require and ensure mitigation that provides a net conservation gain to the species, including accounting for any uncertainty associated with the effectiveness of such mitigation. This will be achieved by avoiding, minimizing, and compensating for impacts by applying beneficial mitigation actions. Exceptions to net conservation gain for GRSG may be made for vegetation treatments to benefit Utah prairie dog.<br><br>Mitigation will be conducted according to the mitigation framework contained in Appendix F.<br><br>C- Buffers:<br>In undertaking BLM management actions, and consistent with valid and existing rights and applicable law in authorizing third-party actions, the BLM will apply the lek buffer-distances identified in the US Geological Survey Report Conservation Buffer Distance Estimates for Greater Sage-Grouse – A Review (Open File Report 2014-1239; Manier et al. 2014) in accordance with Appendix B.<br><br>D- Required Design Features/Best Management Practices:<br>In GHMA, apply the fluid mineral RDFs that are associated with GHMA identified in Appendix C when authorizing/permitting site-specific fluid mineral development activities/projects.<br><br>The applicability and overall effectiveness of each RDF cannot be fully assessed until | No similar action. | Potential change under Alternatives 3, 4, 5, and 6. |

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| the project level when the project location and design are known. Because of site-specific circumstances, some RDFs may not apply to some projects and/or may require slight variations. All variations in RDFs will require that at least one of the following be demonstrated in the NEPA analysis associated with the project/activity:<br>• A specific RDF is documented to not be applicable to the site-specific conditions of the project/activity (e.g. due to site limitations or engineering considerations). Economic considerations, such as increased costs, do not necessarily require that an RDF be varied or rendered inapplicable;<br>• An alternative RDF, state-implemented conservation measure, or plan-level protection is determined to provide equal or better protection for GRSG or its habitat;<br>• A specific RDF will provide no additional protection to GRSG or its habitat. | *(See above.)* | *(See above.)* |
| **MA-SSS-6**<br><u>Sage-Grouse Management Outside PHMA/GHMA</u><br>Proposed projects within State of Utah Sage-Grouse Management Areas (SGMA) and USFWS priority areas for conservation (PAC), as well as adjacent to PHMA outside these areas, will consider impacts on GRSG and implement measures to mitigate impacts when preparing site-specific planning and environmental compliance documents.<br><br>Outside of PHMA, prior to site-specific authorizations, the BLM will evaluate habitat conditions and may require surveys to determine if the project area contains GRSG habitat (FLPMA, 43 United States Code (USC) 1701 Sec. 201 (a); BLM Manual 6840.04 D3; BLM-M-6840.04 E2). Surveys will be required prior to authorizing discrete anthropogenic disturbances within 4 miles of an occupied lek that is located in PHMA, but only in existing sagebrush. | **MA-SSS-6**<br><u>Sage-Grouse Management Outside PHMA</u><br>Outside PHMA, implement Greater Sage-Grouse management actions included in the RMPs and project-specific mitigation measures associated with decisions that pre-dated the 2015 amendments.<br><br>Proposed projects within State of Utah Sage-Grouse Management Areas (SGMA) and USFWS priority areas for conservation (PAC), as well as adjacent to PHMA outside these areas, will consider impacts on GRSG and may implement measures to mitigate impacts on GRSG populations within adjacent PHMA when preparing site-specific planning and environmental compliance documents.<br><br>Outside of PHMA, but within SGMAs and PACs, avoid removal of sagebrush and minimize development that creates a physical barrier to GRSG movement; these areas may be used by GRSG to connect to other populations or seasonal habitat areas. Exceptions shall be made for vegetation treatments to benefit Utah prairie dog, | Potential change under Alternatives 3, 4, 5, and 6. |

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| If an area is determined to be GRSG habitat (e.g., nesting, brood-rearing, winter, transition), mitigation will be considered as part of the project level NEPA analysis and will be attached as conditions of approval to new discretionary actions, if deemed necessary to protect the habitat (BLM Manual 6840.04 D 5). Measures that may be considered include those identified in Appendix C.<br><br>Outside of PHMA, but within SGMAs and PACs, avoid removal of sagebrush and minimize development that creates a physical barrier to GRSG movement; these areas may be used by GRSG to connect to other populations or seasonal habitat areas. Exceptions shall be made for vegetation treatments to benefit Utah prairie dog, where the landscape will be managed for both species.<br><br>Outside of PHMA, but within SGMAs and PACs, consider noise and permanent structure stipulations around leks.<br><br>Outside PHMA, portions of State of Utah opportunity areas (see Final EIS Map 2.4) within 4 miles of a lek that is located in PHMA will be managed with the following allocations:<br>• Fluid minerals will be open for leasing with CSU stipulations (noise and tall structures).<br>• Lands ROWs, permits, and leases will be avoided, applying avoidance criteria for noise and tall structures.<br><br>Do not site wind energy development in opportunity areas within 5 miles from occupied GRSG leks that are in PHMA.<br><br>Outside of PHMA, avoid and minimize effects from discrete anthropogenic disturbances in areas that have been treated with the intent of improving or creating new GRSG habitat. Evaluate conditions in the treated area to determine if it is providing habitat for GRSG and if additional measures are necessary to protect the habitat. | where the landscape will be managed for both species.<br><br>Outside of PHMA, but within SGMAs and PACs, consider noise and permanent structure stipulations around leks.<br><br>Outside PHMA, after analyzing the impacts using the buffer distances identified in Appendix B from a lek that is located in PHMA, portions of State of Utah opportunity areas will be managed with the following allocations:<br>• Fluid minerals will be open for leasing with CSU stipulations (noise and tall structures).<br>• Lands ROWs, permits, and leases will be avoided, applying avoidance criteria for noise and tall structures.<br><br>Avoid siting wind energy development in opportunity areas within the buffer distances identified in Appendix B from occupied GRSG leks that are in PHMA, if the lek buffer analysis as identified in Appendix B shows that siting wind energy development in opportunities areas will impact lek persistence within PHMA.<br><br>Outside of PHMA, avoid and minimize effects from discrete anthropogenic disturbances in areas that have been treated with the intent of improving or creating new GRSG habitat. Evaluate conditions in the treated area to determine if it is providing habitat for GRSG and if additional measures are necessary to protect the habitat.<br><br>Outside of PHMA, provide that acres of GRSG seasonal habitat (based on best available maps, then confirmed to be regularly used by Greater Sage-Grouse to sustain one or more seasonal habitat requirements through coordination with the appropriate State of Utah agency and through on-the-ground information) that is lost to habitat degradation actions (Appendix C, Table C.2 of the 2015 ROD/Approved RMPA) are replaced by creating/improving Greater Sage-Grouse habitat within PHMA. | *(See above.)* |

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| **MA-SSS-7**<br>Adaptive Management<br>This plan establishes soft and hard triggers for both GRSG populations and habitat. The specific triggers and additional detail on the management responses are identified in Appendix I, Adaptive Management. The hard and soft trigger data will be analyzed as soon as it becomes available after the signing of the ROD and then at a minimum, analyzed annually thereafter.<br><br>If monitoring indicates the soft-trigger is met, the BLM will determine if there is a specific cause or causes that are contributing to the decline. If it is determined that the decline is related to a natural population variation, no specific management actions will be required. However, if BLM management actions are determined to cause or contribute to the decline, the BLM manager will apply measures within their implementation-level discretion to mitigate the decline of populations and/or habitats to the area where the trigger has been met. These measures will apply more conservative or restrictive implementation conservation conditions, terms, or decisions within the agencies' discretion to mitigate the decline of populations and/or habitats.<br><br>If monitoring indicates the hard trigger is met, a set of specific management actions from the BLM Proposed Plan will immediately be replaced with or adjusted by different management actions in the area where the trigger has been met. Table I.1 of Appendix I identifies the management actions from the BLM Proposed Plan, and the corresponding new management actions that will be immediately implemented to the specific area in the event a hard trigger is met. In addition to these specific changes, the BLM will review available and pertinent data for the area, in coordination GRSG biologists from multiple agencies including the appropriate State of Utah agency, USFWS, and NRCS, to determine the causal factor(s) and implement a corrective strategy. The final strategy associated with a hard trigger being met will be the | **MA-SSS-7**<br>Adaptive Management<br>This plan establishes soft and hard triggers for both GRSG populations and habitat. The specific triggers and additional detail on the management responses are identified in Appendix I, Adaptive Management. The hard and soft trigger data will be analyzed annually.<br><br>If monitoring indicates the soft-trigger is met, the BLM will review available and pertinent data, in coordination with GRSG biologists from multiple agencies including the appropriate State of Utah agency, USFS, USFWS, and/or NRCS, to determine the causal factor(s) for the declines within 6 months of identifying that a trigger has been met. If it is determined that the decline is related to a natural population variation, no specific management actions will be required; however, if BLM management actions are determined to cause or contribute to the decline, the BLM will work with the appropriate State of Utah agency and public land users to identify and apply management to slow down or stop the population decline. Such measures would be applied by the BLM manager within their implementation-level discretion to mitigate the decline of populations and/or habitats to the area where the trigger has been met. These measures will apply more conservative or restrictive implementation conservation conditions, terms, or decisions within the agencies' discretion to mitigate the decline of populations and/or habitats. Such measures could also include other management actions which may require the need to amend the RMP to address the situation and modify management.<br><br>If monitoring indicates the hard trigger is met, the BLM will review available and pertinent data, in coordination with GRSG biologists from multiple agencies including the appropriate State of Utah agency, USFS, USFWS, and/or NRCS, to determine the causal factor(s) for the declines. The BLM and the team will also identify measures needed to address the causal factor(s) and develop a corrective strategy for the area where the trigger has been met. The corrective strategy would include the | Potential change under Alternatives 3, 4, 5, and 6. |

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| changes identified in Table I.1 of Appendix I, and may also include the need to further amend or revise the RMP to address the situation and modify management accordingly, for the area where the trigger was met. | applicable changes identified in Table I.1 of Appendix I that address the causal factor, and could also include other management actions, which may be require the need to amend the RMP to address the situation and modify management. If determining the causal factor and development of the corrective strategy is not completed within 6 months of documenting that the trigger has been met, all the plan level responses identified in Table I.1 will be applied until the causal factor analysis is complete. Upon completion of the causal factor analysis any responses that do not address the causal factor(s) would be removed. In developing a corrective strategy, managers may select changes in management that are identified in Table I.1, Specific Management Responses that have already been analyzed for implementation. This table also identifies which decision from the BLM RMPA would be changed.<br><br>The management identified in the corrective strategy would be implemented until ten-year population trends reflect natural fluctuations anticipated for the area. The BLM would determine the area reflects natural fluctuations in coordination with GRSG biologists from multiple agencies including Forest Service, UDWR, USFWS, and/or NRCS. Upon determination, the management would revert to the RMPA.<br><br>If all the leks in an area that has met a hard trigger are not active for ten years, becoming unoccupied by definition, the PHMA designation and all its associated management would be removed since there is no longer a GRSG population for which management should be prioritized.<br><br>For any area that has met a soft or hard trigger, the BLM, the appropriate State of Utah agency, and other members of the technical team will annually review monitoring data regarding population and habitat trends to verify that management actions implemented to mitigate declines are being successful. If monitoring indicates continued declines, the causal factor analysis will be reviewed, updated if needed, and applicable additional management would be identified and implemented. | *(See above.)* |

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| ***VEGETATION (VEG)*** | ***VEGETATION (VEG)*** | ***VEGETATION (VEG)*** |
| **Objectives:** | **Objectives:** | **Objectives:** |
| **Objective VEG-1:** In SFA and PHMA, the desired condition is to maintain all lands ecologically capable of producing sagebrush (but no less than 70 percent) with a minimum of 15 percent sagebrush cover or as consistent with specific ecological site conditions; exceptions to this objective shall be made where GRSG habitat and Utah prairie dog occur on the same landscape, which will be managed for both species. The attributes necessary to sustain these habitats are described in Interpreting Indicators of Rangeland Health (BLM Tech Ref 1734-6). | **Objective VEG-1:** In PHMA, the desired condition is to maintain all lands ecologically capable of producing sagebrush (but no less than 70 percent) with a minimum of 15 percent sagebrush cover or as consistent with specific ecological site conditions; exceptions to this objective shall be made where GRSG habitat and Utah prairie dog occur on the same landscape, which will be managed for both species. The attributes necessary to sustain these habitats are described in Interpreting Indicators of Rangeland Health (BLM Tech Ref 1734-6). | No change proposed. |
| **Management Actions (MA):** | **Management Actions (MA):** | **Management Actions (MA):** |
| **MA-VEG-1**: In PHMA, where necessary to meet GRSG habitat objectives, treat areas to maintain and expand healthy GRSG habitat (e.g., conifer encroachment areas and annual grasslands).<br><br>In PHMA, prioritize implementation of restoration/treatment projects based on environmental variables that improve chances for project success in areas most likely to benefit GRSG (e.g., proximity to existing GRSG populations, ecological site potential, and resistance and resilience), documented in Appendix H, Fire and Invasives Assessment Tool.<br><br>In PHMA, prioritize restoration in seasonal habitats that are identified as the limiting factor for GRSG distribution and/or abundance.<br><br>Apply seasonal restrictions to avoid treating areas during seasons of use, as needed, when implementing vegetation treatments (see MA-SSS-3G).<br><br>In PHMA, avoid sagebrush reduction treatments within GRSG nesting and winter habitat unless the project plan and associated NEPA document demonstrate a biological need for the treatment to maintain or improve habitat for the GRSG population, or unless the treatment is for Utah prairie dog recovery where the needs of both species will be addressed on the landscape. Coordinate with the appropriate State of Utah agency and the | **MA-VEG-1**: In PHMA, where necessary to meet GRSG habitat objectives, treat areas to maintain and expand healthy GRSG habitat (e.g., conifer encroachment areas and invasive annual grasslands).<br><br>In PHMA, prioritize implementation of restoration/treatment projects based on environmental variables that improve chances for project success in areas most likely to benefit GRSG (e.g., proximity to existing GRSG populations, ecological site potential, and resistance and resilience), documented in Appendix H, Fire and Invasives Assessment Tool.<br><br>In PHMA, prioritize restoration in seasonal habitats that are identified as the limiting factor for GRSG distribution and/or abundance.<br><br>Apply seasonal restrictions to avoid treating areas during seasons of use, as needed, when implementing vegetation treatments (see MA-SSS-3G).<br><br>In PHMA, avoid sagebrush reduction treatments within GRSG nesting and winter habitat unless the project plan and associated NEPA document demonstrate a biological need for the treatment to maintain or improve habitat for the GRSG population, or unless the treatment is for Utah prairie dog recovery where the needs of both species will be addressed on the landscape. Coordinate with the appropriate State of Utah agency and the USFWS prior | No change proposed. |

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| USFWS prior to conducting sagebrush treatment projects within nesting and winter habitat.<br><br>Use collaborative planning efforts to develop and implement habitat restoration projects. Expertise and ideas from entities such as local landowners, local GRSG working groups, and other federal, state, county, and private organizations shall be solicited and considered in development of restoration projects.<br><br>In PHMA, implement project design features that will contribute to the most favorable conditions for success when planning and implementing restoration/vegetation treatment projects. Examples include, but are not limited to the following:<br>• Review of available plant species and their adaptation to the site when developing seed mixes.<br>• The need to reduce non-native annual grass densities and competition through herbicide, targeted grazing, tillage, etc.<br>• Assessment of on-site vegetation to ascertain if enough desirable perennial vegetation exists to consider the use of passive restoration techniques.<br>• Use of site preparation techniques that retain existing desirable vegetation.<br>• Use of "mother plant" techniques or planting of satellite populations of desirable plants to serve as seed sources.<br>• The need for post-treatment control of non-native annual grass and other invasive species.<br><br>Upon completion of vegetation treatments, monitor and manage the project area to ensure long-term success, including persistence of seeded species and/or other treatment components, such as implementing maintenance treatments. | to conducting sagebrush treatment projects within nesting and winter habitat.<br><br>Use collaborative planning efforts to develop and implement habitat restoration projects. Expertise and ideas from entities such as local landowners, local GRSG working groups, and other federal, state, county, and private organizations shall be solicited and considered in development of restoration projects.<br><br>In PHMA, implement project design features that will contribute to the most favorable conditions for success when planning and implementing restoration/vegetation treatment projects. Examples include, but are not limited to the following:<br>• Review of available plant species and their adaptation to the site when developing seed mixes.<br>• The need to reduce non-native annual grass densities and competition through herbicide, targeted grazing, tillage, etc.<br>• Assessment of on-site vegetation to ascertain if enough desirable perennial vegetation exists to consider the use of passive restoration techniques.<br>• Use of site preparation techniques that retain existing desirable vegetation.<br>• Use of "mother plant" techniques or planting of satellite populations of desirable plants to serve as seed sources.<br>• The need for post-treatment control of non-native annual grass and other invasive species.<br><br>Upon completion of vegetation treatments, monitor and manage the project area to ensure long-term success, including persistence of seeded species and/or other treatment components, such as implementing maintenance treatments. | *(See above.)* |

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| **MA-VEG-2:** Remove conifers encroaching into sagebrush habitats, in a manner that considers tribal cultural values. When conducting conifer treatments:<br>• Prioritize treatments closest to occupied GRSG habitats and near occupied leks, and where juniper encroachment is phase I or phase II.<br>• Treat areas in late Phase II or Phase III condition to create movement corridors, connect habitats, or to break up continuous, hazardous fuels and reduce the potential for catastrophic fire.<br>• Prioritize methods to reduce conifer canopy cover to those that maintain the understory vegetation as the preferred treatment methods (e.g., mechanical, lop and scatter).<br>• Require that vegetation treatments conducted within 0.6 miles of a lek include an objective of reducing conifer, where technically feasible, to less than 5 percent canopy cover, with preference for complete removal.<br>• Include stipulations to avoid removing old-growth pinyon/juniper stands (e.g., Tausch et al. 2009; Miller et al. 1999).<br>• Use of site-specific analysis and tools like the Vegetation Dynamics Development Tool and the fire and invasives assessment tool report (Chambers et al. 2014) will help refine the location for specific areas to be treated. | **MA-VEG-2:** Remove conifers encroaching into sagebrush habitats, in a manner that considers tribal cultural values. When conducting conifer treatments:<br>• Prioritize treatments closest to occupied GRSG habitats and near occupied leks, and where juniper encroachment is phase I or phase II.<br>• Treat areas in late Phase II or Phase III condition to create movement corridors, connect habitats, or to break up continuous, hazardous fuels and reduce the potential for catastrophic fire.<br>• Prioritize methods to reduce conifer canopy cover to those that maintain the understory vegetation as the preferred treatment methods (e.g., mechanical, lop and scatter).<br>• When conducting habitat treatments, remove trees that have corvid nests that could impact PHMA nesting and brood-rearing habitat when in compliance with the Migratory Bird Treaty Act (e.g., when the nest is unoccupied and outside of migratory bird nesting season).<br>• Require that vegetation treatments conducted within 0.6 miles of a lek include an objective of reducing conifer, where technically feasible, to less than 5 percent canopy cover, with preference for complete removal.<br>• Include stipulations to avoid removing old-growth pinyon/juniper stands (e.g., Tausch et al. 2009; Miller et al. 1999).<br>• Use of site-specific analysis and tools like the Vegetation Dynamics Development Tool and the fire and invasives assessment tool report (Chambers et al. 2014) will help refine the location for specific areas to be treated. | No change proposed. |
| **MA-VEG-3:** In PHMA manage wet meadows to maintain a component of perennial forbs with diverse species richness relative to site potential (e.g., reference state) to facilitate brood rearing. Also conserve or enhance these wet meadow complexes to maintain or increase amount of edge and cover within that edge. | **MA-VEG-3:** In PHMA manage riparian areas for proper functioning condition. In PHMA manage wet meadows to maintain a component of perennial forbs with diverse species richness relative to site potential (e.g., reference state) to facilitate brood rearing. Also conserve or enhance these wet meadow complexes to maintain or increase amount of edge and cover within that edge. | No change proposed. |

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| **MA-VEG-4**: In PHMA, include GRSG habitat objectives in restoration/treatment projects. Include short-term and long-term habitat conditions in treatment objectives, including specific objectives for the establishment of sagebrush cover and height, as well as cover and heights for understory perennial grasses and forbs necessary for GRSG seasonal habitats (see Objective SSS-3).<br><br>Make meeting the GRSG objectives for the restoration/treatment project one of the primary priorities for the project and subsequent land uses, recognizing that managing for other special status species may result in treatment objectives that may not meet GRSG seasonal habitat objectives (e.g., winter habitat cover requirements versus creation of Utah prairie dog habitat). Where GRSG habitat overlaps with that of federally listed threatened or endangered species (e.g., Utah prairie dogs), coordinate with species-specific experts to develop conservation and recovery objectives and allow habitat treatments that will benefit both species. | No changes made. | No change proposed. |
| **MA-VEG-5**: In PHMA, prioritize the use of native seeds for restoration based on availability, adaptation (ecological site potential), and probability of success. Where probability of success or adapted seed availability is low, desirable non-native seeds may be used as long as they support GRSG habitat objectives. Re-establishment of appropriate sagebrush species/subspecies and important understory plants, relative to site potential, should be the principle objective for rehabilitation efforts. | No changes made. | No change proposed. |
| **MA-VEG-6**: In PHMA, design post restoration management to ensure long term persistence. This could include changes in livestock grazing management, wild horse and burro management and travel management, etc., to achieve and maintain the desired condition of the restoration effort that benefits GRSG, as well as monitoring and maintaining the treated area. | No changes made. | No change proposed. |

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| **MA-VEG-7**: In PHMA, limit commercial seed or live plant collection to levels that ensure long-term maintenance of the GRSG habitat objectives. Locations, species allowed for collection, and limits on the amounts to be collected will be developed on a case-by-case basis following environmental review of annual site-specific conditions. Commercial collection during sensitive seasonal periods (see MA-SSS-3G) will include mitigation, developed to reflect the site-specific conditions on the ground, that could include, but is not necessarily limited to, restrictions on the timing and method of collection activities, limiting the number of individuals collecting, providing portions of collected seeds for use in local restoration projects, etc. | No changes made. | No change proposed. |
| **MA-VEG-8:** In PHMA, allow for seed collection and use in restoration/reclamation activities. Prioritize use of seed from areas as close as possible to where the seed will be used to capture local adaptations. | No changes made. | No change proposed. |
| **MA-VEG-9:** In PHMA, diversify the perennial grass and forb components through additional seeding in areas where historical seedings (e.g., crested wheatgrass) have been recolonized by sagebrush. | No changes made. | No change proposed. |
| **MA-VEG-10**: Follow the applicable and technically feasible RDFs in Appendix C for vegetation projects/activities (fuels management) at the site-level unless at least one of the following can be demonstrated in the NEPA analyses associated with the project/activity:<br>• A specific RDF is documented to not be applicable to the site-specific conditions of the project/activity;<br>• An alternative RDF, state-implemented conservation measure, or plan-level protection is determined to provide equal or better protection for GRSG or its habitat;<br>• A specific RDF will provide no additional protection to GRSG or its habitat. | No changes made. | No change proposed. |

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| **MA-VEG-11**: In PHMA, design post Emergency Stabilization and Rehabilitation/Burn Area Emergency Rehabilitation management to ensure long term persistence of seeded or pre-burn native plants. This may require temporary or long-term changes in livestock grazing, wild horse and burro, and travel management, etc., to achieve and maintain the desired condition of Emergency Stabilization and Rehabilitation projects to benefit GRSG (Eiswerth and Shonkwiler 2006).<br><br>Monitor and control invasive vegetation post-wildfire for at least 3 years. | No changes made. | No change proposed. |
| Integrated Invasive Species Management<br>**MA-VEG-12**: In PHMA, integrated Vegetation Management will be used to control, suppress, and eradicate noxious and invasive species per BLM Handbook H-1740-2. | No changes made. | No change proposed. |
| **MA-VEG-13**: In PHMA, treatments of Mormon cricket outbreaks will be collaborated with partners at the federal, state, and local levels to maintain and enhance GRSG habitats. | No changes made. | No change proposed. |
| **MA-VEG-14**: Treat areas that contain cheatgrass and other invasive or noxious species to minimize competition and favor establishment of desired species. | No changes made. | No change proposed. |

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| ***FIRE AND FUELS MANAGEMENT (FIRE)*** | ***FIRE AND FUELS MANAGEMENT (FIRE)*** | — |
| **Management Actions (MA):** | **Management Actions (MA):** | — |
| **MA-FIRE-1:** In collaboration with the USFWS and relevant state agencies, complete and maintain GRSG Landscape Wildland Fire and Invasive Species Habitat Assessments to prioritize at risk habitats, and identify fuels management, preparedness, suppression and restoration priorities necessary to maintain sagebrush habitat to support interconnecting GRSG populations. These assessments and subsequent assessment updates will also be a collaborative effort to take into account other GRSG priorities identified in this plan. Appendix H describes a minimal framework example and suggested approach for this assessment.<br><br>Implementation actions will be tiered to the local GRSG Landscape Wildland Fire and Invasive Species Assessment, using best available science related to the conservation of GRSG.<br><br>In collaboration with USFWS and relevant state agencies, BLM planning units will identify annual treatment needs for wildfire and invasive species management as identified in local unit level Landscape Wildfire and Invasive Species Assessments. Annual treatment needs will be coordinated across state/regional scales and across jurisdictional boundaries for long-term conservation of GRSG.<br><br>Annually complete a review of landscape assessment implementation efforts with appropriate USFWS and state agency personnel. | No changes made. | No change proposed. |

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| **MA-FIRE-3:** In PHMA, fuel treatments will be designed through an interdisciplinary process to expand, enhance, maintain, or protect GRSG habitat.<br>• In collaboration with USFWS and relevant state agencies, BLM planning units with large blocks of GRSG habitat will develop, using the assessment process described in Appendix H, a fuels management strategy which considers an up-to-date fuels profile, land use plan direction, current and potential habitat fragmentation, sagebrush and GRSG ecological factors, and active vegetation management steps to provide critical breaks in fuel continuity, where appropriate. When developing this strategy, planning units will consider the risk of increased habitat fragmentation from a proposed action versus the risk of large scale fragmentation posed by wildfires if the action is not taken.<br>• Use green strips and/or fuel breaks to protect GRSG habitat from fire events.<br>• When possible, locate fuel breaks along existing roads, ROWs, and other suitable topographic or natural features (e.g., areas devoid of vegetation, rock outcrops).<br>• Avoid constructing fuel breaks through large areas of intact GRSG habitat, unless the associated NEPA document demonstrates a biological need for the fuel break to maintain or protect habitat for the GRSG population. Coordinate with the appropriate State of Utah agency and the USFWS prior to constructing fuel breaks within nesting and winter habitat.<br>• Using an interdisciplinary approach, a full range of fuel reduction techniques will be available. Fuel reduction techniques such as conifer reduction, grazing, prescribed fire, chemical, biological, and mechanical treatments may be acceptable, given site-specific variables.<br>• Remove encroaching conifer stands as a fuels management tool, where environmental review documents it protects or improves GRSG habitat. | **MA-FIRE-3:** In PHMA, fuel treatments will be designed through an interdisciplinary process to expand, enhance, maintain, or protect GRSG habitat.<br>• In collaboration with USFWS and relevant state agencies, BLM planning units with large blocks of GRSG habitat will develop, using the assessment process described in Appendix H, a fuels management strategy which considers an up-to-date fuels profile, land use plan direction, current and potential habitat fragmentation, sagebrush and GRSG ecological factors, and active vegetation management steps to provide critical breaks in fuel continuity, where appropriate. When developing this strategy, planning units will consider the risk of increased habitat fragmentation from a proposed action versus the risk of large scale fragmentation posed by wildfires if the action is not taken.<br>• Use green strips and/or fuel breaks to protect GRSG habitat from fire events.<br>• When possible, locate fuel breaks along existing roads, ROWs, and other suitable topographic or natural features (e.g., areas devoid of vegetation, rock outcrops).<br>• Avoid constructing fuel breaks through large areas of intact GRSG habitat, unless the associated NEPA document demonstrates a biological need for the fuel break to maintain or protect habitat for the GRSG population. Coordinate with the appropriate State of Utah agency and the USFWS prior to constructing fuel breaks within nesting and winter habitat.<br>• Using an interdisciplinary approach, a full range of fuel reduction techniques will be available. Fuel reduction techniques such as conifer reduction, targeted livestock grazing, prescribed fire, chemical, biological, and mechanical treatments may be acceptable, given site-specific variables.<br>• Remove encroaching conifer stands as a fuels management tool, where environmental review documents it protects or improves GRSG habitat.<br>• Prioritize the use of native seeds for fuels management treatment based on availability, adaptation (site potential), and probability of success. Where probability | No change proposed. |

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| • Prioritize the use of native seeds for fuels management treatment based on availability, adaptation (site potential), and probability of success. Where probability of success for native seed availability is low, desirable non-native seeds may be used to meet GRSG habitat objectives to trend toward restoring the fire regime. When reseeding, use fire resistant native and desirable non-native species, as appropriate, to provide for fire breaks.<br>• Upon project completion, monitor and manage fuels projects to ensure long-term success, including persistence of seeded species and/or other treatment components, such as implementing maintenance actions. Control invasive vegetation post-treatment.<br>• Apply seasonal restrictions, as needed, for implementing fuels management treatments according to the type of seasonal habitats present (see MA-SSS-3G).<br><br>In PHMA, avoid sagebrush reduction fuels treatments within GRSG nesting and winter habitat unless the project plan and associated NEPA document demonstrate a biological need for the treatment to maintain or improve habitat for the GRSG population, or unless the treatment is for Utah prairie dog recovery where the needs of both species will be addressed on the landscape. Treatments in winter habitat should be designed to maintain sagebrush, especially tall sagebrush (sagebrush capable of standing above heavier than normal snowfall), which will be available to GRSG above snow during a severe winter, considering the needs of Utah prairie dog recovery. Prior to conducting fuels treatments in winter habitat, coordinate with the appropriate State of Utah agency and the USFWS to design the treatment to strategically reduce wildfire risk around or in the winter habitat. | of success for native seed availability is low, desirable non-native seeds may be used to meet GRSG habitat objectives to trend toward restoring the fire regime. When reseeding, use fire resistant native and desirable non-native species, as appropriate, to provide for fire breaks.<br>• Upon project completion, monitor and manage fuels projects to ensure long-term success, including persistence of seeded species and/or other treatment components, such as implementing maintenance actions. Control invasive vegetation post-treatment.<br>• Apply seasonal restrictions, as needed, for implementing fuels management treatments according to the type of seasonal habitats present (see MA-SSS-3G).<br><br>In PHMA, avoid sagebrush reduction fuels treatments within GRSG nesting and winter habitat unless the project plan and associated NEPA document demonstrate a biological need for the treatment to maintain or improve habitat for the GRSG population, or unless the treatment is for Utah prairie dog recovery where the needs of both species will be addressed on the landscape. Treatments in winter habitat should be designed to maintain sagebrush, especially tall sagebrush (sagebrush capable of standing above heavier than normal snowfall), which will be available to GRSG above snow during a severe winter, considering the needs of Utah prairie dog recovery. Prior to conducting fuels treatments in winter habitat, coordinate with the appropriate State of Utah agency and the USFWS to design the treatment to strategically reduce wildfire risk around or in the winter habitat. | *(See above.)* |

| 2015 BLM GRSG Approved RMP Amendment | Changes between 2015 and 2019 GRSG Management | Potential for Change in 2023 Plan |
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| **MA-FIRE-4:** If prescribed fire is used in GRSG habitat, the NEPA analysis for the Burn Plan will address:<br>• why alternative techniques were not selected as a viable options;<br>• how GRSG goals and objectives will be met by its use;<br>• how the COT Report objectives will be addressed and met;<br>• a risk assessment to address how potential threats to GRSG habitat will be minimized.<br><br>Prescribed fire as a vegetation or fuels treatment shall only be considered after the NEPA analysis for the Burn Plan has addressed the four bullets outlined above. Prescribed fire may be used to meet specific fuels objectives that will protect GRSG habitat in PHMA (e.g., creation of fuel breaks that will disrupt the fuel continuity across the landscape in stands where annual invasive grasses are a minor component in the understory, burning slash piles from conifer reduction treatments, used as a component with other treatment methods to combat annual grasses and restore native plant communities), as well as managing the landscape for GRSG in concert with Utah prairie dog.<br><br>Prescribed fire in known winter range shall only be considered after the NEPA analysis for the Burn Plan has addressed the four bullets outlined above. Any prescribed fire in winter habitat will need to be designed to strategically reduce wildfire risk around and/or in the winter range and designed to protect winter range habitat quality. | No changes made. | No change proposed. |
| **MA-FIRE-5**: In PHMA, during fuels management project design, consider the use of targeted livestock grazing to strategically reduce fine fuels and, if used, implement grazing management that will accomplish this objective. If implementing targeted grazing, implement measures to minimize impacts on native perennial grasses. | No similar action. | No change proposed. |

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| Pre-Suppression<br>**MA-FIRE-6**: Follow the applicable and technically feasible RDFs in Appendix C for fire and fuels management at the site-level unless at least one of the following can be demonstrated in the NEPA analyses associated with the project/activity:<br>• A specific RDF is documented to not be applicable to the site-specific conditions of the project/activity;<br>• An alternative RDF, state-implemented conservation measure, or plan-level protection is determined to provide equal or better protection for GRSG or its habitat;<br>• A specific RDF will provide no additional protection to GRSG or its habitat.<br><br>Implement a coordinated inter-agency approach to fire restrictions based upon National Fire Danger Rating System thresholds (fuel conditions, drought conditions and predicted weather patterns) for GRSG habitat.<br><br>Develop wildfire prevention plans that explain the resource value of GRSG habitat and include fire prevention messages and actions to reduce human-caused ignitions. | No changes made. | No change proposed. |
| Suppression<br>**MA-FIRE-7:** Follow the applicable and technically feasible RDFs in Appendix C for fire and fuels management at the site-level unless at least one of the following can be demonstrated in the NEPA analyses associated with the project/activity:<br>• A RDF is documented to not be applicable to the site-specific conditions of the project/activity;<br>• An alternative RDF, state-implemented conservation measure, or plan-level protection is determined to provide equal or better protection for GRSG or its habitat;<br>• A specific RDF will provide no additional protection to GRSG or its habitat. | No changes made. | No change proposed. |

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| **MA-FIRE-8**: The protection of human life is the single, overriding priority. Setting priorities among protecting human communities and community infrastructure, other property and improvements, and natural and cultural resources will be done based on the values to be protected, human health and safety, and the costs of protection. GRSG habitat in PHMA will be prioritized commensurate with property values and other critical habitat to be protected, with the goal to restore, enhance, and maintain areas suitable for GRSG across the range of GRSG habitat consistent with LUP direction.<br><br>PHMA will be viewed as more valuable than GHMA when priorities are established. When suppression resources are widely available, maximum efforts will be placed on limiting fire growth in GHMA polygons as well. These priority areas will be further refined following completion of the GRSG Landscape Wildland Fire Invasive Species Habitat Assessments described in Appendix H.<br><br>In GHMA or areas where treatment/seeding has occurred to improve habitat, prioritize suppression where wildfires threaten adjacent PHMA. | **MA-FIRE-8**: The protection of human life is the single, overriding priority. Setting priorities among protecting human communities and community infrastructure, other property and improvements, and natural and cultural resources will be done based on the values to be protected, human health and safety, and the costs of protection. GRSG habitat in PHMA will be prioritized commensurate with property values and other critical habitat to be protected, with the goal to restore, enhance, and maintain areas suitable for GRSG across the range of GRSG habitat consistent with LUP direction.<br><br>PHMA will be viewed as more valuable than non-PHMA when priorities are established. When suppression resources are widely available, maximum efforts will be placed on limiting fire growth outside and adjacent to PHMA polygons as well. These priority areas will be further refined following completion of the GRSG Landscape Wildland Fire Invasive Species Habitat Assessments described in Appendix H.<br><br>Outside PHMA or areas where treatment/seeding has occurred to improve habitat, prioritize suppression where wildfires threaten adjacent PHMA. | Potential change under Alternatives 3, 4, 5, and 6. |
| **MA-FIRE-9**: Within acceptable risk levels use a full range of fire management strategies and tactics, including the management of wildfires to achieve resource objectives, across the range of GRSG habitat consistent with LUP direction.<br><br>In PHMA, burnout operations areas should be avoided by constructing direct fire lines, whenever safe and practical to do so. | No changes made. | No change proposed. |

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| ***LIVESTOCK GRAZING/RANGE MANAGEMENT (LG)*** | ***LIVESTOCK GRAZING/RANGE MANAGEMENT (LG)*** | ***LIVESTOCK GRAZING/ RANGE MANAGEMENT (LG)*** |
| **Management Actions (MA):** | **Management Actions (MA):** | **Management Actions (MA):** |
| **MA-LG-1:** PHMA and GHMA will be available for livestock grazing (Figure 2-3, Livestock Grazing [Appendix A]). Active animal unit months (AUMs) for livestock grazing will be 329,521 on BLM lands. Make adjustments to permitted AUMs consistent with regulation and the remaining grazing direction. In addition, on an annual basis livestock numbers and the season of use can be adjusted within the terms and conditions of the permit.<br><br>Make adjustments to permitted use and annual adjustments to levels of livestock use consistent with regulation and the direction identified below where livestock grazing is identified as a causal factor to not meeting standards or habitat objectives. | No similar action.<br>[Meaning the presence of GRSG habitat management areas does not affect the determination of whether or not an area is available for livestock grazing or the active AUMs.] | Potential change under Alternatives 3, 4, 5, and 6. |
| **MA-LG-2**: The BLM will prioritize (1) the review of grazing permits/leases, in particular to determine if modification is necessary prior to renewal, and (2) the processing of grazing permits/leases in SFA first followed by PHMA outside SFA. In setting workload priorities, precedence will be given to existing permits/leases in these areas not meeting Land Health Standards, with focus on those containing riparian areas, including wet meadows. The BLM may use other criteria for prioritization to respond to urgent natural resource concerns (ex., fire) and legal obligations. | No similar action. | Potential change under Alternatives 3, 4, 5, and 6. |
| **MA-LG-3**: In PHMA, consult, cooperate, and collaborate with other land owners and management agencies (e.g., private and SITLA) to develop plans which provide for landscape level approaches to habitat improvement. Manage unfenced private and SITLA lands within a grazing allotment that are under exchange of use agreements or percent public land use as a single unit that will have the same management as the public lands. | No similar action. | Potential change under Alternatives 3, 4, 5, and 6. |

| 2015 BLM GRSG Approved RMP Amendment | Changes between 2015 and 2019 GRSG Management | Potential for Change in 2023 Plan |
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| **MA-LG-4:** Evaluate Utah's Rangeland Health Standards and process grazing permits. Focus monitoring and management activities on allotments found not to be achieving Utah's Rangeland Health Standards where livestock grazing is identified as a causal factor and that have the best opportunities for conserving, enhancing or restoring habitat for GRSG.<br><br>Use ecological site descriptions and/or other appropriate information to determine the desired plant community within proper functioning ecological processes for conducting land health assessments to evaluate the achievement or non-achievement of rangeland health standards. | No similar action. | Potential change under Alternatives 3, 4, 5, and 6. |
| **MA-LG-5:** In PHMA and GHMA, conduct land health assessments that include indicators and measurements of structure, condition, composition, etc., of vegetation specific to achieving GRSG habitat objectives (Objective SSS-3), including within wetlands and riparian areas. Prioritize land health assessments in SFA, followed by PHMA outside of the SFA. Conduct land health assessments at the watershed scale and use the GRSG habitat objectives when assessing the applicable standard in GRSG habitats. | No similar action. | Potential change under Alternatives 3, 4, 5, and 6. |

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| **MA-LG-6:** In PHMA, when livestock management practices are determined to not be compatible with meeting or making progress towards achievable habitat objectives following appropriate consultation, cooperating and coordination, implement changes in grazing management through grazing authorization modifications, or allotment management plan implementation. Potential modifications include, but are not limited to, changes in:<br>• Season or timing of use;<br>• Numbers of livestock;<br>• Distribution of livestock use;<br>• Duration and/or level of use;<br>• Kind of livestock (e.g., cattle, sheep, horses, or goats); and<br>• Grazing schedules (including rest or deferment).<br>*Not in priority order<br><br>The NEPA analysis for renewals and modifications of livestock grazing permits/leases that include lands within SFA and PHMA will include specific management thresholds based on **Table 2**, Land Health Standards (43 CFR, Part 4180.2), and ecological site potential, and one or more defined responses that will allow the authorizing officer to make adjustments to livestock grazing that have already been subjected to NEPA analysis. Adjustments to meet seasonal GRSG habitat requirements could include those items identified in the list above. | **MA-LG-6:** In PHMA, when an area is not meeting or making progress towards achievable habitat objectives and Land Health Standards, and the causal factor is livestock grazing (i.e., improper livestock grazing), implement changes in grazing management through grazing authorization modifications, or allotment management plan implementation. Potential modifications include, but are not limited to, changes in:<br>• Season or timing of use;<br>• Numbers of livestock;<br>• Distribution of livestock use;<br>• Duration and/or level of use;<br>• Kind of livestock (e.g., cattle, sheep, horses, or goats); and<br>• Grazing schedules (including rest or deferment).<br>*Not in priority order<br><br>When improper livestock grazing is the causal factor for not meeting or making progress towards achievable habitat objectives and Land Health Standards, the NEPA analysis for renewals and modifications of livestock grazing permits/leases that include lands within PHMA will analyze multiple potential modifications (e.g., alternatives from the list above) that address the reasons for not meeting, allowing the authorizing officer to make adjustments to livestock grazing that have already been subjected to NEPA analysis. Adjustments to meet seasonal GRSG habitat requirements could include those items identified in the list above. | Potential change under Alternatives 3, 4, 5, and 6. |
| **MA-LG-7:** In PHMA, during drought periods, prioritize evaluating effects of the drought relative to GRSG needs for food and cover.<br><br>Initiate emergency management measures (e.g. delaying turnout, adjusting the amount and/or duration of livestock grazing, implement other terms of the permit) during times of drought to protect GRSG habitat, in accordance with Instruction Memorandum 2013-094 (Resource Management During Drought), or other agency policies.<br><br>Implement post-drought management to allow for vegetation recovery that meets GRSG needs. | No similar action. | Potential change under Alternatives 3, 4, 5, and 6. |

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| **MA-LG-8:** In PHMA, manage riparian areas and wet meadows for proper functioning condition. | No similar action. | Potential change under Alternatives 3, 4, 5, and 6. |
| **MA-LG-9:** In PHMA, assess livestock grazing in riparian and meadow complexes and ensure recovery or maintenance of appropriate vegetation and water quality. Where recovery or maintenance is not occurring and the causal factor is livestock grazing, reduce pressure on riparian or wet meadow vegetation used by GRSG in the summer by adjusting grazing management practices (e.g., use fencing/herding techniques, or changes in seasonal use or livestock distribution).<br><br>Allotments within SFA, followed by those within PHMA, and focusing on those containing riparian areas, including wet meadows, will be prioritized for field checks to help ensure compliance with the terms and conditions of the grazing permits. Field checks could include monitoring for actual use, utilization, and use supervision. | No similar action. | Potential change under Alternatives 3, 4, 5, and 6. |
| **MA-LG-10:** In PHMA, limit authorization of new water developments to projects that have a neutral effect or are beneficial to GRSG habitat (such as by shifting livestock use away from critical areas). New developments that divert surface water must be designed to maintain riparian or wet meadow vegetation and hydrology to meet GRSG needs. | **MA-LG-10:** In PHMA, manage existing and new water developments to have a neutral or beneficial effect to GRSG habitat. | Potential change under Alternatives 3, 4, 5, and 6. |
| **MA-LG-11:** In PHMA, evaluate existing water developments (springs, seeps, etc., and their associated pipelines) to determine if modifications are necessary to maintain or improve riparian areas and GRSG habitat. Make modifications where necessary, considering impacts on other water uses when such considerations are neutral or beneficial to GRSG. | No similar action. | Potential change under Alternatives 3, 4, 5, and 6. |
| **MA-LG-12:** In PHMA, ensure that vegetation treatments conserve, enhance or restore GRSG habitat (this includes treatments that benefit livestock). | No similar action. | Potential change under Alternatives 3, 4, 5, and 6. |

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| **MA-LG-13**: In PHMA, evaluate the role of existing seedings that are currently composed of primarily introduced perennial grasses to determine if they should be restored to sagebrush or habitat of higher quality for GRSG. If existing seedings provide value in conserving or enhancing GRSG habitats, then no restoration will be necessary. Assess the compatibility of these seedings for GRSG habitat during the land health assessments. | No similar action. | Potential change under Alternatives 3, 4, 5, and 6. |
| **MA-LG-14:** In PHMA, design new structural range improvements to have a neutral effect or conserve, enhance, or restore GRSG habitat through an improved grazing management system relative to GRSG objectives. Structural range improvements, in this context, include but are not limited to: cattle guards, fences, exclosures, corrals or other livestock handling structures; pipelines, troughs, storage tanks (including moveable tanks used in livestock water hauling), windmills, ponds/reservoirs, solar panels and spring developments. Potential for invasive species establishment or increase following construction must be considered in the project planning process and monitored and treated post-construction. | No similar action. | Potential change under Alternatives 3, 4, 5, and 6. |
| **MA-LG-15:** In PHMA, evaluate existing structural range improvements to make sure they have a neutral effect or conserve, enhance or restore GRSG habitat. | No similar action. | Potential change under Alternatives 3, 4, 5, and 6. |
| **MA-LG-16:** To reduce outright GRSG strikes and mortality, remove, modify or mark fences in high risk areas (Stevens et al. 2012) based on proximity to lek (e.g., within 1.2 miles of a lek), lek size, and topography, or as latest science indicates. Prioritize actions in SFA first, then PHMA.<br><br>Employ NRCS fence collision risk tool (NRCS/CEAP Conservation Insight Publication "Applying the Sage Grouse Fence Collision Risk Tool to Reduce Bird Strikes"). | **MA-LG-16:** To reduce outright GRSG strikes and mortality, remove, modify or mark fences in high risk areas (Stevens et al. 2012) based on proximity to lek (e.g., within 1.2 miles of a lek), lek size, and topography, or as latest science indicates.<br><br>Employ NRCS fence collision risk tool (NRCS/CEAP Conservation Insight Publication "Applying the Sage Grouse Fence Collision Risk Tool to Reduce Bird Strikes"). | Potential change under Alternatives 3, 4, 5, and 6. |
| **MA-LG-17:** In PHMA, monitor for and treat noxious weeds and treat invasive species where needed, associated with existing range improvements. | No similar action. | Potential change under Alternatives 3, 4, 5, and 6. |

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| **MA-LG-18:** At the time a permittee or lessee voluntarily relinquishes a permit or lease, the BLM will consider whether the public lands where that permitted use was authorized should remain available for livestock grazing or be used for other resource management objectives, such as reserve common allotments or fire breaks. This does not apply to or impact grazing preference transfers, which are addressed in 43 CFR, Part 4110.2-3. | No similar action. | Potential change under Alternatives 3, 4, 5, and 6. |
| ***WILD HORSES AND BURROS (WHB)*** | ***WILD HORSES AND BURROS (WHB)*** | — |
| **Management Actions (MA):** | **Management Actions (MA):** | — |
| **MA-WHB-1:** Manage HMAs in GRSG habitat within established appropriate management level ranges to achieve and maintain GRSG habitat objectives (Objective SSS-3). | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |
| **MA-WHB-2:** Complete rangeland health assessments for HMAs containing GRSG habitat using an interdisciplinary team of specialists (e.g. range, wildlife, and riparian). The priorities for conducting assessments are:<br>1. HMAs containing PHMA;<br>2. HMAs containing only GHMA;<br>3. HMAs containing sagebrush habitat outside of PHMA and GHMA mapped habitat; and<br>4. HMAs without GRSG habitat. | **MA-WHB-2:** Complete rangeland health assessments for HMAs containing GRSG habitat using an interdisciplinary team of specialists (e.g. range, wildlife, and riparian). The priorities for conducting assessments are:<br>1. HMAs containing PHMA;<br>2. HMAs containing sagebrush habitat outside of PHMA mapped habitat; and<br>3. HMAs without GRSG habitat. | Potential change under Alternatives 3, 4, 5, and 6. |
| **MA-WHB-3:** Prioritize gathers and population growth suppression techniques in HMAs in GRSG habitat, unless removals are necessary in other areas to address higher priority environmental issues, including herd health impacts. | No changes made. | Potential change under Alternative 3. |
| **MA-WHB-4:** In PHMA, assess and adjust appropriate management levels through the NEPA process within HMAs when wild horses or burros are identified as a significant causal factor in not meeting land health standards, even if current appropriate management levels are not being exceeded. | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |
| **MA-WHB-5:** In PHMA, monitor the effects of WHB use in relation to GRSG seasonal habitat objectives on an annual basis to help determine future management actions. | No changes made. | Potential change under Alternative 3. |

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| **MA-WHB-6:** Develop or amend herd management plans to incorporate GRSG habitat objectives and management considerations for all HMAs within GRSG habitat, with an emphasis placed on PHMA. | No changes made. | Potential change under Alternative 3. |
| **MA-WHB-7:** Consider removals or exclusion of wild horses/burros during or immediately following emergency situations (such as fire, floods, and drought) to facilitate meeting GRSG habitat objectives where HMAs overlap with GRSG habitat. | No changes made. | Potential change under Alternative 3. |
| **MA-WHB-8**: When conducting NEPA analysis for wild horse/burro management activities, water developments, or other rangeland improvements for wild horses, address the direct and indirect effect on GRSG populations and habitat. Implement any water developments or rangeland improvements using the criteria identified for domestic livestock. | No changes made. | Potential change under Alternative 3. |
| **MA-WHB-9:** Coordinate with professionals from other federal and state agencies, researchers at universities, and others to utilize and evaluate new management tools (e.g., population growth suppression, inventory techniques, and telemetry) for implementing the wild horse and burro program. | No changes made. | Potential change under Alternative 3. |
| ***MINERALS RESOURCES (MR)*** | ***MINERALS RESOURCES (MR)*** | — |
| **Management Actions (MA):** | **Management Actions (MA):** | — |
| **MA-MR-1:** Allow exploration for all minerals (e.g., geophysical, trenching, drilling, etc.) within mapped occupied GRSG habitat areas that are not closed to leasing, permitting, etc., to obtain exploratory information. In areas where leasing, permitting, etc. is still available, minerals exploration shall be subject to the pertinent management for discretionary activities in PHMA (MA-SSS-3) and GHMA (MA-SSS-5). | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |

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| ***Fluid Minerals*** | ***Fluid Minerals*** | ***Fluid Minerals*** |
| **Objectives:** | **Objectives:** | **Objectives:** |
| **Objective MR-1:** Priority will be given to leasing and development of fluid mineral resources, including geothermal, outside of PHMA and GHMA. When analyzing leasing and authorizing development of fluid mineral resources, including geothermal, in PHMA and GHMA, and subject to applicable stipulations for the conservation of GRSG, priority will be given to development in non-habitat areas first and then in the least suitable habitat for GRSG. The implementation of these priorities will be subject to valid existing rights and any applicable law or regulation, including, but not limited to, 30 USC 226(p) and 43 CFR, Part 3162.3-1(h). | No similar objective. | Potential change under Alternatives 3, 4, 5, and 6. |
| **Objective MR-2:** Where a proposed fluid mineral development project on an existing lease could adversely affect GRSG populations or habitat, the BLM will work with the lessees, operators, or other project proponents to avoid, minimize, and compensate for adverse impacts on the extent compatible with lessees' rights to drill and produce fluid mineral resources. The BLM will work with the lessee, operator, or project proponent in developing an application for permit to drill for the lease to avoid, minimize, and compensate for impacts on GRSG or its habitat and will ensure that the best information about the GRSG and its habitat informs and helps to guide development of such federal leases. | No changes made. | No change proposed. |
| **Management Actions (MA):** | **Management Actions (MA):** | — |
| **MA-MR-2:** Manage fluid mineral leasing in PHMA as follows (Figure 2-4, Fluid Minerals [Oil and Gas] [Appendix A]) (Appendix G, Stipulations Associated with Fluid Mineral Leasing):<br>• open to leasing, subject to standard stipulations: 0 acres<br>• open to leasing, subject to CSU and/or TL stipulations: 23,600 acres<br>• open to leasing, subject to NSO stipulations: 3,229,600 acres<br>• closed to leasing: 111,900 acres | No changes made. | Potential change under Alternatives 3 and 5a. |

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| ***Unleased Federal Fluid Mineral Estate*** | ***Unleased Federal Fluid Mineral Estate*** | — |
| **MA-MR-3:**<br><u>Unleased Areas within PHMA</u><br>PHMA will be designated as open to leasing fluid minerals, subject to NSO stipulations.<br><br>In SFA, there will be no waivers, exceptions, or modifications. In the remainder of PHMA, no waivers or modifications to a fluid mineral lease NSO stipulation will be granted. The Authorized Officer may grant an exception to a fluid mineral lease no-surface-occupancy stipulation only where the proposed action:<br>• Would not have direct, indirect, or cumulative effects on GRSG or its habitat; or,<br>• Is proposed to be undertaken as an alternative to a similar action occurring on a nearby parcel, and would provide a clear conservation gain to GRSG.<br><br>Exceptions based on conservation gain (ii) may only be considered in (a) PHMA of mixed ownership where federal minerals underlie less than fifty percent of the total surface, or (b) areas of the public lands where the proposed exception is an alternative to an action occurring on a nearby parcel subject to a valid federal fluid mineral lease existing as of the date of this Approved RMPA. Exceptions based on conservation gain must also include measures, such as enforceable institutional controls and buffers, sufficient to allow the BLM to conclude that such benefits will endure for the duration of the proposed action's impacts.<br><br>Any exceptions to this lease stipulation may be approved by the Authorized Officer only with the concurrence of the State Director. The Authorized Officer may not grant an exception unless the applicable state wildlife agency, the USFWS, and the BLM unanimously find that the proposed action satisfies (i) or (ii). Such finding shall initially be made by a team of one field biologist or other GRSG expert from each respective agency. In the event the initial finding is not unanimous, the finding may be elevated to the appropriate BLM State Director, USFWS | **MA-MR-3:**<br><u>Unleased Areas within PHMA</u><br>PHMA will be designated as open to leasing fluid minerals, subject to NSO stipulations.<br><br>Within PHMA, the Authorized Officer may grant an exception to a fluid mineral lease NSO stipulation where the proposed action:<br>• Occurs in non-habitat that does not provide important connectivity between habitat areas and the development would not cause indirect disturbance to or disruption of adjacent seasonal habitats that would impair their biological function of providing the life-history or behavioral needs of the Greater Sage-Grouse population due to project design (e.g., minimize sound, preclude tall structures, require perch deterrents), as demonstrated in the project's NEPA document; or<br>• Is proposed to be undertaken as an alternative to a similar action occurring on a nearby parcel, and development on the parcel in question would have less of an impact on Greater Sage-Grouse or its habitat than on the nearby parcel; this exception must also include measures sufficient to allow the BLM to conclude that such benefits will endure for the duration of the proposed action's impacts.<br><br>The BLM Authorized Officer may grant a modification to a fluid mineral lease no surface occupancy stipulation only where an exception is granted, as described above, for the primary disturbance (e.g., well pad, compressor station). A modification to the no surface occupancy stipulation could be considered for the associated infrastructure related to the development that are not individually precluded by other Greater Sage-Grouse actions (e.g., roads, pipelines, power lines). While the no surface occupancy stipulation could be modified for this infrastructure, it must still comply with other Greater Sage-Grouse management contained in MA-SSS-3.<br><br>The BLM Authorized Officer may grant a waiver to a fluid mineral lease no surface occupancy stipulation if, through the appropriate planning process (i.e., plan | Potential change under Alternatives 3, 4, 5, and 6. |

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| State Ecological Services Director, and state wildlife agency head for final resolution. In the event their finding is not unanimous, the exception will not be granted. Approved exceptions will be made publically available at least quarterly.<br><br>In addition, any lease activities will apply the pertinent management for discretionary activities in PHMA identified in MA-SSS-3 (e.g., mitigation, disturbance cap, minerals/energy density, buffers, seasonal restrictions, and RDFs).<br><br>Outside PHMA, portions of opportunity areas within 4 miles of a lek that is located in PHMA will be open for leasing with CSU stipulations (avoiding noise and tall structures that could affect adjacent GRSG use of PHMA). | maintenance, amendment) the area is no longer within PHMA.<br><br>Approved exceptions will be made publicly available at least quarterly.<br><br>In addition, any lease activities will apply the pertinent management for discretionary activities in PHMA identified in MA-SSS-3 (e.g., mitigation, disturbance cap, minerals/energy density, seasonal restrictions, and RDFs), including if an exception to the NSO is granted.<br><br>Outside PHMA, portions of opportunity areas within the buffer distances identified in Appendix B of a lek that is located in PHMA will be open for leasing with CSU stipulations (avoiding noise and tall structures that could affect adjacent GRSG use of PHMA). | *(See above.)* |
| **MA-MR-4:**<br><u>Unleased Areas within GHMA</u><br>Manage fluid mineral leasing in GHMA as follows (Figure 2-4):<br>• open to leasing, subject to standard stipulations: 238,700 acres<br>• open to leasing, subject to CSU and/or TL stipulations: 294,200 acres<br>• open to leasing, subject to NSO stipulations: 32,700 acres<br>• closed to leasing: 28,400 acres<br>• planning decision not mapped: 133,400 acres<br><br>In GHMA, new development of fluid mineral leases could be considered if they apply the pertinent management for discretionary activities in GHMA identified in MA-SSS-5. | No similar action. | Potential change under Alternative 3, 4, 5, and 6. |
| ***Leased Federal Fluid Mineral Estate*** | ***Leased Federal Fluid Mineral Estate*** | ***Leased Federal Fluid Mineral Estate*** |
| **MA-MR-5:** Apply the following conservation measures through implementation decisions (e.g., approval of an application for permit to drill, geothermal drilling permit, Sundry Notice, Master Development Plans, etc.) and upon completion of the environmental record of review (43 CFR, Part 3162.5). In this process, evaluate whether the conservation measures are "reasonable" (43 CFR, Part 3101.1-2) with the valid existing rights. | No changes made. | Potential change under Alternative 3. |

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| **MA-MR-6:** In PHMA, avoid, minimize, and compensate for impacts on GRSG and their habitat (e.g., habitat loss, fragmentation, indirect impacts, etc.) from new oil and gas development on existing leases.<br><br>Where possible, place development outside of PHMA. If it is determined that this restriction renders the recovery of fluid minerals infeasible or uneconomic, considering the lease as a whole, or where development of existing leases requires that disturbance density exceeds 1 per 640, and/or 3 percent disturbance cap, apply other measures to site proposed lease activities to meet GRSG habitat objectives and require mitigation as described in Appendix F. If the lease is entirely within PHMA, if feasible, apply the lek buffers from MA-SSS-3H. If this is not technically feasible, locate infrastructure in areas that will minimize habitat loss. Require any development to be placed at the most distal part of the lease from the lek or in areas least harmful to GRSG populations and habitat (e.g., areas where local terrain features such as ridges and ravines may reduce habitat importance or shield nearby habitat from disruptive factors).<br><br>For geophysical exploration activities, include seasonal TLs and RDFs as permit conditions of approval to eliminate or minimize surface-disturbing and disruptive activities within nesting and brood-rearing habitat and winter concentration areas. | **MA-MR-6:** In PHMA, avoid, minimize, and compensate for impacts on GRSG and their habitat (e.g., habitat loss, fragmentation, indirect impacts, etc.) from new oil and gas development on existing leases (see MA-SSS-1 language related to placement of development in non-habitat portions of PHMA).<br><br>Where possible, place development outside of PHMA. If it is determined that this restriction renders the recovery of fluid minerals infeasible or uneconomic, considering the lease as a whole, or where development of existing leases requires that disturbance density exceeds 1 per 640, and/or 3 percent disturbance cap, apply other measures to site proposed lease activities to meet GRSG habitat objectives and require mitigation as described in Appendix F. If the lease is entirely within PHMA, if technically feasible, apply the lek buffers from MA-SSS-3H. If this is not technically feasible, locate infrastructure in areas that will minimize habitat loss. Require any development to be placed at the most distal part of the lease from the lek or in areas least harmful to GRSG populations and habitat (e.g., areas where local terrain features such as ridges and ravines may reduce habitat importance or shield nearby habitat from disruptive factors).<br><br>For geophysical exploration activities, include seasonal TLs and RDFs as permit conditions of approval to eliminate or minimize surface-disturbing and disruptive activities within nesting and brood-rearing habitat and winter concentration areas. | Potential change under Alternative 3. |
| **MA-MR-7:** To the extent consistent with existing lease-rights, apply the pertinent management for discretionary activities in PHMA identified in MA-SSS-3 (e.g., mitigation, disturbance cap, minerals/energy density, buffers, seasonal restrictions, and RDFs) and in GHMA identified in MA-SSS-5 (i.e., mitigation, buffers, and RDFs). | **MA-MR-7:** To the extent consistent with existing lease-rights, apply the pertinent management for discretionary activities in PHMA identified in MA-SSS-3 (e.g., mitigation, disturbance cap, minerals/energy density, buffers, seasonal restrictions, and RDFs). | Potential change under Alternative 3. |

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| **MA-MR-8:** In PHMA, operators must submit a master development plan with site-specific plans of development for roads, wells, pipelines and other infrastructure prior to any development being authorized. The BLM will evaluate the plan through the NEPA process. | No changes made. | Potential change under Alternative 3. |
| **MA-MR-9:** In PHMA, encourage unitization when deemed necessary for proper development and operation of an area (with strong oversight and monitoring) to minimize adverse impacts on GRSG according to the Federal Lease Form, 3100-11, Sections 4 and 6. | No changes made. | Potential change under Alternative 3. |
| **MA-MR-10:** In PHMA, identify areas where acquisitions (including federal mineral rights) or conservation easements, will benefit GRSG habitat. | No similar action. | Potential change under Alternative 3. |
| **MA-MR-11:** In PHMA, require a full reclamation bond specific to the site in accordance with 43 CFR, Parts 3104.2, 3104.3, 3104.5, and 36 CFR, Part 228.109. Insure bonds are sufficient for costs relative to reclamation that will result in full restoration of the lands to the condition it was found prior to disturbance. Base the reclamation costs on the assumption that contractors will perform the work. | No changes made. | Potential change under Alternative 3. |

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| ***Locatable Minerals*** | ***Locatable Minerals*** | — |
| **Management Actions (MA):** | **Management Actions (MA):** | — |
| **MA-MR-12:** SFA will be recommended for withdrawal from the Mining Law of 1872 (as amended), subject to valid existing rights (Figure 2-5, Locatable Minerals [Appendix A]).<br><br>Other federal lands or non-federal lands with federal mineral interests within PHMA or GHMA that are not already withdrawn will be available for locatable mineral entry. Areas that are recommended for withdrawal will continue to be managed as they are currently managed.<br><br>In PHMA, to the extent consistent with the rights of a mining claimant under existing laws and regulations, limit surface disturbance from locatable mineral development and apply management to minimize and mitigate impacts. To the extent allowable by law, work with claimants to voluntarily apply the pertinent management for discretionary activities in PHMA identified in MA-SSS-3 (e.g., mitigation, disturbance cap, minerals/energy density, buffers, seasonal restrictions, and RDFs) and in GHMA identified in MA-SSS-5 (i.e., mitigation and buffers).<br><br>Regardless of whether agreements with the claimant incorporates the 3 percent disturbance cap (MA-SSS-3B), disturbance from locatable mineral development will be included as disturbance when calculating disturbance for other land uses. | **MA-MR-12:** Federal lands or non-federal lands with federal mineral interests within PHMA that are not already withdrawn will be available for locatable mineral entry. Areas that are recommended for withdrawal will continue to be managed as they are currently managed.<br><br>In PHMA, to the extent consistent with the rights of a mining claimant under existing laws and regulations, limit surface disturbance from locatable mineral development and apply management to minimize and mitigate impacts. To the extent allowable by law, work with claimants to voluntarily apply the pertinent management for discretionary activities in PHMA identified in MA-SSS-3 (e.g., mitigation, disturbance cap, minerals/energy density, buffers, seasonal restrictions, and RDFs).<br><br>Regardless of whether agreements with the claimant incorporates the 3 percent disturbance cap (MA-SSS-3B), disturbance from locatable mineral development will be included as disturbance when calculating disturbance for other land uses. | Potential change under Alternatives 3 and 6. |
| ***Saleable Materials*** | ***Saleable Materials*** | — |
| **Management Actions (MA):** | **Management Actions (MA):** | — |
| **MA-MR-13:** In PHMA, manage mineral materials as follows (Figure 2-6, Salable Minerals [Mineral Materials] [Appendix A]):<br>• open to mineral materials development: 0 acres<br>• closed to mineral materials development: 2,587,100 acres | No changes made. | Potential change under Alternatives 3 and 6. |

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| **MA-MR-14:** Close PHMA to new mineral material sales. However, these areas remain "open" to free use permits and the expansion of existing active pits, only if the following criteria are met at all phases of the development (construction and long-term operation of facilities):<br>• the activity is within the population area (BSU) and project area disturbance cap (MA-SSS-3B);<br>• the activity is subject to the provisions set forth in the mitigation framework (MA-SSS-3A);<br>• all applicable RDFs are applied (MA-SSS-3I); and<br>• the activity applies the other pertinent management for discretionary activities in PHMA in MA-SSS-3.<br><br>In GHMA, new mineral material developments can be considered if consistent with the pertinent management for discretionary activities described in MA-SSS-5. | **MA-MR-14:** Close PHMA to new mineral material sales (see MA-SSS-1 language related to placement of development in non-habitat portions of PHMA). However, these areas remain "open" to free use permits and the expansion of existing active pits, only if the following criteria are met at all phases of the development (construction and long-term operation of facilities):<br>• the activity is within the population area (BSU) and project area disturbance cap (MA-SSS-3B);<br>• the activity is subject to the provisions set forth in the mitigation framework (MA-SSS-3A);<br>• all applicable RDFs are applied (MA-SSS-3I); and<br><br>the activity applies the other pertinent management for discretionary activities in PHMA in MA-SSS-3. | Potential change under Alternatives 3, 4, 5, and 6. |
| ***Non-Energy Leasable Minerals*** | ***Non-Energy Leasable Minerals*** | — |
| **Management Actions (MA):** | **Management Actions (MA):** | — |
| **MA-MR-15:** In PHMA, manage nonenergy leasable minerals on federal lands and non-federal lands with federal mineral interests as follows (Figure 2-7, Non-Energy Leasable Minerals [Appendix A]):<br>• Open to Leasing Consideration – 24,800 acres (National Forest System lands in Wyoming)<br>• Closed to Leasing – 3,340,200 acres<br><br>In PHMA, close federal lands and non-federal lands with federal mineral interests to nonenergy leasable mineral leasing. However, expansion of existing operations could be considered if the new lease is contiguous with an existing operation and the new lease (construction, operation, or maintenance) applies the pertinent management for discretionary activities in PHMA identified in MA-SSS-3 (e.g., mitigation, disturbance cap, minerals/energy density, buffers, seasonal restrictions, and RDFs). | **MA-MR-15:** In PHMA, manage nonenergy leasable minerals on federal lands and non-federal lands with federal mineral interests as follows (Figure 2-7, Non-Energy Leasable Minerals [Appendix A]) (see MA-SSS-1 language related to placement of development in non-habitat portions of PHMA):<br>• Open to Leasing Consideration – 24,800 acres (National Forest System lands in Wyoming)<br>• Closed to Leasing – 3,340,200 acres<br><br>In PHMA, close federal lands and non-federal lands with federal mineral interests to nonenergy leasable mineral leasing. However, expansion of existing operations could be considered if the new lease is contiguous with an existing operation and the new lease (construction, operation, or maintenance) applies the pertinent management for discretionary activities in PHMA identified in MA-SSS-3 (e.g., mitigation, disturbance cap, minerals/energy density, buffers, seasonal restrictions, and RDFs). | Potential change under Alternatives 3 and 6. |

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| **MA-MR-16:** In GHMA, manage nonenergy leasable minerals on federal lands and non-federal lands with federal mineral interests as follows (Figure 2-7):<br>• Open to Leasing Consideration – 699,300 acres<br>• Closed to Leasing – 28,200 acres<br><br>New leasing and development in GHMA can be considered if consistent with the pertinent management for discretionary activities described in MA-SSS-5. | No similar action. | Potential change under Alternatives 3, 4, 5, and 6. |
| **MA-MR-17:** In PHMA, exploration and prospecting activities associated with nonenergy leasable minerals will be required to comply with the same stipulations identified for leasing and development, above. In addition:<br>• The exploration/prospecting activity does not occur during sensitive seasonal periods (i.e., breeding and nesting, brood rearing, winter) (MA-SSS-3G).<br>• Facilities associated with exploration/prospecting activities will be removed before the next breeding season.<br>• Disturbances will be restored. | No changes made. | Potential change under Alternatives 3 and 6. |
| ***Coal*** | ***Coal*** | — |
| **Management Actions (MA):** | **Management Actions (MA):** | — |
| **MA-MR-18:**<br><u>Leases Associated with Surface Mining</u><br>At the time an application for a new coal lease or lease modification is submitted to the BLM, the BLM will determine whether the lease application area is "unsuitable" for all or certain coal mining methods pursuant to 43 CFR, Part 3461.5. PHMA is essential habitat for maintaining GRSG for purposes of the suitability criteria set forth at 43 CFR, Part 3461.5(o)(1). | **MA-MR-18:**<br><u>Leases Associated with Surface Mining</u><br>At the time an application for a new coal lease or lease modification is submitted to the BLM, the BLM will determine whether the lease application area is "unsuitable" for all or certain coal mining methods pursuant to 43 CFR, Part 3461.5. Coordination with the appropriate State of Utah agency and the determination of essential habitat for maintaining GRSG for purposes of the suitability criteria set forth at 43 CFR, Part 3461.5(o)(1) will consider site-specific information associated with potential lease nomination areas as part of the unsuitability process identified above. | Potential change under Alternative 3. |

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| **MA-MR-19:**<br>Leases Associated with Underground Mining<br>Consider leasing PHMA for coal that will be extracted through underground mining. Require the following stipulations as part of any new lease or lease modification:<br>• In PHMA, appurtenant facilities will not be placed in GRSG habitat, where technically feasible.<br>• In PHMA, if placement of facilities outside of GRSG habitat is not technically feasible, disturbances associated with the lease (construction, operation, or maintenance) can be allowed if they are consistent with the pertinent management for discretionary activities identified in MA-SSS-3 (e.g., mitigation, disturbance cap, minerals/energy density, buffers, noise restrictions, seasonal restrictions, etc.).<br>If the above criteria cannot be met, do not grant new leases or modifications. | No changes made. | No change proposed. |
| **MA-MR-20:** New leasing for underground mining of coal in GHMA can be considered if consistent with the pertinent management for discretionary activities described in MA-SSS-5. | No similar action. | Potential change under Alternatives 3, 4, 5, and 6. |
| **MA-MR-21:** In PHMA, exploration activities needed to meet data adequacy standards associated with potential coal leasing will be required to comply with the pertinent management for discretionary activities identified in MA-SSS-3 (e.g., mitigation, disturbance cap, buffers, noise restrictions, seasonal restrictions, etc.). | No similar action. | No change proposed. |

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| **MA-MR-22:** For underground coal mining operations on existing leases: In PHMA, unless required for technical or safety reasons, do not authorize new appurtenant surface facilities for existing underground mining. If new appurtenant surface facilities associated the existing mine leases cannot be located outside of PHMA, collocate them with any existing disturbed areas, if possible. If collocation is not possible, then construct new facilities to minimize disturbed areas while meeting mine safety standards/requirements, as identified by Mine Safety and Health Administration mine-plan approval process, and locate the facilities in an area least harmful to GRSG habitat based on vegetation, topography, or other habitat features. | No changes made. | No change proposed. |
| **MA-MR-23:** For coal mining operations on existing leases: In GHMA, new disturbances could be considered if consistent with the pertinent management for discretionary activities described in MA-SSS-5. | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |
| ***Mineral Split-Estate*** | ***Mineral Split-Estate*** | — |
| **Management Actions (MA):** | **Management Actions (MA):** | — |
| **MA-MR-24:** Where the federal government manages the mineral estate in PHMA and GHMA, and the surface is in non-federal ownership, apply the same stipulations, conditions of approval, and/or conservation measures and RDFs applied if the mineral estate is developed on BLM-administered lands in that management area, to the maximum extent permissible under existing authorities, and in coordination with the landowner.<br><br>Where the federal government manages the surface and the mineral estate is in non-federal ownership in PHMA and GHMA, apply appropriate surface use conditions of approval, stipulations, and mineral RDFs through ROW grants or other surface management instruments, to the maximum extent permissible under existing authorities, in coordination with the mineral estate owner/lessee. | **MA-MR-24:** Where the federal government manages the mineral estate in PHMA, and the surface is in non-federal ownership, apply the same stipulations, conditions of approval, and/or conservation measures and RDFs applied if the mineral estate is developed on BLM-administered lands in that management area, to the maximum extent permissible under existing authorities, and in coordination with the landowner.<br><br>Where the federal government manages the surface and the mineral estate is in non-federal ownership in PHMA, apply appropriate surface use conditions of approval, stipulations, and mineral RDFs through ROW grants or other surface management instruments, to the maximum extent permissible under existing authorities, in coordination with the mineral estate owner/lessee. | Potential change under Alternatives 3, 4, 5, and 6. |

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| ***RENEWABLE ENERGY (WIND AND SOLAR) (RE)*** | ***RENEWABLE ENERGY (WIND AND SOLAR) (RE)*** | — |
| **Management Actions (MA):** | **Management Actions (MA):** | — |
| *Wind Energy Development*<br>**MA-RE-1:** PHMA will be designated as exclusion areas for wind energy development (2,026,400 acres) (Figure 2-8, Wind [Appendix A]).<br><br>Do not site wind energy development in opportunity areas within 5 miles from occupied GRSG leks that are in PHMA.<br><br>Manage wind energy development in GHMA as follows:<br>• Open – 484,900 acres<br>• Avoided – 0 acres<br>• Excluded – 17,600 acres<br><br>New wind ROW authorizations can be allowed in GHMA if they apply the pertinent management for discretionary activities identified in MA-SSS-5.<br><br>*Solar Energy Development*<br>The BLM's Approved Resource Management Plan Amendments/ROD for Solar Energy Development in Six Southwestern States (October 2012) excluded all GRSG occupied habitat to new utility-scale solar development. Because the existing land use plans already exclude solar development in GRSG habitat; this plan amendment process does not need to make additional decisions related to solar development (Figure 2-9, Solar [Appendix A]). | *Wind Energy Development*<br>**MA-RE-1:** PHMA will be designated as exclusion areas for wind energy development (2,026,400 acres) (Figure 2-8, Wind [Appendix A]).<br><br>Avoid siting wind energy development in opportunity areas within the buffer distances identified in Appendix B from occupied GRSG leks that are in PHMA, if the lek buffer analysis as identified in Appendix B shows that siting wind energy development in opportunities areas will impact lek persistence within PHMA.<br><br>*Solar Energy Development*<br>The BLM's Approved Resource Management Plan Amendments/ROD for Solar Energy Development in Six Southwestern States (October 2012) excluded all GRSG occupied habitat to new utility-scale solar development. Because the existing land use plans already exclude solar development in GRSG habitat; this plan amendment process does not need to make additional decisions related to solar development (Figure 2-9, Solar [Appendix A]). | Potential change under Alternatives 3, 4, 5, and 6. |
| ***LANDS AND REALTY (LR)*** | ***LANDS AND REALTY (LR)*** | — |
| **Objectives:** | **Objectives:** | — |
| **Objective LR-1:** Effects of infrastructure projects, including siting, will be minimized using the best available science, updated as monitoring information on current infrastructure projects becomes available. | No changes made. | No change proposed. |
| **Management Actions (MA):** | **Management Actions (MA):** | — |
| **MA-LR-1:** In PHMA, manage lands ROWs, permits, and leases as follows (Figure 2-11, Rights-of-Way [Appendix A]):<br>• Open: 18,900 acres (associated with designated above-ground ROW corridors)<br>• Avoided: 1,997,000 acres<br>• Excluded: 10,500 acres | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |

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| **MA-LR-2:**<br>Linear and Site-Type ROWs, Permits, and Leases (excluding wind and solar)<br>PHMA will be avoidance areas for new linear and site type ROWs, permits, and leases except for within ROW corridors designated for aboveground use. Placement of new ROWs, permits, and leases in PHMA shall be avoided if at all possible. Where avoidance is not possible in PHMA, placement of a new ROW/permit/lease can be allowed if it applies the management for discretionary activities in PHMA identified in MA-SSS-3 (e.g., mitigation, disturbance cap, buffers, tall structure restrictions, seasonal restrictions, and applicable RDFs).<br><br>In PHMA, lands ROWs, permits and leases that cannot be avoided shall be located in areas that minimize the effect on the GRSG population (e.g., non-habitat areas, least suitable habitat, collocated with existing disturbances).<br><br>In PHMA, new proposals for power lines, access roads, pump storage, and other hydroelectric facilities licensed by Federal Energy Regulatory Commission will be subject to all GRSG ROW avoidance allocations and pertinent management for discretionary activities in MA-SSS-3.<br><br>Outside PHMA, portions of opportunity areas within 4-miles of a lek that is located in PHMA will be avoidance areas for new ROWs, permits and leases, applying stipulations for noise and tall structures.<br><br>In addition to the above requirements, the subsequent conditions will apply to specific types of ROW authorizations:<br><br>Transmission Lines<br>PHMA are designated as avoidance areas for high voltage transmission line ROWs, except for the transmission projects specifically identified below. All authorizations in these areas, other than the following identified projects, must comply with the conservation measures outlined in this plan, including the RDFs and avoidance criteria presented in MA-SSS-03. The BLM is currently processing an application for TransWest Express (including those portions of Energy | **MA-LR-2:**<br>Linear and Site-Type ROWs, Permits, and Leases (excluding wind and solar)<br>PHMA will be avoidance areas for new linear and site type ROWs, permits, and leases except for within ROW corridors designated for aboveground use. Placement of new ROWs, permits, and leases in PHMA shall be avoided if at all possible. Where avoidance is not possible in PHMA, placement of a new ROW/permit/lease can be allowed if it applies the management for discretionary activities in PHMA identified in MA-SSS-3 (e.g., mitigation, disturbance cap, buffers, tall structure restrictions, seasonal restrictions, and applicable RDFs).<br><br>In PHMA, lands ROWs, permits and leases that cannot be avoided shall be located in areas that minimize the effect on the GRSG population (e.g., non-habitat areas, least suitable habitat, collocated with existing disturbances).<br><br>In PHMA, new proposals for power lines, access roads, pump storage, and other hydroelectric facilities licensed by Federal Energy Regulatory Commission will be subject to all GRSG ROW avoidance allocations and pertinent management for discretionary activities in MA-SSS-3.<br><br>Outside PHMA, portions of opportunity areas within 4-miles of a lek that is located in PHMA will be avoidance areas for new ROWs, permits and leases, applying stipulations for noise and tall structures.<br><br>In addition to the above requirements, the subsequent conditions will apply to specific types of ROW authorizations:<br><br>Transmission Lines<br>PHMA are designated as avoidance areas for high voltage transmission line ROWs, except for the transmission projects specifically identified below. All authorizations in these areas, other than the following identified projects, must comply with the conservation measures outlined in this plan, including the RDFs and avoidance criteria presented in MA-SSS-03. The BLM is currently processing an application for TransWest Express (including those portions of Energy Gateway South that are collocated) and the NEPA review for this project is well underway. | Potential change under Alternatives 3, 4, 5, and 6. |

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| Gateway South that are collocated) and the NEPA review for this project is well underway. Conservation measures for GRSG are being analyzed through the project's NEPA review process, which should achieve a net conservation benefit for the GRSG.<br><br>In PHMA, high voltage transmission lines (100 kilovolt or greater) will be avoided if possible. If avoidance is not possible, they will be placed in designated corridors where technically feasible. Where not technically feasible, lines should be located adjacent to existing infrastructure, unless using a different alignment better minimizes impacts on GRSG. New ROWs constructed adjacent to existing infrastructure will be constructed as close as technically feasible to existing infrastructure to limit disturbance to the smallest footprint.<br><br>In PHMA outside of designated corridors, new transmission lines must be buried where technically feasible. Where burying transmission lines is not technically feasible:<br>• new transmission lines must be located adjacent to existing infrastructure, unless using a different alignment better minimizes impacts on GRSG; and<br>• they will be subject to GRSG ROW avoidance criteria described above.<br><br>In PHMA, if an existing transmission line is being upgraded to a higher voltage transmission line outside an existing corridor:<br>• the existing transmission line must be removed within a reasonable amount of time after the new line is installed and energized; and<br>• the new line must be constructed in the same alignment as the existing line unless an alternate route will benefit GRSG or GRSG habitat.<br><br>In PHMA, where existing guy wires are determined to have a negative impact on GRSG or its habitat, they shall be removed or appropriately marked with bird flight diverters to make them more visible to GRSG in flight. | Conservation measures for GRSG are being analyzed through the project's NEPA review process, which should achieve a net conservation benefit for the GRSG.<br><br>In PHMA, high voltage transmission lines (100 kilovolt or greater) will be avoided if possible. If avoidance is not possible, they will be placed in designated corridors where technically feasible. Where not technically feasible, lines should be located adjacent to existing infrastructure, unless using a different alignment or construction method (e.g., burial) better minimizes impacts on GRSG. New ROWs constructed adjacent to existing infrastructure will be constructed as close as technically feasible to existing infrastructure to limit disturbance to the smallest footprint.<br><br>In PHMA, if an existing transmission line is being upgraded to a higher voltage transmission line outside an existing corridor:<br>• the existing transmission line must be removed within a reasonable amount of time after the new line is installed and energized; and<br>• the new line must be constructed in the same alignment as the existing line unless an alternate route will benefit GRSG or GRSG habitat.<br><br>In PHMA, where existing guy wires are determined to have a negative impact on GRSG or its habitat, they shall be removed or appropriately marked with bird flight diverters to make them more visible to GRSG in flight.<br><br><u>Pipelines</u><br>In PHMA, major pipelines (greater than 24 inches) that cannot avoid PHMA will be placed in designated corridors where technically feasible. Where not technically feasible, pipelines shall be located adjacent to existing infrastructure, unless using a different alignment better minimizes impacts on GRSG.<br><br><u>Communication Sites</u><br>In PHMA, new communication towers that cannot avoid PHMA must be located, where technically feasible, within an existing communication site. New sites will be | *(See above.)* |

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| Pipelines<br>In PHMA, major pipelines (greater than 24 inches) that cannot avoid PHMA will be placed in designated corridors where technically feasible. Where not technically feasible, pipelines shall be located adjacent to existing infrastructure, unless using a different alignment better minimizes impacts on GRSG.<br><br>Communication Sites<br>In PHMA, new communication towers that cannot avoid PHMA must be located, where technically feasible, within an existing communication site. New sites will be considered where necessary for public safety. | considered where necessary for public safety. | *(See above.)* |

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| **MA-LR-3:**<br>Road ROWs<br>In PHMA, new road ROWs will be authorized when necessary for public safety, administrative access, or subject to valid existing rights. If the new ROW is necessary for public safety, administrative access, or subject to valid existing rights and creates new surface disturbance, then avoid, minimize, and compensate for the impacts.<br><br>In PHMA, limit route construction to realignments of existing ROWs if the realignment maintains or enhances GRSG habitat, eliminates the need to authorize a new ROW to construct a new road, or is necessary for public safety or public need.<br><br>In PHMA, subject to valid existing rights, new road ROWs/easements will be authorized only when necessary for public safety or administrative access or, if it creates no new or de minimis new surface disturbance.<br><br>In PHMA, collocate new ROWs as close as technically possible to existing ROWs or where it best minimizes GRSG impacts. Use existing roads, or realignments, to access valid existing rights that are not yet developed. If valid existing rights cannot be accessed via existing roads, then build any new road constructed to the absolute minimum standard necessary.<br><br>In PHMA, existing Federal Highway Act Appropriation ROWs will be managed as valid existing rights, and new Federal Highway Act ROWs will continue to be considered and subject to all GRSG ROW plan restrictions. | No changes made. | No change proposed. |

| 2015 BLM GRSG Approved RMP Amendment | Changes between 2015 and 2019 GRSG Management | Potential for Change in 2023 Plan |
|---|---|---|
| **MA-LR-4:** In PHMA, designate ROW corridors as identified on Figure 2-10, Designated Utility Corridors [Appendix A]:<br>• Retain 17,600 acres of existing designated ROW corridor<br>• Retain 44,300 acres of existing designated ROW corridor, but stipulate new developments be limited to underground use only<br>• Undesignate 18,200 acres of existing designated ROW corridor<br><br>In PHMA, placement of new ROWs in corridors should be avoided if at all possible. Where avoidance is not possible:<br>• Allow new linear ROWs in designated corridors.<br>• New ROWs constructed in designated corridors will be constructed as close as technically feasible to existing linear ROW infrastructure to limit disturbance to the smallest footprint, unless using a different alignment better minimizes impacts on GRSG.<br>• Apply the pertinent management for discretionary activities in PHMA identified in MA-SSS-3. | No changes made. | No change proposed. |

| 2015 BLM GRSG Approved RMP Amendment | Changes between 2015 and 2019 GRSG Management | Potential for Change in 2023 Plan |
|---|---|---|
| **MA-LR-5:** In PHMA, when a ROW grant expires, is relinquished, or terminated, required rehabilitation as a term and condition of the FLPMA ROW grant, in compliance with 43 CFR, Part 2805.12(i).<br>• the lease holder will be required to restore the site by removing overhead lines and other infrastructure, and;<br>• eliminate existing raven nesting opportunities created by anthropogenic development on public lands (e.g., remove power line and communication facilities no longer in service).<br><br>In PHMA, during renewal, amendment or reauthorization of existing permits, work with existing ROW holders to mitigate impacts of existing ROW infrastructure. Where technically feasible, require ROW holders to bury or relocate existing power lines to minimize long-term impacts on GRSG habitat. Where the potential long-term impacts of relocating or burying the line will be greater than the existing impacts, do not pursue the mitigation. If relocation or burying is not feasible or will result in severe short-term or greater long-term impacts on GRSG habitat, incorporate additional terms and conditions in the ROW authorization for protection of GRSG habitat.<br><br>Work with ROW holders to retrofit existing towers with perch deterrents or other anti-perching devices, where appropriate, to limit GRSG predation. | **MA-LR-5:** In PHMA, when a ROW grant expires, is relinquished, or terminated, required rehabilitation as a term and condition of the FLPMA ROW grant, in compliance with 43 CFR, Part 2805.12(i).<br>• the lease holder will be required to restore the site by removing overhead lines and other infrastructure, and;<br>• eliminate existing raven nesting opportunities created by anthropogenic development on public lands (e.g., remove power line and communication facilities no longer in service).<br><br>In PHMA, during renewal, amendment or reauthorization of existing permits, work with existing ROW holders to mitigate impacts of existing ROW infrastructure on GRSG (e.g., predator deterrents, maintenance schedules, relocation, burial, etc.). Where the potential long-term impacts of mitigation will be greater than the existing impacts, do not pursue the mitigation. If relocation or burying is not feasible or will result in severe short-term or greater long-term impacts on GRSG habitat, incorporate additional terms and conditions in the ROW authorization for protection of GRSG habitat.<br><br>Work with ROW holders to retrofit existing towers with perch deterrents or other anti-perching devices, where appropriate, to limit GRSG predation. | No change proposed. |
| **MA-LR-6:** In PHMA, where existing leases or ROWs have had some level of development (road, fence, well, etc.) and are no longer in use, remove the features and restore the habitat. | No changes made. | No change proposed. |
| **MA-LR-7:** In GHMA, manage ROWs, permits, and leases as follows (Figure 2-11):<br>• Open: 484,900 acres<br>• Avoided: 0 acres<br>• Excluded: 17,600 acres<br><br>New ROWs (including permits and leases) authorizations will be allowed if they apply the pertinent management for discretionary activities in GHMA identified in MA-SSS-5. | No similar action. | Potential change under Alternatives 3, 4, 5, and 6. |

| 2015 BLM GRSG Approved RMP Amendment | Changes between 2015 and 2019 GRSG Management | Potential for Change in 2023 Plan |
|---|---|---|
| **MA-LR-8:** In GHMA, retain 74,700 acres of designated ROW corridors as identified on Figure 2-10. | No similar action. | No change proposed. |
| ***Land Tenure*** | ***Land Tenure*** | — |
| **MA-LR-9:** Lands classified as PHMA and GHMA for GRSG will be retained in federal management (Figure 2-12, Land Tenure [Appendix A]) unless: (1) the agency can demonstrate that disposal of the lands, including land exchanges, will provide a net conservation gain to the GRSG or (2) the agency can demonstrate that the disposal of the lands, including land exchanges, will have no direct or indirect adverse impact on conservation of the GRSG. | **MA-LR-9:** Lands classified as PHMA for GRSG will be retained in federal management (Figure 2-12, Land Tenure [Appendix A]) unless: (1) the agency can demonstrate that disposal of the lands, including land exchanges, will improve the condition of GRSG habitat or (2) the agency can demonstrate that the disposal of the lands, including land exchanges, will not compromise the persistence of GRSG populations within a PHMA. | No change proposed. |
| **MA-LR-10:** In PHMA, where suitable conservation actions cannot be achieved, seek to acquire state and private lands with intact federal mineral estate by donation, purchase or exchange in order to best conserve, enhance or restore GRSG habitat. | No changes made. | No change proposed. |
| ***Recommended Withdrawals*** | ***Recommended Withdrawals*** | — |
| **MA-LR-11:** SFA will be recommended for withdrawal from the Mining Law of 1872 (as amended), subject to valid existing rights. Other federal lands or non-federal lands with federal mineral interests within PHMA or GHMA that are not already withdrawn or recommended for withdrawal will be available for locatable mineral entry (Figure 2-5). | **MA-LR-11:** Federal lands or non-federal lands with federal mineral interests within PHMA that are not already withdrawn or recommended for withdrawal will be available for locatable mineral entry (Figure 2-5). | No change proposed. |
| ***RECREATION (REC)*** | ***RECREATION (REC)*** | — |
| **Management Actions (MA):** | **Management Actions (MA):** | — |
| **MA-REC-1**: In PHMA, only allow BLM SRPs that have neutral or beneficial effect on GRSG and their habitat. Evaluate existing SRPs for adverse effect on GRSG and their habitat. Modify or cancel the permit, as appropriate and where possible to avoid or mitigate effects of habitat alterations or other physical disturbances to GRSG (e.g., breeding, brood-rearing, migration patterns, or winter survival).<br><br>Identify permit stipulations that require the permittee to implement any necessary habitat restoration activities after SRP events. Restoration activities must be consistent with GRSG habitat objectives. | No changes made. | No change proposed. |

| 2015 BLM GRSG Approved RMP Amendment | Changes between 2015 and 2019 GRSG Management | Potential for Change in 2023 Plan |
|---|---|---|
| **MA-REC-2:** In PHMA, do not construct new recreation facilities (e.g., campgrounds, trailheads, staging areas) unless the development will have a net conservation gain to GRSG habitat (such as concentrating recreation, diverting use away from critical areas, etc.), or unless the development is required for visitor health and safety or resource protection. | No changes made. | No change proposed. |
| ***TRAVEL AND TRANSPORTATION MANAGEMENT (TTM)*** | ***TRAVEL AND TRANSPORTATION MANAGEMENT (TTM)*** | — |
| **Management Actions (MA):** | **Management Actions (MA):** | — |
| **MA-TTM-1:** Manage off-highway vehicle (OHV) use in GRSG habitat as follows (Figure 2-13, Trails and Travel Management [Appendix A]):<br>• Open to cross-country use: 525 acres (one area each in Parker Mountain and Uintah Population Areas)<br>• Limited to existing routes: 1,274,700 acres<br>• Limited to designated routes: 1,220,500 acres<br>• Closed: 33,200 acres | **MA-TTM-1:** Manage off-highway vehicle (OHV) use in GRSG habitat as follows (Figure 2-13, Trails and Travel Management [Appendix A]):<br>• Open to cross-country use: 525 acres (one area each in Parker Mountain and Uintah Population Areas); two areas outside of PHMA in the Sheeprocks Population Area, associated with 5-Mile Pass (6,320 acres) and Little Sahara Sand Dunes (7,900 acres)<br>• Limited to existing routes: 1,260,500 acres<br>• Limited to designated routes: 1,220,500 acres<br>• Closed: 33,200 acres | No change proposed. |

| 2015 BLM GRSG Approved RMP Amendment | Changes between 2015 and 2019 GRSG Management | Potential for Change in 2023 Plan |
|---|---|---|
| **MA-TTM-2:** PHMA and GHMA that do not have designated routes in a Travel Management Plan will be managed as limited to existing routes until a Travel Management Plan designates routes (unless they are already designated as limited to designated routes or closed to OHV use). OHV Areas designated as "closed" will be managed as areas closed to motorized vehicles. OHV Areas designated as "limited existing" within PHMA will be managed as "limited to existing roads, primitive roads, and trails" until the completion of an implementation level travel plan. Individual route designations will occur during subsequent implementation level travel management planning efforts. Upon the completion of implementation level travel management plans OHV areas designated as "Limited" will automatically transition to "limited to designated roads, primitive roads and trails." | **MA-TTM-2:** PHMA that does not have designated routes in a Travel Management Plan will be managed as limited to existing routes until a Travel Management Plan designates routes (unless they are already designated as limited to designated routes or closed to OHV use).<br><br>Two areas that were GHMA previously will remain limited to existing routes, though they would no longer be GHMA: 7,400 acres in the Bald Hills area and 13,500 acres in the Fillmore Field Office portions of Sheeprocks area, east of Highway 6. The other two areas of former GHMA (6,320 acres in the 5-Mile Pass area and 7,900 acres in the Little Sahara Recreation Area) will also remain limited until the BLM completes the Section 106 OHV area designation process found in the *Programmatic Agreement among the Advisory Council on Historic Preservation, The Bureau of Land Management – Utah and the Utah State Historic Preservation Office regarding National Historic Preservation Act Responsibilities for Travel and Transportation Management Undertakings*. Under the Programmatic Agreement the BLM will identify an Area of Potential Effect, conduct an identification process, make a finding of effect, and if necessary, develop a historic properties treatment plan. Once these procedures are completed, the applicable portions of these areas will revert to being open to cross-country use, consistent with prior RMP OHV allocations.<br><br>OHV Areas designated as "closed" will be managed as areas closed to motorized vehicles. OHV Areas designated as "limited existing" within PHMA will be managed as "limited to existing roads, primitive roads, and trails" until the completion of an implementation level travel plan. Individual route designations will occur during subsequent implementation level travel management planning efforts. Upon the completion of implementation level travel management plans OHV areas designated as "Limited" will automatically transition to "limited to designated roads, primitive roads and trails." | No change proposed. |

| 2015 BLM GRSG Approved RMP Amendment | Changes between 2015 and 2019 GRSG Management | Potential for Change in 2023 Plan |
|---|---|---|
| **MA-TTM-3:** Implementation level travel planning efforts will be guided by the goals, objectives and guidelines outlined in the GRSG section, relevant national and Utah specific guidance as well as the following:<br>• A timeline to complete travel planning efforts will be identified, prioritized and updated annually in all relevant planning areas to accelerate the accomplishment of: data collection, route evaluation and selection, and on the ground implementation efforts including signing, monitoring and rehabilitation.<br>• During subsequent travel management planning, consultation "with interested user groups, federal, state, county, and local agencies, local landowners, and other parties in a manner that provides an opportunity for the public to express itself and have its views given consideration." Consequently, a public outreach plan to fully engage all interested stakeholders will be incorporated into future travel management plans.<br>• Among other designation criteria from 43 CFR, Part 8342.1(b), "areas and trails shall be located to minimize harassment of wildlife or significant disruption of wildlife habitats. Special attention will be given to protect endangered or threatened species and their habitats."<br>• During subsequent travel management planning, all routes will undergo a route evaluation to determine its purpose and need and the potential resource and/or user conflicts from motorized travel. Where resource and/or user conflicts outweigh the purpose and need for the route, the route will be considered for closure or considered for relocation outside of sensitive GRSG habitat.<br>• During subsequent travel planning, threats to GRSG and their habitat will be considered when evaluating route designations and/or closures.<br>• During subsequent travel management planning, routes that do not have a purpose or need will be considered for closure.<br>• During subsequent travel management, planning, routes that are duplicative, | **MA-TTM-3:** Implementation level travel planning efforts will be guided by the goals, objectives and guidelines outlined in the GRSG section, relevant national and Utah specific guidance as well as the following:<br>• A timeline to complete travel planning efforts will be identified, prioritized and updated annually in all relevant planning areas to accelerate the accomplishment of: data collection, route evaluation and selection, and on the ground implementation efforts including signing, monitoring and rehabilitation.<br>• During subsequent travel management planning, consultation "with interested user groups, federal, state, county, and local agencies, local landowners, and other parties in a manner that provides an opportunity for the public to express itself and have its views given consideration." Consequently, an outreach plan to fully engage all interested stakeholders, including state, local, and tribal governments, will be incorporated into future travel management plans.<br>• Among other designation criteria from 43 CFR, Part 8342.1(b), "areas and trails shall be located to minimize harassment of wildlife or significant disruption of wildlife habitats. Special attention will be given to protect endangered or threatened species and their habitats." | No change proposed. |

| 2015 BLM GRSG Approved RMP Amendment | Changes between 2015 and 2019 GRSG Management | Potential for Change in 2023 Plan |
|---|---|---|
| parallel, or redundant will be considered for closure.<br>• During subsequent travel management planning, seasonal restrictions on OHV use will be considered in important seasonal habitats where OHV use is a threat. During subsequent travel management planning, consider limiting over snow vehicles designed for use over snow and that runs on a track or tracks and/or a ski or skis, while in use over snow to designated routes or consider seasonal closures in GRSG wintering areas from November 1 through March 31.<br>• During subsequent travel management planning, routes not required for public access or recreation with a current administrative/agency purpose or need will be evaluated for administrative access only.<br>• During subsequent travel management planning, consider prioritizing restoration of routes not designated in a Travel Management Plan.<br>• During subsequent travel management plan implementation, consider using seed mixes or transplant techniques that will maintain or enhance GRSG habitat when rehabilitating linear disturbances.<br>• During subsequent travel management plan implementation, consider scheduling road maintenance to avoid disturbance during sensitive periods and times to the extent practicable. Consider using time of day limits (e.g., no use between 6:00 pm and 9:00 am) to reduce impacts on GRSG during breeding periods. | *(See above.)* | *(See above.)* |

| 2015 BLM GRSG Approved RMP Amendment | Changes between 2015 and 2019 GRSG Management | Potential for Change in 2023 Plan |
|---|---|---|
| **MA-TTM-4:** In PHMA, complete transportation plans in accordance with National BLM Travel Management guidance, requiring the BLM to maintain a current action plan and planning schedule to most effectively target available resources. The following GRSG population areas are Utah's top priority areas to designate comprehensive travel plans:<br>• Sheeprocks<br>• Box Elder<br>• Ibapah<br>• Bald Hills<br>• Rich<br>• Hamlin Valley | No changes made. | No change proposed. |
| **MA-TTM-5:** In PHMA, travel systems will be managed with an emphasis on improving the sustainability of the travel network in a comprehensive manner to minimize impacts on GRSG, maintain motorist safety, and prevent unauthorized cross country travel while meeting access needs. To do so, it may be necessary to improve portions of existing routes, close existing routes or create new routes that meet user group needs, thereby reducing the potential for pioneering unauthorized routes. The emphasis of the comprehensive travel and transportation planning will be placed on having a neutral or positive effect on GRSG habitat. | No changes made. | No change proposed. |
| **MA-TTM-6:** In PHMA, when considering upgrade of existing routes that will change route category (BLM route categories: road, primitive road, or trail) or capacity, consider the larger transportation network while providing for protection of GRSG habitat. | No similar action. | No change proposed. |
| **MA-TTM-7:** In PHMA, use existing roads, or realignments as described above to access valid existing rights that are not yet developed. If valid existing rights cannot be accessed via existing roads, then build any new road constructed to the absolute minimum standard necessary, and add the surface disturbance to the total disturbance. Apply additional effective mitigation necessary to offset the resulting loss of GRSG habitat. Plan for new routes in consideration of the larger transportation network objectives and needs while providing for protection of GRSG habitat. | No changes made. | No change proposed. |

| 2015 BLM GRSG Approved RMP Amendment | Changes between 2015 and 2019 GRSG Management | Potential for Change in 2023 Plan |
|---|---|---|
| **MA-TTM-8:** In PHMA, when reseeding roads, primitive roads and trails, use appropriate seed mixes and consider the use of transplanted sagebrush. | No similar action. | No change proposed. |
| **MA-TTM-9:** Develop an educational process to advise OHV users of the potential for conflict with GRSG. | No changes made. | No change proposed. |
| **MA-TTM-10:** In PHMA and GHMA, temporary closures will be considered in accordance with 43 CFR subpart 8364 (Closures and Restrictions); 43 CFR, subpart 8351 (Designated National Area); 43 CFR, subpart 6302 (Use of Wilderness Areas, Prohibited Acts, and Penalties); 43 CFR, subpart 8341 (Conditions of Use) and any applicable policies.<br><br>Temporary closure or restriction orders under these authorities are enacted at the discretion of the authorized officer to resolve management conflicts and protect persons, property, and public lands and resources. Where an authorized officer determines that OHVs are causing or will cause considerable adverse effects upon soil, vegetation, wildlife, wildlife habitat, cultural resources, historical resources, threatened or endangered species, wilderness suitability, other authorized uses, or other resources, the affected areas shall be immediately closed to the type(s) of vehicle causing the adverse effect until the adverse effects are eliminated and measures implemented to prevent recurrence. (43 CFR, Part 8341.2) A closure or restriction order should be considered only after other management strategies and alternatives have been explored. The duration of temporary closure or restriction orders should be limited to 24 months or less; however, certain situations may require longer closures and/or iterative temporary closures. This may include closure of routes or areas. | **MA-TTM-10:** In PHMA, temporary closures will be considered in accordance with 43 CFR subpart 8364 (Closures and Restrictions); 43 CFR, subpart 8351 (Designated National Area); 43 CFR, subpart 6302 (Use of Wilderness Areas, Prohibited Acts, and Penalties); 43 CFR, subpart 8341 (Conditions of Use) and any applicable policies.<br><br>Temporary closure or restriction orders under these authorities are enacted at the discretion of the authorized officer to resolve management conflicts and protect persons, property, and public lands and resources. Where an authorized officer determines that OHVs are causing or will cause considerable adverse effects upon soil, vegetation, wildlife, wildlife habitat, cultural resources, historical resources, threatened or endangered species, wilderness suitability, other authorized uses, or other resources, the affected areas shall be immediately closed to the type(s) of vehicle causing the adverse effect until the adverse effects are eliminated and measures implemented to prevent recurrence. (43 CFR, Part 8341.2) A closure or restriction order should be considered only after other management strategies and alternatives have been explored. The duration of temporary closure or restriction orders should be limited to 24 months or less; however, certain situations may require longer closures and/or iterative temporary closures. This may include closure of routes or areas. | No change proposed. |

**Table 2. 2015 Habitat Objectives for Greater Sage-Grouse**

| Attribute | Indicators | Desired Condition |
|---|---|---|
| **Breeding and Nesting (February 15-June 15)[1, 2, 3, 4, 5, 6]** | | |
| Lek Security | Proximity of trees | Trees absent or uncommon on shrub/grassland ecological sites within 1.8 miles (approx. 3 kilometers) of occupied leks. [6, 7, 8] |
| | Proximity of sagebrush to leks | Has adjacent sagebrush cover.[6] |
| Cover | % of seasonal habitat meeting desired conditions | >80% of the mapped nesting habitat meets the recommended vegetation characteristics, where appropriate (relative to ecological site potential, etc.).[8] |
| | Sagebrush cover | ≥15%[6, 8, 9] |
| | Total shrub cover[6, 8, 9] | 15-30%: Box Elder, Parker Mountain, Bald Hills, Hamlin Valley, Panguitch, Uintah south of Hwy 40<br>15-35%: Rich, Carbon, Emery, Sheeprocks, Ibapah, Uintah north of Highway 40 |
| | Sagebrush height[6, 8, 9] | >12 inches (30 cm): Box Elder, Bald Hills, Hamlin Valley, Sheeprocks, Ibapah<br>>10 inches (25 cm): Rich, Carbon, Emery, Uintah north of Highway 40<br>>8 inches (20 cm): Parker Mountain, Panguitch, Uintah south of Highway 40 |
| | Predominant sagebrush shape[10] | >50% in spreading (applicable to the specific sagebrush types prone to columnar vs. spreading shape e.g., Wyoming, not black sage)[6] |
| | Perennial grass cover (such as native bunchgrasses, rhizomatous grasses called for on applicable ecological site descriptions, or other perennial grasses that provide similar functionality)[6, 8, 9] | >10%: Box Elder, Bald Hills, Hamlin Valley, Rich, Carbon, Emery, Sheeprocks, Ibapah, Uintah north of Highway 40<br>>5%:Parker Mountain, Panguitch, Uintah south of Highway 40 |
| | Perennial grass and forb height (includes residual grasses)[6, 8, 9] | Provide overhead and lateral concealment from predators.[11] |
| | Perennial forb canopy cover[6, 8, 9] | >5%: Box Elder, Bald Hills, Hamlin Valley, Rich, Carbon, Emery, Sheeprocks, Ibapah, Uintah north of Highway 40<br>>3%: Parker Mountain, Panguitch, Uintah south of Highway 40 |

| Attribute | Indicators | Desired Condition |
|---|---|---|
| **Brood-Rearing/Summer (April 15-August 15)[1]** | | |
| Cover | % of Seasonal habitat meeting desired condition | >40% of the mapped brood-rearing/summer habitat meets recommended habitat characteristics where appropriate (relative to ecological site potential, etc.)[8] |
| | Sagebrush cover[6, 8, 9] | >10% |
| | Total shrub cover[6, 8, 9] | 10-25%: Box Elder, Bald Hills, Hamlin Valley, Panguitch, Rich, Parker Mountain, Uintah<br>10-30%: Carbon, Emery, Sheeprocks, Ibapah, |
| | Sagebrush height[6, 8, 9] | >12 inches (30 cm): Box Elder, Bald Hills, Hamlin Valley, Sheeprocks, Ibapah<br>>10 inches (25 cm): Rich, Carbon, Emery, Uintah north of Highway 40<br>>8 inches (20 cm): Parker Mountain, Panguitch, Uintah south of Highway 40 |
| | Perennial grass cover and forbs[6, 8, 9] | >15% (Grass: >10%; Forb: >5%): Box Elder, Rich, Sheeprocks, Ibapah, Parker Mountain, Panguitch, Uintah, Carbon, Emery<br>>15% (Grass: >8%; Forb: >7%): Bald Hills, Hamlin Valley, |
| | Riparian areas/mesic meadows | Proper Functioning Condition |
| | Upland and riparian perennial forb availability | Preferred forbs are common with several preferred species present[6, 12] |
| **Winter (November 15-March 15)[1]** | | |
| Cover and Food | % of seasonal habitat meeting desired conditions | >80% of the mapped wintering habitat meets winter habitat characteristics where appropriate (relative to ecological site, etc.). [8] |
| | Sagebrush cover above snow[6, 8,] | >10% |
| | Sagebrush height above snow[6, 8, 9, 13] | >10 inches (25 cm): Box Elder, Bald Hills, Hamlin Valley, Rich, Carbon, Emery, Sheeprocks, Ibapah, Uintah north of Highway 40<br>>8 inches (20 cm): Parker Mountain, Panguitch, Uintah south of Highway 40 |

[1] Specific dates will be based on site-specific conditions and may be modified due to documented local variations (e.g., higher/lower elevations) or annual climactic fluctuations (e.g., early/late spring, and long and/or heavy winter), in coordination with the appropriate State of Utah agency.
[2] Utah Greater Sage-Grouse Working Group 2013
[3] Doherty 2008
[4] Doherty et al. 2010
[5] Holloran and Anderson 2005
[6] Stiver et al. 2015 *In Press*
[7] Baruch-Mordo et al. 2013
[8] Connelly et al. 2000
[9] Unpublished data, Utah Community-Based Conservation Program Greater Sage-Grouse Statewide Database, Utah State University, Logan, Utah and Brigham Young University, Provo, Utah. Summarization and analysis of nesting and brood-rearing habitat characteristics from data collected through Utah State University and Brigham Young University research efforts. Researchers located the nest and brood sites using radio-marked telemetry methods. Shortly after the site was used by the marked bird (after hatch or use by a brood), vegetation characteristics on the site were measured using the line intercept method for shrub canopy cover and Daubenmire frames for herbaceous cover. Researchers across the various study areas used methods that followed the guidelines identified in Connelly et al. (2003).
[10] Sagebrush plants that are more tree or columnar-shaped provide less protective cover near the ground than sagebrush plants with a spreading shape (Stiver et al. 2015 *In Press*). Some sagebrush plants are naturally columnar (e.g., Great Basin big sagebrush), and a natural part of the plant community. However, a predominance of columnar shape arising from animal impacts may warrant management investigation or adjustments at site specific scales.
[11] Specific height requirements needed to meet the objective will be set at the time of watershed assessments.
[12] Preferred forbs are listed in Stiver et al. 2015 *In Press*. Overall total forb cover may be greater than that of preferred forb cover since not all forb species are listed as preferred.
[13] The height of sagebrush remaining above the snow depends upon snow depth in a particular year. Intent is to manage for tall, healthy, sagebrush stands.

**Table 3. 2019 Habitat Objectives for Greater Sage-Grouse (see Figure 3-1 for the Low, Mid, and High Habitat Objective Zones)**

| Attribute | Indicators | Desired Condition |
|---|---|---|
| **Breeding and Nesting (February 15-June 15)[1, 2, 3, 4, 5, 6]** | | |
| Lek Security | Proximity to conifers | Conifers are absent or uncommon on shrub/grassland ecological sites within 1.8 miles (approx. 3 kilometers) of occupied leks.[6, 7, 8] |
| | Proximity of sagebrush to leks | Has adjacent sagebrush cover.[6] |
| Cover | % of seasonal habitat meeting desired conditions | >80% of the mapped nesting habitat meets the recommended vegetation characteristics[8], where appropriate (relative to ecological site potential, etc.). |
| | Sagebrush cover[9] | Low: ≥ 7%<br>Mid: ≥ 18%<br>High: ≥ 14% |
| | Total shrub cover[6, 8, 9] | Low: ≥ 17%<br>Mid: ≥ 22%<br>High: ≥ 19% |
| | Sagebrush Composition[9] | Low: ≥ 36%<br>Mid: ≥ 71%<br>High: ≥ 83% |
| | Shrub height[6, 8, 9] | Low: ≥ 12 inches (30 cm)<br>Mid: ≥ 5.9 inches (15 cm)<br>High: ≥ 9 inches (23 cm) |
| | Perennial grass cover (such as native bunchgrasses, rhizomatous grasses called for on applicable ecological site descriptions, or other perennial grasses that provide similar functionality)[6, 8, 9] | Low: ≥ 5%<br>Mid: ≥ 4%<br>High: ≥ 8% |
| | Perennial grass and forb height (includes residual grasses)[6, 8, 9] | Provide overhead and lateral concealment from predators.[11] |
| | Perennial forb canopy cover[6, 8, 9] | Low: ≥ 2%<br>Mid: ≥ 1%<br>High: ≥ 4% |

| Attribute | Indicators | Desired Condition |
|---|---|---|
| **Brood-Rearing/Summer (April 15-August 15)[1]** | | |
| Cover | % of Seasonal habitat meeting desired condition | >40% of the mapped brood-rearing/summer habitat meets recommended habitat characteristics[8] where appropriate (relative to ecological site potential, etc.) |
| | Sagebrush cover[6, 8, 9] | Low: ≥ 4%<br>Mid: ≥ 16%<br>High: ≥ 17% |
| | Total shrub cover[6, 8, 9] | Low: ≥ 10%<br>Mid: ≥ 19%<br>High: ≥ 15% |
| | Sagebrush Composition[9] | Low: ≥ 28%<br>Mid: ≥ 77%<br>High: ≥ 77% |
| | Shrub height[6, 8, 9] | Low: ≥ 10.25 inches (26 cm)<br>Mid: ≥ 4.3 inches (11 cm)<br>High: ≥ 8 inches (20 cm) |
| | Perennial grass cover[9] | Low: ≥ 5%<br>Mid: ≥ 6%<br>High: ≥ 8% |
| | Perennial forb cover[9] | Low: ≥ 2%<br>Mid: ≥ 2%<br>High: ≥ 6% |
| | Riparian areas/mesic meadows | Proper Functioning Condition |
| | Upland and riparian perennial forb availability | Preferred forbs are common with several preferred species present[6, 12] |
| **Winter (November 15-March 15)[1]** | | |
| Cover and Food | % of seasonal habitat meeting desired conditions | >80% of the mapped wintering habitat meets winter habitat characteristics[8] where appropriate (relative to ecological site, etc.). |
| | Sagebrush cover above snow[6, 8,] | ≥10% |
| | Shrub height[9] | Low: ≥ 12 inches (30 cm)<br>Mid: ≥ 5.9 inches (15 cm)<br>High: ≥ 9 inches (23 cm) |

[1] Specific dates will be based on site-specific conditions and may be modified due to documented local variations (e.g., higher/lower elevations) or annual climactic fluctuations (e.g., early/late spring, and long and/or heavy winter), in coordination with the appropriate State of Utah agency.
[2] Utah Greater Sage-Grouse Working Group 2013
[3] Doherty 2008
[4] Doherty et al. 2010
[5] Holloran and Anderson 2005
[6] Stiver et al. 2015
[7] Baruch-Mordo et al. 2013
[8] Connelly et al. 2000
[9] Dahlgren, D., T. A. Messmer, B. A. Crabb, M. T. Kohl, S. N. Frey, E. Thacker, R. T. Larsen, and R. J. Baxter. (In Review). An empirical approach to refining Greater Sage-Grouse (Centrocercus urophasianus) breeding habitat guidelines. Ecosphere.
[11] Specific height requirements needed to meet the objective will be set at the time of watershed assessments.
[12] Preferred forbs are listed in Stiver et al. 2015. Overall total forb cover may be greater than that of preferred forb cover, since not all forb species are listed as preferred.

## Table 4. PHMA and GHMA in the 2015 BLM GRSG Approved RMPA

| Population Area | Acres | | | | | |
|---|---|---|---|---|---|---|
| | PHMA | | | GHMA | | |
| | Total Surface[1] | BLM Surface[2] | Split Estate[3] | Total Surface[1] | BLM Surface[2] | Split Estate[3] |
| Uintah | 566,800 | 263,200 | 140,800 | 991,500 | 294,200 | 81,700 |
| Carbon[4] | 260,100 | 43,500 | 124,200 | 198,700 | 82,800 | 19,200 |
| Emery | 85,500 | 100 | 84,000 | 11,400 | 0 | 9,700 |
| Parker Mtn. | 741,300 | 214,200 | 378,300 | 12,900 | 0 | 7,400 |
| Panguitch | 343,900 | 163,200 | 91,000 | 0 | 0 | 0 |
| Bald Hills | 326,400 | 259,400 | 5,200 | 21,200 | 8,300 | 1,200 |
| Hamlin Valley | 143,700 | 101,500 | 6,600 | 0 | 0 | 0 |
| Sheeprocks | 534,600 | 381,100 | 111,200 | 296,500 | 52,800 | 15,300 |
| Ibapah | 88,800 | 48,000 | 700 | 10,800 | 10,100 | 0 |
| Box Elder | 1,227,800 | 439,200 | 112,000 | 0 | 0 | 0 |
| Rich | 1,051,000 | 167,000 | 178,400 | 197,900 | 300 | 20,600 |
| Lucerne | 0 | 0 | 0 | 37,500 | 0 | 11,500 |
| Strawberry | 161,500 | 0 | 40,900 | 20,600 | 0 | 500 |
| *Statewide* | *5,531,400* | *2,080,400* | *1,273,300* | *1,799,000* | *448,500* | *167,100* |
| *% PHMA/ GHMA* | *75%* | *80%* | *85%* | *25%* | *20%* | *15%* |

[1] Acreage associated with total PHMA polygon, regardless of land ownership.
[2] Acreage within PHMA where the BLM has managerial authority on the surface estate.
[3] Acreage where the surface and mineral estates are owned or administered by separate entities. These acres show where the surface estate is not BLM (e.g., private, state, tribal, and Forest Service), but that have a federal mineral estate administered by the BLM. Most minerals decisions apply to the combination of the BLM surface and mineral estates.
[4] The 41,200 acres of National Forest System lands in the Anthro Mountain area would be managed as neither PHMA nor GHMA. These areas would be identified as "Anthro Mountain." In the BLM's RMPPA, these areas are considered split-estate, where the BLM administers the mineral estate.

**Table 5. PHMA in the 2019 BLM GRSG Approved RMPA**

| Population Area | Acres | | |
|---|---|---|---|
| | PHMA | | |
| | Total Surface[1] | BLM Surface[2] | Split Estate[3] |
| Uintah | 566,800 | 263,200 | 140,800 |
| Carbon [4] | 260,100 | 43,500 | 124,200 |
| Emery | 85,500 | 100 | 84,000 |
| Parker Mtn. | 741,300 | 214,200 | 378,300 |
| Panguitch | 343,900 | 163,200 | 91,000 |
| Bald Hills | 326,400 | 259,400 | 5,200 |
| Hamlin Valley | 143,700 | 101,500 | 6,600 |
| Sheeprocks | 534,600 | 381,100 | 111,200 |
| Ibapah | 88,800 | 48,000 | 700 |
| Box Elder | 1,227,800 | 439,200 | 195,800 |
| Rich | 1,015,400 | 167,000 | 153,700 |
| Lucerne | 0 | 0 | 0 |
| Strawberry | 161,500 | 0 | 40,900 |
| *Statewide*[5] | *5,495,800* | *2,080,400* | *1,332,400* |

[1] Acreage associated with total PHMA polygon, regardless of land ownership.
[2] Acreage within PHMA where the BLM has managerial authority on the surface estate.
[3] Acreage where the surface and mineral estates are owned or administered by separate entities. These acres show where the surface estate is not BLM (e.g., private, state, tribal, and Forest Service), but that have a federal mineral estate administered by the BLM. Most minerals decisions apply to the combination of the BLM surface and mineral estates.
[4] The 41,200 acres of National Forest System lands in the Anthro Mountain area would not be managed PHMA. These areas would be identified as "Anthro Mountain." In the BLM's RMPPA, these areas are considered split-estate, where the BLM administers the mineral estate.
[5] PHMA were mapped to exclude all incorporated towns/cities.

### 2.15.2 Relevant Appendices

The following table shows which appendices from the 2015 and 2019 plans have management direction that may change through this RMP amendment. If 2019 is not listed in the year, then no change was made to the appendix between the 2015 and 2019 plans. The appendices can be found on the Utah GRSG ePlanning website.

| ARMPA Appendix Name | Year | Potential for Change in 2023 Plan |
|---|---|---|
| A: Approved RMP Amendment Maps | 2015 | Yes |
| A: Maps | 2019 | Yes |
| B: Applying Lek Buffer Distances | 2015, 2019 | No |
| C: Required Design Features | 2015 | Yes |
| D: Greater Sage-Grouse Monitoring Framework | 2015 | No |
| E: Greater Sage-Grouse Disturbance Cap Guidance | 2015, 2019 | Yes |
| F: Mitigation Strategy: Utah Greater Sage-Grouse RMPA | 2015 | Yes |
| G: Stipulations Associated with Fluid Mineral Leasing | 2015, 2019 | Yes |
| H: Fire and Invasives Assessment Tool | 2015 | No |
| I: Adaptive Management | 2015, 2019 | Yes |
| J: Biological Opinion | 2015 | No |
| K: Greater Sage Grouse Habitat Baseline and Habitat Update Protocol | 2015, 2019 | Yes |

# Appendix 2.16
# Wyoming RMP 2015 Amendments

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## 2.16 WYOMING RMP 2015 AMENDMENTS

This appendix presents the GRSG approved RMP amendment language from the 2015 record of decision for the RMP Amendments for Casper, Kemmerer, Newcastle, Pinedale, Rawlins, and Rock Springs RMPs. These RMPs were not amended in 2019. The table below notes which goals, objectives, appendices, and management decisions/actions have a potential to change as a result of the current planning effort and if so, under which alternatives changes are being considered. Note that any references to tables and appendices are to those applicable 2015 appendices that are listed in **Section 2.16.2** of this appendix.

### 2.16.1 Existing GRSG RMP Management – Wyoming RMP 2015 Amendments (Casper, Kemmerer, Newcastle, Pinedale, Rawlins, and Rock Springs RMPs)

**Table 1. Summary of Goals, Objectives, and Management Actions in Wyoming 2015 RMP Amendments**

| 2015 Approved RMPAs | 2019 Approved RMPAs | Potential Change in 2023 Plan |
|---|---|---|
| Management Goal 1: Conserve, restore, and enhance Greater Sage-Grouse habitat on a landscape scale consistent with local, state, and federal management plans and policies, as practical, while providing for multiple use of BLM-administered lands. | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |
| Management Objective (MO) 1: In cooperation with the State of Wyoming and its agencies, local governments, private landowners, local Greater Sage-Grouse working groups, partners, and stakeholders, develop site-specific conservation strategies to maintain or enhance Greater Sage-Grouse habitats and habitat connectivity. | No changes made. | No change proposed. |
| MO 2: Maintain and enhance quality/suitable habitat to support the expansion of Greater Sage-Grouse populations on federally administered lands within the planning area. | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |
| MO 3: Manage Greater Sage-Grouse seasonal habitats and maintain habitat connectivity to support population objectives set by the State of Wyoming in cooperation with the agencies. | No changes made. | No change proposed. |
| MO 4: Identify and prioritize opportunities for habitat enhancement and conservation within Greater Sage-Grouse core habitat areas based on threats and the ability to manage Greater Sage-Grouse habitat. | No changes made. | No change proposed. |
| MO 5: Restore native (or desirable) plants and create landscape patterns that most benefit Greater Sage-Grouse. | No changes made. | No change proposed. |

| 2015 Approved RMPAs | 2019 Approved RMPAs | Potential Change in 2023 Plan |
|---|---|---|
| MO 6: Develop specific habitat objectives to protect, enhance, or restore Greater Sage-Grouse priority habitat based on ESDs and BLM land health evaluations (including within wetlands and riparian areas) taking into account site history (historic treatments or habitat manipulations) that have changed the soil chemistry, possibly altering the ESD. If an effective grazing system that meets sage-grouse habitat requirements is not already in place, analyze at least one alternative that conserves, restores, or enhances sage-grouse habitat in the NEPA document prepared for grazing management (Doherty et al. 2011, Williams et al. 2011). | Develop specific habitat objectives to protect, enhance, or restore Greater Sage-Grouse priority habitat based on ESDs and BLM land health evaluations (including within wetlands and riparian areas) taking into account site history (historic treatments or habitat manipulations) that have changed the soil chemistry, possibly altering the ESD. | No change proposed. |
| MO 7: Establish measurable objectives related to Greater Sage-Grouse habitat from baseline monitoring data, ESDs, or land health assessments/evaluations. | No changes made. | No change proposed. |
| MO 8: Manage for vegetation composition and structure consistent with ecological site potential to achieve Greater Sage-Grouse seasonal habitat objectives. | No changes made. | No change proposed. |
| MO 9: Incorporate available site information collected using the Sage-Grouse Habitat Assessment Framework or similar methods to evaluate existing resource conditions and to develop any necessary resource solutions in cooperation with the State of Wyoming and its agencies, the local governments, private landowners, project proponents, partners, and stakeholders. | No changes made. | No change proposed. |
| MO 10: Incorporate management practices that will provide for maintenance and/or enhancement of Greater Sage-Grouse habitats, including specific attention to maintenance of desired understories of sagebrush plant communities. When developing objectives for residual cover and species diversity, identify the ecological site types within the planning area and refer to the appropriate ESDs. | No changes made. | No change proposed. |
| MO 11: In determining appropriate management actions that will be considered, refer to the document, *Grazing Influence, Management, and Objective Development in Wyoming's Greater Sage-Grouse Habitat* (Cagney et al. 2010) for guidance. | No changes made. | No change proposed. |

| 2015 Approved RMPAs | 2019 Approved RMPAs | Potential Change in 2023 Plan |
|---|---|---|
| MO 12: Identify PHMA and GHMA for each WAFWA MZ across the current geographic range of Greater Sage-Grouse that are large enough to stabilize populations in the short term and enhance populations over the long term. Greater Sage-Grouse habitat in this planning area overlaps two WAFWA MZs: (1) MZ I - Great Plains and (2) MZ II - Wyoming Basin. | No changes made. | Potential change under Alternatives 4 and 5. |
| MO 13: Protect PHMA and GHMA from anthropogenic disturbance that will reduce distribution or abundance of Greater Sage-Grouse. | No changes made. | Potential change under Alternatives 4 and 5. |
| MO 14: Priority will be given to leasing and development of fluid mineral resources, including geothermal, outside of PHMA and GHMA. When analyzing leasing and authorizing development of fluid mineral resources, including geothermal, in PHMA and GHMA, and subject to applicable stipulations for the conservation of Greater Sage-Grouse, priority would be given to development in non-habitat areas first and then in the least suitable habitat for Greater Sage-Grouse. The implementation of these priorities will be subject to valid existing rights and any applicable law or regulation, including, but not limited to, 30 U.S.C. 226(p) and 43 CFR 3162.3-1(h). Where a proposed fluid mineral development project on an existing lease could adversely affect Greater Sage-Grouse populations or habitat, the BLM will work with the lessees, operators, or other project proponents to avoid, reduce, and mitigate adverse impacts on the extent compatible with lessees' rights to drill and produce fluid mineral resources. The BLM will work with the lessee, operator, or project proponent in developing an APD for the lease to avoid and minimize impacts on Greater Sage-Grouse or its habitat and will ensure that the best information about the Greater Sage-Grouse and its habitat informs and helps to guide development of such federal leases. | Leasing is allowed in PHMA. Where the BLM has a backlog of Expressions of Interest for leasing, the BLM will prioritize its work first in non-habitat management areas, followed by lower priority habitat management areas (e.g., GHMA) and then higher priority habitat management areas (i.e., PHMA). To the extent consistent with federal regulation, law, and policy, priority would be given to leasing and development of fluid mineral resources, including geothermal, outside of PHMA. When analyzing leasing and authorizing development of fluid mineral resources, including geothermal, in PHMA, and subject to applicable stipulations for the conservation of Greater Sage-Grouse, priority would be given to development in non-habitat areas first and then in the least suitable habitat for Greater Sage-Grouse. The implementation of these priorities will be subject to valid existing rights and any applicable law or regulation, including, but not limited to, 30 U.S.C. 226(p) and 43 CFR 3162.3-1(h). Where a proposed fluid mineral development project on an existing lease could adversely affect Greater Sage-Grouse populations or habitat, the BLM will work with the lessees, operators, or other project proponents to avoid, reduce, and mitigate adverse | Potential change under Alternatives 3, 4, 5, and 6. |

| 2015 Approved RMPAs | 2019 Approved RMPAs | Potential Change in 2023 Plan |
|---|---|---|
| *(See above.)* | impacts on the extent compatible with lessees' rights to drill and produce fluid mineral resources. To incentivize development to locate outside of PHMA, the BLM would work with the lessee, operator, or project proponent in developing an APD for the lease to avoid and minimize impacts on Greater Sage-Grouse or its habitat and will ensure that the best information about the Greater Sage-Grouse and its habitat informs and helps to guide development of such federal leases. | *(See above.)* |
| MO 15: In all SFAs and PHMA, the desired condition is to maintain all lands ecologically capable of producing sagebrush (but no less than 70 percent) with a minimum of 15 percent sagebrush cover or as consistent with specific ecological site conditions. The attributes necessary to sustain these habitats are described in *Interpreting Indicators of Rangeland Health* (BLM Tech Ref 1734-6). | In PHMA, the desired condition is to maintain all lands ecologically capable of producing sagebrush (but no less than 70 percent) with a minimum of 15 percent sagebrush cover or as consistent with specific ecological site conditions. The attributes necessary to sustain these habitats are described in *Interpreting Indicators of Rangeland Health* (BLM Tech Ref 1734-6). | No change proposed. |
| MO 16: The habitat objectives (see Tables 2-2 and 2-3) will be part of the Greater Sage-Grouse habitat assessment to be used during land health evaluations (see Monitoring Framework in Appendix D). These habitat objectives are not obtainable on every acre within the designated Greater Sage-Grouse habitat management areas. Therefore, the determination on whether the objectives have been met will be based on the specific site's ecological ability to meet the desired condition identified in the table. | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |
| MO 17: Effects of infrastructure projects, including siting, will be minimized using the best available science, updated as monitoring information on current infrastructure projects becomes available. | No changes made. | No change proposed. |
| MD GMD 1: Continue to support the development of statewide Greater Sage-Grouse seasonal habitat models for the State of Wyoming. | No changes made. | No change proposed. |

| 2015 Approved RMPAs | 2019 Approved RMPAs | Potential Change in 2023 Plan |
|---|---|---|
| MD GMD 2: Field offices will work with project proponents, partners, and stakeholders to avoid or minimize impacts and/or implement direct mitigation (e.g., relocating disturbance, timing restrictions, etc.), and utilize best management practices (BMPs). | No changes made. | No change proposed. |
| MD GMD 3: Utilize the Wyoming SGIT and LWG plans or other state plans, analyses, and other sources of information to guide development of conservation objectives for local management of Greater Sage-Grouse habitats. The BLM will collaborate with appropriate federal agencies, and the State of Wyoming as contemplated under Governor Executive Order 2013-3, to: (1) develop appropriate conservation objectives; (2) define a framework for evaluating situations where Greater Sage-Grouse conservation objectives are not being achieved on federal land, to determine if a causal relationship exists between improper grazing (by wildlife or wild horses or livestock) and Greater Sage-Grouse conservation objectives; and (3) identify appropriate site-based action to achieve Greater Sage-Grouse conservation objectives within the framework. | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |
| MD GMD 4: Include the collection of baseline data and outline post-project monitoring components in project planning, as appropriate and necessary. | No changes made. | No change proposed. |
| MD GMD 5: The BLM will coordinate new recommendations, mitigation, habitat objectives, and management considerations applied for Greater Sage-Grouse with the WGFD and other appropriate agencies, local government cooperators, and the Wyoming SGIT. These measures will be analyzed in site-specific NEPA documents, and planning-level documents, as necessary. | No changes made. | No change proposed. |
| MD GMD 6: Apply appropriate seasonal restrictions for implementing vegetation management treatments according to the type of seasonal habitats present within Greater Sage-Grouse habitat. Vegetation treatments must include monitoring to determine achievement of objectives and their long-term success. | No changes made. | No change proposed. |
| MD GMD 7: Ensure site-specific, measurable conservation and mitigation objectives are included in project planning within Greater Sage-Grouse habitats. | No changes made. | No change proposed. |

| 2015 Approved RMPAs | 2019 Approved RMPAs | Potential Change in 2023 Plan |
|---|---|---|
| MD GMD 8: Each BLM field office will develop landscape-scale restoration, conservation, and maintenance strategies, including special management of seasonal habitats and identified connectivity zones outside of PHMA, working with voluntary partners and cooperating agencies. These strategies and habitat designations must be coordinated and reconciled with Wyoming's Greater Sage-Grouse Core Area Protection strategy (EO 2015-4), and where possible, with adjoining management entities that share habitats or populations. | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |
| MD GMD 9: Design all projects in a manner that minimizes potential for invasive species establishment. Monitor and treat invasive species associated with all permitted activities consistent with BLM Handbook H-1740-2. | No changes made. | No change proposed. |
| MD GMD 10: Apply all appropriate RDFs (Appendix C) as mandatory Stipulations/COA/Terms and Conditions within PHMA for all program areas as applicable. | No changes made. | No change proposed. |
| MD GMD 11: Integrated vegetation management will be used to control, suppress, and eradicate, where possible, noxious and invasive species per BLM Handbook H-1740-2. Manage weed treatments to maintain and improve Greater Sage-Grouse habitat. RDFs and BMPs will be applied to the permit as COA as determined through the site-specific analysis. | No changes made. | No change proposed. |

| 2015 Approved RMPAs | 2019 Approved RMPAs | Potential Change in 2023 Plan |
|---|---|---|
| MD GMD 12: Existing notices and approved plans of operations under 43 CFR 3809: For projects that overlap PHMA, operators may be requested to submit modifications to the accepted notice or approved plan of operations so that the operations minimally affect PHMA (core only). The AO may convey to the operator suggested conservation measures, based on the notice or plan level operations and the geographic area of those operations (also called the project area, which is defined in 43 CFR 3809.5). These suggested conservation measures include measures that support the overall goals and objectives of the priority/core population area strategy and may not be reasonable or applicable to the BLM's determination of whether the proposed operations will cause unnecessary or undue degradation under 43 CFR 3809.5. The request containing the suggested conservation measures must make clear that the operator's compliance is not mandatory. Notices or plans of operation, or modifications thereto, submitted following the issuance of this guidance: As part of the 15-day completeness review of notices (or modifications thereto) and 30-day completeness review of plans of operations (or modifications thereto), the proposed project area(s) where exploration, development, mining, access and reclamation would take place will be reviewed for overlap of Greater Sage-Grouse PHMA in the corporate GIS database. If there is overlap, the BLM AO may notify the operator of ways that they may minimize impacts on PHMA (core only) and request the operator to amend its notice or plan to include such measures. The request to amend the submitted notice or plan of operations must make clear that the operator's compliance is not mandatory and that including such measures is not a requirement for completeness of either the notice or a plan of operations, nor is it a condition of acceptance of the notice or approval of the plan of operations. | No changes made. | No change proposed. |

| 2015 Approved RMPAs | 2019 Approved RMPAs | Potential Change in 2023 Plan |
|---|---|---|
| MD GMD 13: As new occupied Greater Sage-Grouse habitat is found or occurs either through additional inventories or expansion into previously unoccupied habitat, the BLM will incorporate, through appropriate processes and analyses, these areas into the GHMA category and manage them as such, until the earliest review occurs by the SGIT. At that time, they will be considered for PHMA status or continue to be managed as GHMA and will be added to the statewide map. | No changes made. | Potential change under Alternatives 4, 5, and 6. |
| MD GMD 14: Contribute to actions that help to ground-truth the statewide Greater Sage-Grouse seasonal habitat models for the State of Wyoming. | No changes made. | No change proposed. |
| MD GMD 15: Use the Sage-grouse Habitat Assessment Framework or best available assessment tool (approved by the AO) when assessing or evaluating Greater Sage-Grouse habitats at multiple scales. | No changes made. | No change proposed. |
| MD GMD 16: The official Wyoming Greater Sage-Grouse lek database is maintained by the WGFD in accordance with Appendix 4B of the Umbrella MOU between the WGFD and BLM (WGFD and BLM 1990). The MOU states that agencies will meet at least annually to coordinate and review the accuracy of data, and incorporate the most up-to-date information. | No changes made. | No change proposed. |
| MD GMD 17: Many Greater Sage-Grouse seasonal habitats within and outside of PHMA (core only) are encumbered by valid existing rights, such as mineral leases or existing rights-of-way. Fluid mineral leases often will include less stringent lease stipulations than the timing, distance, and density requirements identified for consideration in this plan. The BLM will work with proponents holding valid existing leases that include less stringent lease stipulations than the timing, distance, and density restrictions described within this plan to ensure that measurable Greater Sage-Grouse conservation objectives (such as, but not limited to, consolidation of infrastructure to reduce habitat fragmentation and loss, and effective conservation of seasonal habitats and habitat connectivity to support management objectives set by the WGFD) are included in all project proposals. | No changes made. | No change proposed. |

| 2015 Approved RMPAs | 2019 Approved RMPAs | Potential Change in 2023 Plan |
|---|---|---|
| MD GMD 18: PHMA will be designated as OHV Limited Areas. The OHV limitation will ultimately be to "Designated Routes" as determined through a subsequent implementation/activity-level Travel Management Plan. In the interim, motorized use on existing routes may occur; however, no new routes may be created without specific authorization. | No changes made. | No change proposed. |
| MD GMD 19: Complete activity-level travel plans within 5 years of the record of decision (ROD) for this planning effort. During activity-level planning, where appropriate, designate routes in PHMA with current administrative/agency purpose or need to administrative access only. Existing plans shall be assessed for consistency with Greater Sage-Grouse conservation objectives. | No changes made. | No change proposed. |
| MD GMD 20: Construct roads needed for production activities to minimum design standards within PHMA, in compliance with the Density and Disturbance Calculation Tool (DDCT) process. | No changes made. | No change proposed. |
| MD GMD 21: Field office staff will work with project proponents (including those within the BLM) and the WGFD to site their projects in locations that meet the purpose and need for their project, utilize the DDCT, and have been determined to contain the least sensitive habitats. | No changes made. | No change proposed. |
| MD GMD 22: Evaluate opportunities to coordinate management plans and strategies on multiple allotments where coordination under a single management plan/strategy will result in enhancing Greater Sage-Grouse populations or its habitat, as determined in coordination with the state wildlife agency and with project proponents, partners, and stakeholders. | No changes made. | No change proposed. |
| MD GMD 23: Existing RMP decisions, pertaining to non-Greater Sage-grouse resources, will be retained unless vacated or modified by decisions in this ARMPA. Where more restrictive land use allocations or decisions are made in existing RMPs, those more restrictive land use allocations or decisions will remain in effect and will not be amended by this ARMPA. | Existing RMP decisions, pertaining to non-Greater Sage-Grouse resources, will be retained unless vacated or modified by decisions in this ARMPA. Where inconsistencies between the 2015 Greater Sage-Grouse ARMPA and this 2019 Wyoming GrSG ARMPA arise, the 2019 Wyoming GrSG ARMPA decisions and Appendices apply. | No change proposed. |

| 2015 Approved RMPAs | 2019 Approved RMPAs | Potential Change in 2023 Plan |
|---|---|---|
| MD GMD 24: Fire and fuels management actions will be designed to contribute to the protection and enhancement of sagebrush habitat that support Greater Sage-Grouse populations (including large, contiguous blocks of sagebrush). | No changes made. | No change proposed. |
| MD GMD 25: BLM planning units (Districts), in coordination with the USFWS and relevant state agencies, will complete and continue to update Greater Sage-Grouse Landscape Wildfire & Invasive Species Habitat Assessments to prioritize at-risk habitats, and identify fuels management, preparedness, suppression and restoration priorities necessary to maintain sagebrush habitat to support interconnecting Greater Sage-Grouse populations. These assessments and subsequent assessment updates will also be a coordinated effort with an interdisciplinary team to take into account other Greater Sage-Grouse priorities identified in this plan. 2015 ARPMA Appendix L describes a minimal framework example and suggested approach for this assessment. Implementation actions will be tiered to the Local (District) Greater Sage-Grouse Landscape Wildfire & Invasive Species Assessment using the best available science related to the conservation of Greater Sage-Grouse. In coordination with the USFWS and relevant state agencies, the BLM planning units (Districts) will identify annual treatment needs for wildfire and invasive species management as identified in local unit-level Landscape Wildfire and Invasive Species Assessments. Annual treatment needs will be coordinated across state/regional scales and across jurisdictional boundaries for long-term conservation of Greater Sage-Grouse. These landscape assessment implementation efforts will be reviewed annually with appropriate USFWS and state agency personnel. | No changes made. | No change proposed. |
| MD GMD 26: Implement a coordinated inter-agency approach to fire restrictions based on National Fire Danger Rating System thresholds (fuel conditions, drought conditions, and predicted weather patterns) for Greater Sage-Grouse habitat. | No changes made. | No change proposed. |

| 2015 Approved RMPAs | 2019 Approved RMPAs | Potential Change in 2023 Plan |
|---|---|---|
| MD GMD 27: Within acceptable risk levels, utilize a full range of fire management strategies and tactics, including the management of wildfires, to achieve resource objectives across the range of Greater Sage-Grouse habitat consistent with land use plan direction. | No changes made. | No change proposed. |
| (No similar action.) | MD GMD 28: The BLM will update its Greater Sage-Grouse habitat management areas, including biologically significant units (BSUs), in conjunction with the State of Wyoming's core areas, upon issuance of any Wyoming Governor's Executive Order revising or amending the core area boundaries and upon completion of appropriate NEPA analysis and process. The BLM will complete the appropriate NEPA documentation (including appropriate public comment) prior to adopting any revised core area boundaries (e.g., maintenance action or plan amendment, environmental assessment, etc.). | Potential change under Alternatives 3, 4, 5, and 6. |
| MD SSS 1: Within PHMA, specific to management for Greater Sage-Grouse, all RMPs are amended as follows: The BLM, in coordination with the State of Wyoming and its agencies, other local partners and stakeholders, will establish monitoring framework (Appendix D) for Greater Sage-Grouse populations and habitat that will be incorporated into individual project approvals, including small and in-house projects, as appropriate and necessary. Outside of PHMA and/or for values other than Greater Sage-Grouse, the following RMP decisions remain in effect with the modification described above:<br><u>Casper RMP:</u><br>Bates Hole and Fish Creek/Willow Creek: The areas will have priority for vegetation treatments to improve Greater Sage-Grouse habitats and for vegetation monitoring to ensure residual herbaceous vegetation is maintained for nesting cover on public lands. | No changes made. | No change proposed. |

| 2015 Approved RMPAs | 2019 Approved RMPAs | Potential Change in 2023 Plan |
|---|---|---|
| MD SSS 2: In PHMA (core only), the density of disturbance of an energy or mining facility (Appendix D) will be limited to an average of one site per square mile (640 acres) within the DDCT, subject to valid existing rights. The one location and cumulative value of existing disturbances will not exceed 5 percent of suitable habitat of the DDCT area. Inside PHMA, all suitable habitat disturbed (any program area) will not exceed 5 percent within the DDCT area using the DDCT process. | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |
| MD SSS 3: Inside PHMA (connectivity only), all suitable habitat disturbed (any program area) will not exceed 5 percent of suitable habitat within the DDCT area using the DDCT process. | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |
| MD SSS 4: Within PHMA, Specific to management for Greater Sage-Grouse, all RMPs are amended as follows: In undertaking BLM management actions, and, consistent with valid existing rights and applicable law, in authorizing third-party actions that result in habitat loss and degradation in PHMA, the BLM will require and ensure mitigation that provides a net conservation gain to the species including accounting for any uncertainty associated with the effectiveness of such mitigation. This will be achieved by avoiding, minimizing, and compensating for impacts by applying beneficial mitigation actions. In Wyoming, the USFWS has found that "the core area strategy, if implemented by all landowners via regulatory mechanism, would provide adequate protection for Greater Sage-Grouse and their habitats in the state." The BLM will implement actions to achieve the goal of net conservation gain consistent with the Wyoming Strategy (EO2015-4) that includes "compensatory mitigation as a strategy that should be used when avoidance and minimization are inadequate to protect Core Population Area Greater sage-grouse."<br>Outside of PHMA and/or for values other than Greater Sage-Grouse, the following RMP decisions remain in effect with the modification described above:<br><u>Pinedale RMP:</u><br>Off-site mitigation proposed by oil and gas or other operators shall be considered and analyzed in future environmental documents as possible mitigation for proposed activities | Specific to management for Greater Sage-Grouse, all RMPs are amended as follows: Adopt the State of Wyoming's Greater Sage-Grouse Compensatory Mitigation Framework to the extent consistent with federal law, regulations, and policy.<br>In all Greater Sage-Grouse habitat, when authorizing third-party actions in designated Greater Sage-Grouse habitat, the BLM will seek to achieve the planning-level Greater Sage-Grouse management goals and objectives through implementation of mitigation and management actions, consistent with valid existing rights and applicable law. Under this Plan Amendment, management would be consistent with the Greater Sage-Grouse goals and objectives, and in conformance with BLM Manual 6840, Special Status Species Management. In accordance with BLM Manual 6840, the BLM will undertake planning decisions, actions and authorizations "to minimize or eliminate threats affecting the status of [Greater Sage-Grouse] or to improve the condition of [Greater Sage-Grouse] habitat" across the planning area. | Potential change under Alternatives 3, 4, 5, and 6. |

| 2015 Approved RMPAs | 2019 Approved RMPAs | Potential Change in 2023 Plan |
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| within the planning area. Proposed off-site mitigation will be described and analyzed for effectiveness in detail on a project-specific basis. Planning for off-site mitigation will be performed in coordination with local government agencies. The need for off-site mitigation will be determined in conformance with current BLM policy, as updated.<br>The order of use of mitigation methods from most to least preferred is as follows:<br>1. On-site mitigation directly resolving impacts created by the action<br>2. Off-site mitigation to the resources affected by the action that cannot be resolved on-site<br>3. Off-site mitigation to similar or related resources affected by the action that cannot be resolved on-site.<br>The following stipulations apply to off-site mitigation measures:<br>1. Off-site mitigation will be used as a last choice when developing mitigation measures.<br>2. Off-site mitigation proposals will describe the replacement or substitution activities or methods that are used to address potential impacts on specific resources or environments or both.<br>3. Off-site mitigation must be as close to "in-kind" in replacement or substitution of resources, habitat function, or environments as practicable (e.g., elk habitat for elk habitat, historical properties for historical properties).<br>4. Off-site mitigation practices must last as long as the impacts are expected to occur.<br>5. Off-site mitigation practices are to be developed, conducted or performed, and funded by the project proponent.<br>6. Off-site mitigation activities must be conducted subject to BLM review and approval that the mitigation will actually address the impacts occurring on the public lands.<br>The priority order for mitigating resource impacts on-site or off-site is as follows:<br>1. On-site Mitigation – On-site (avoid, minimize, rectify, or reduce in time).<br>2. Off-site Mitigation – Local (unless greater resource benefits can be achieved through regional or interstate mitigation). | Accordingly, before authorizing third-party actions that result in habitat loss and degradation, the BLM will complete the following steps, in alignment with the Governor of Wyoming's Executive Order 2015-4 (July 29, 2015):<br>1. Work jointly with the WGFD to evaluate projects and recommend mitigation in the form of avoidance and minimization.<br>2. The WGFD will determine if the State requires or recommends any additional mitigation – including compensatory mitigation – under State regulations, policies, or programs related to the conservation of Greater Sage-Grouse.<br>3. Incorporate state required or recommended mitigation into the BLM's NEPA decision-making process, if the WGFD determines that compensatory mitigation is required to address impacts to GRSG habitat as a part of State policy or authorization, or if a proponent voluntarily offers mitigation.<br>4. Analyze whether the compensatory mitigation (deferring to the appropriate State authority to quantify habitat offsets, durability, and other aspects used to determine the recommended compensatory mitigation action):<br>• achieves measurable outcomes for Greater Sage-Grouse habitat function on a landscape scale as determined by WGFD that are at least equal to the lost or degraded values in accordance with the Governor of Wyoming's Executive Order 2015-4. | *(See above.)* |

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| 3. Off-site Mitigation – Regional (unless greater resource benefits can be achieved through interstate mitigation).<br>4. Off-site Mitigation – Interstate: The preferred area for conducting off-site mitigation is as near (local off-site mitigation) to the project or affected area as possible or as scientific information and impact analysis suggests.<br>5. Off-site Mitigation – Interstate: The preferred area for conducting off-site mitigation is as near (local off-site mitigation) to the project or affected area as possible or as scientific information and impact analysis suggests. | • provides benefits that are in place for at least the duration of the impacts<br>• accounts for a level of risk that the mitigation action may fail or not persist for the full duration of the impact<br>5. Ensure mitigation outcomes are consistent with the State of Wyoming's mitigation strategy and principles outlined in 2019 GrSG ARMPA Appendix C, The Greater Sage-Grouse Habitat Management Strategy<br>The BLM has determined that, except where the law specifically requires, compensatory mitigation must be voluntary unless required by other applicable law and in recognition that State authorities may also require compensatory mitigation (IM 2019-018, *Compensatory Mitigation*, December 6, 2018). Therefore, consistent with valid existing rights and applicable law, when authorizing third-party actions that result in habitat loss and degradation, the BLM will consider voluntary compensatory mitigation actions only as a component of compliance with a State mitigation plan, program, or authority, or when offered voluntarily by a project proponent.<br>Project-specific analysis will be necessary to determine how a compensatory mitigation proposal addresses impacts from a proposed action. The BLM will cooperate with the State to determine appropriate project design and alignment with State policies and requirements, including those regarding compensatory mitigation. When the BLM is considering compensatory mitigation as a component of the project proponent's submission or based | *(See above.)* |

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| *(See above.)* | on a mitigation requirement from the State, the BLM's NEPA analysis would evaluate the need to avoid or minimize impacts of the proposed project and achieve the goals and objectives of this RMPA. The BLM will defer to the appropriate State authority to quantify habitat offsets, durability, and other aspects used to determine the recommended compensatory mitigation action. | *(See above.)* |
| MD SSS 5: Greater Sage-Grouse leks inside PHMA: Surface occupancy and surface-disturbing activities will be prohibited on or within a 0.6-mile radius of the perimeter of occupied Greater Sage-Grouse leks (Map 2-8). The AO may grant an exception if an environmental record of review determines that the action, as proposed or conditioned, will not impair the function or utility of the site for the current or subsequent seasonal habitat, life-history, or behavioral needs of Greater Sage-Grouse. | Greater Sage-Grouse leks inside PHMA: Surface occupancy and surface-disturbing activities will be prohibited on or within a 0.6-mile radius of the perimeter of occupied Greater Sage-Grouse leks (or lek center if no perimeter is yet mapped) (Map 2-8). The authorized officer may grant an exception on a case-by-case basis subject to appropriate site-specific analysis, mitigation requirements, and consultation with the State of Wyoming and consistent with the applicable State management strategy (currently Governor of Wyoming's Executive Order 2015-4) (see MD SSS 4). | Potential change under Alternatives 3, 4, 5, and 6. |
| MD SSS 6: Greater Sage-Grouse leks outside PHMA: Surface occupancy and surface-disturbing activities will be prohibited on or within a 0.25-mile radius of the perimeter of occupied Greater Sage-Grouse leks (Map 2-8).<br>The AO may grant an exception if an environmental record of review determines that the action, as proposed or conditioned, will not impair the function or utility of the site for the current or subsequent seasonal habitat, life-history, or behavioral needs of Greater Sage-Grouse. | Greater Sage-Grouse leks outside PHMA: Surface occupancy and surface-disturbing activities will be prohibited on or within a 0.25-mile radius of the perimeter of occupied Greater Sage-Grouse leks (or lek center if no perimeter is yet mapped) (Map 2-8). The authorized officer may grant an exception on a case-by-case basis subject to appropriate site-specific analysis, mitigation requirements, and consultation with the State of Wyoming and consistent with the applicable State management strategy (currently Governor of Wyoming's Executive Order 2015-4)(see MD SSS 4). | Potential change under Alternatives 3, 4, 5, and 6. |

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| MD SSS 7: Greater Sage-Grouse breeding, nesting, and early brood-rearing habitat inside PHMA (core only):<br>Surface-disturbing and/or disruptive activities will be prohibited from March 15–June 30 to protect Greater Sage-Grouse breeding, nesting, and early brood rearing habitat. This timing limitation will be applied throughout the PHMA (core only). Activities in unsuitable habitats will be evaluated under the exception and modification criteria and shall be allowed on a case by case basis. Where credible data support different timeframes for this seasonal restriction, dates may be expanded by up to 14 days prior to or subsequent to the above dates. | Greater Sage-Grouse breeding, nesting, and early brood-rearing habitat inside PHMA (core only):<br>Surface-disturbing and/or disruptive activities will be prohibited from March 15–June 30 to protect Greater Sage-Grouse breeding, nesting, and early brood rearing habitat. This timing limitation will be applied throughout the PHMA (core only). The authorized officer may grant an exception on a case-by-case basis subject to appropriate site-specific analysis, mitigation requirements, and consultation with the State of Wyoming and consistent with the applicable State management strategy (currently Governor of Wyoming's Executive Order 2015-4) (see MD SSS 4).-Where credible data support different timeframes for this seasonal restriction, dates may be expanded by up to 14 days prior to or subsequent to the above dates, but not both. | Potential change under Alternatives 3, 4, 5, and 6. |

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| MD SSS 8: Sage-Grouse breeding, nesting, and early brood-rearing habitat inside PHMA (connectivity only): Surface-disturbing and/or disruptive activities will be prohibited within PHMA (connectivity only) from March 15–June 30 to protect breeding, nesting, and early brood-rearing habitats within 4 miles of the lek or lek perimeter of any occupied Greater Sage-Grouse lek within identified PHMA (connectivity only). This timing limitation will be applied throughout the PHMA (connectivity only Activities in unsuitable habitats will be evaluated under the exception and modification criteria and may be allowed on a case-by-case basis. Where credible data support different timeframes for this seasonal restriction, dates can be shifted by 14 days prior or subsequent to the above dates. | Greater Sage-Grouse breeding, nesting, and early brood-rearing habitat inside PHMA (connectivity only): Surface-disturbing and/or disruptive activities will be prohibited from March 15–June 30 to protect breeding, nesting, and early brood-rearing habitats within 4 miles of the perimeter of any occupied Greater Sage-Grouse lek (or lek center if no perimeter is yet mapped) within identified PHMA (connectivity only). The authorized officer may grant an exception on a case-by-case basis subject to appropriate site-specific analysis, mitigation requirements, and consultation with the State of Wyoming and consistent with the applicable State management strategy (currently Governor of Wyoming's Executive Order 2015-4) (see MD SSS 4).-Where credible data support different timeframes for this seasonal restriction, dates can be shifted by 14 days prior or subsequent to the above dates, but not both. | Potential change under Alternatives 3, 4, 5, and 6. |

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| MD SSS 9: Greater Sage-Grouse breeding, nesting, and early brood-rearing habitat outside PHMA: Surface-disturbing and/or disruptive activities will be prohibited from March 15—June 30 to protect Greater Sage-Grouse nesting and early brood rearing habitat within 2 miles of the lek or lek perimeter of an occupied lek located outside PHMA. Where credible data support different timeframes for this seasonal restriction, dates may be expanded up to 14 days prior to or subsequent to the above dates. | Greater Sage-Grouse breeding, nesting, and early brood-rearing habitat outside PHMA: Surface-disturbing and/or disruptive activities will be prohibited from March 15—June 30 to protect Greater Sage-Grouse breeding, nesting, and early brood rearing habitat within 2 miles of the perimeter of an occupied lek (or lek center if no perimeter is yet mapped) located outside PHMA. The authorized officer may grant an exception on a case-by-case basis subject to appropriate site-specific analysis, mitigation requirements, and consultation with the State of Wyoming and consistent with the applicable State management strategy (currently Governor of Wyoming's Executive Order 2015-4) (see MD SSS 4). Where credible data support different timeframes for this seasonal restriction, dates may be expanded up to 14 days prior to or subsequent to the above dates but not both. | Potential change under Alternatives 3, 4, 5, and 6. |

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| MD SSS 10: Sage-Grouse Winter Concentration Areas: Surface-disturbing and/or disruptive actives in Greater Sage-Grouse winter concentration areas would be prohibited from December 1—March 14. Activities in unsuitable habitats within PHMA would be evaluated under the exception and modification criteria and could be allowed on a case-by-case basis. Protection of additional mapped winter concentration areas in GHMA would be implemented where winter concentration areas are identified as supporting populations of Greater Sage-Grouse that attend leks within PHMA (core only). Appropriate seasonal timing restrictions and habitat protection measures would be considered and evaluated on consultation with the WGFD in all identified winter concentration areas. | Greater Sage-Grouse Winter Concentration Areas: Surface-disturbing and/or disruptive actives in Greater Sage-Grouse winter concentration areas would be prohibited from December 1—March 14. The authorized officer may grant an exception on a case-by-case basis subject to appropriate site-specific analysis, mitigation requirements, and consultation with the State of Wyoming and consistent with the applicable State management strategy (currently Governor of Wyoming's Executive Order 2015-4) (see MD SSS 4). Protection of additional mapped winter concentration areas in GHMA would be implemented where winter concentration areas are mapped and designated by the State of Wyoming. Appropriate seasonal timing restrictions and habitat protection measures would be considered and evaluated on consultation with the WGFD in all identified winter concentration areas. | Potential change under Alternatives 3, 4, 5, and 6. |
| MD SSS 11: The BLM will support other agencies in their efforts to minimize impacts from predators. The BLM will implement strategies and techniques in land management decisions that address predators shown to pose a threat to Greater Sage-Grouse (Appendix N). The BLM will support and encourage other agencies in their efforts to minimize impacts from predators on Greater Sage-Grouse where needs have been documented. | The BLM will support other agencies in their efforts to minimize impacts from predators. The BLM will implement strategies and techniques in land management decisions that address predators shown to pose a threat to Greater Sage-Grouse (2015 ARMPA Appendix N). The BLM will support and encourage other agencies in their efforts to minimize impacts from predators on Greater Sage-Grouse where needs have been documented. | No change proposed. |

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| MD SSS 12: New project noise levels, either individual or cumulative, should not exceed 10 dBA (as measured by L50) above baseline noise at the perimeter of the lek from 6:00 pm to 8:00 am during the breeding season (March 1–May 15). Specific noise protocols for measurement and implementation will be developed as additional research and information emerges. | Within PHMA (core only), new project noise levels, either individual or cumulative, should not exceed 10 dBA (as measured by L50) above baseline noise at the perimeter of the lek (or lek center if no perimeter is yet mapped) from 6:00 pm to 8:00 am during the breeding season (March 1–May 15). The authorized officer may grant an exception on a case-by-case basis subject to appropriate site-specific analysis, mitigation requirements, and consultation with the State of Wyoming and consistent with the applicable State management strategy (currently Governor of Wyoming's Executive Order 2015-4) (see MD SSS 4). In coordination with the State of Wyoming, specific noise protocols for measurement and implementation will be developed as additional research and information emerges. These measures would be considered at the site-specific project level where and when appropriate. | Potential change under Alternatives 3, 4, 5, and 6. |

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| MD SSS 13: The Greater Sage-Grouse adaptive management plan (Appendix D) provides a means of addressing and responding to unintended negative impacts on Greater Sage-Grouse, and its habitat will be addressed before consequences become severe or irreversible. The Wyoming Greater Sage-Grouse ARMPA will include the requirement for projects requiring an EIS to develop adaptive management strategies in support of the population management objectives for Greater Sage-Grouse set by the State of Wyoming. Wyoming ADPPs will include an adaptive management plan, as reviewed by the BLM WO, Solicitor's Office, and USFWS, which includes: Upon determination that a hard trigger is tripped, the BLM will immediately defer issuance of discretionary authorizations for new actions for a period of 90 days. In addition, within 14 days of a determination, the AMWG will convene to develop an interim response strategy and initiate an assessment to determine the causal factors.<br>Adaptive management triggers are essential for identifying when potential management changes are needed in order to continue meeting Greater Sage-Grouse conservation objectives. With respect to Greater Sage-Grouse, all regulatory entities in Wyoming, including the BLM, use soft and hard triggers. Soft and hard triggers are focused on three metrics: 1) number of active leks, 2) acres of available habitat, and 3) population trends based on annual lek counts.<br>In making amendments to this plan, the BLM will coordinate with the USFWS as the BLM continues to meet its objective of conserving, enhancing, and restoring Greater Sage-Grouse habitat by reducing, minimizing, or eliminating threats to that habitat. The hard and soft trigger data will be analyzed as soon as it becomes available after the signing of the ROD and then at a minimum, analyzed annually thereafter.<br><u>Soft Triggers:</u><br>Soft triggers are indicators that management or specific activities may not be achieving the intended results of conservation action or that unanticipated changes to populations or habitats have occurred that have the potential to place habitats or populations at risk. The soft trigger is any deviation from normal | The Greater Sage-Grouse adaptive management plan (2019 Wyoming GrSG ARMPA Appendix C) provides a means of addressing and responding to unintended negative impacts on Greater Sage-Grouse, and its habitat will be addressed before consequences become severe or irreversible. The Wyoming Greater Sage-Grouse ARMPA will include the requirement for projects requiring an EIS to develop adaptive management strategies in support of the population management objectives for Greater Sage-Grouse set by the State of Wyoming. Wyoming ADPPs will include an adaptive management plan, as reviewed by the BLM WO, Solicitor's Office, and USFWS, which includes: Upon determination that a hard trigger is tripped, the BLM will immediately defer issuance of discretionary authorizations for new actions for a period of 90 days. In addition, within 14 days of a determination, the AMWG will convene to develop an interim response strategy and initiate an assessment to determine the causal factors. The AMWG would define a process to review and reverse adaptive management actions once the identified causal factor is resolved (e.g., returning to previous management once objectives of interim management strategy have been met).<br>Adaptive management triggers are essential for identifying when potential management changes are needed in order to continue meeting Greater Sage-Grouse conservation objectives. With respect to Greater Sage-Grouse, all regulatory entities in Wyoming, including the BLM, use soft and hard triggers. Soft and hard triggers are focused on three | Potential change under Alternatives 3, 4, 5, and 6. |

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| trends in habitat or population in any given year. Metrics include, but are not limited to, annual lek counts, wing counts, aerial surveys, habitat monitoring, and DDCT evaluations. BLM field offices, with the assistance of their respective land and resource management plan implementation groups, local WGFD offices, and local Greater Sage-Grouse working groups, will evaluate the metrics with the AMWG on an annual basis. For population metrics, normal population trends are calculated as the 5-year running mean of annual population counts. The purpose of these strategies is to address localized Greater Sage-Grouse population and habitat changes by providing the framework in which management will change if monitoring identifies negative population and habitat anomalies in order to avoid crossing a hard trigger threshold.<br>Hard Triggers:<br>Hard triggers are indicators that management is not achieving desired conservation results. Hard triggers will be considered a catastrophic indicator that the species is not responding to conservation actions, or that a larger-scale impact or set of impacts is having a negative effect. Within the range of normal population variables (5-year running mean of annual population counts), hard triggers shall be determined to take effect when two of the three metrics exceeds 60 percent of normal variability for the area under management in a single year, or when any of the three metrics exceeds 40 percent of normal variability for a 3-year time period within a 5-year range of analysis. A minimum of 3 consecutive years in a 5-year period is used to determine trends (i.e., Y1-2-3, Y2-3-4, Y3-4-5). | metrics: 1) number of active leks, 2) acres of available habitat, and 3) population trends based on annual lek counts.<br>In making amendments to this plan, the BLM will coordinate with the USFWS as the BLM continues to meet its objective of conserving, enhancing, and restoring Greater Sage-Grouse habitat by reducing, minimizing, or eliminating threats to that habitat. The hard and soft trigger data will be analyzed as soon as it becomes available after the signing of the ROD and then at a minimum, analyzed annually thereafter.<br>Soft Triggers:<br>Soft triggers are indicators that management or specific activities may not be achieving the intended results of conservation action or that unanticipated changes to populations or habitats have occurred that have the potential to place habitats or populations at risk. The soft trigger is any deviation from normal trends in habitat or population in any given year. Metrics include, but are not limited to, annual lek counts, wing counts, aerial surveys, habitat monitoring, and DDCT evaluations. BLM field offices, with the assistance of their respective land and resource management plan implementation groups, local WGFD offices, and local Greater Sage-Grouse working groups, will evaluate the metrics with the AMWG on an annual basis. For population metrics, normal population trends are calculated as the 5-year running mean of annual population counts. The purpose of these strategies is to address localized Greater Sage-Grouse population and habitat changes by providing the framework in which management will change if monitoring identifies negative population and | *(See above.)* |

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| *(See above.)* | habitat anomalies in order to avoid crossing a hard trigger threshold.<br>Hard Triggers:<br>Hard triggers are indicators that management is not achieving desired conservation results. Hard triggers will be considered a catastrophic indicator that the species is not responding to conservation actions, or that a larger-scale impact or set of impacts is having a negative effect. Within the range of normal population variables (5-year running mean of annual population counts), hard triggers shall be determined to take effect when two of the three metrics exceeds 60 percent of normal variability for the area under management in a single year, or when any of the three metrics exceeds 40 percent of normal variability for a 3-year time period within a 5-year range of analysis. A minimum of 3 consecutive years in a 5-year period is used to determine trends (i.e., Y1-2-3, Y2-3-4, Y3-4-5). | *(See above.)* |
| MD SSS 14: Designate SFAs as shown on Map 1-2 (1,915,990 acres). SFAs will be managed as PHMA, with the following additional management: Recommended for withdrawal from the General Mining Act of 1872, subject to valid existing rights, the lands shown in Map 2-3 (252,160 acres), and 2) Prioritized for vegetation management and conservation actions in these areas, including, but not limited to land health assessments, wild horse and burro management actions, review of livestock grazing permits/leases, and habitat restoration (see specific management sections). | Lands identified as Sagebrush Focal Areas (SFAs) will no longer be designated as SFAs. Lands previously identified as SFAs will be managed as Priority Habitat Management Areas (PHMAs), consistent with Core Area boundaries. | Potential change under Alternatives 3, 4, 5, and 6. |
| MD VEG 1: Manage vegetation composition, diversity, and structure, as determined by ESD, or other methods that reference site potential, and WGFD protocols, to achieve Greater Sage-Grouse habitat management objectives, in cooperation with stakeholders. | No changes made. | No change proposed. |

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| MD VEG 2: Within PHMA in northeast Wyoming (as mapped in EO 2015-4), vegetation treatments in nesting and wintering habitat that will reduce sagebrush canopy to less than 15 percent will not be conducted. | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |
| MD VEG 3: Within PHMA, specific to management for Greater Sage-Grouse, all RMPs are amended as follows: For vegetation treatments in sagebrush within PHMA, refer to 2015 ARMPA Appendix H, WGFD Protocols for Treating Sagebrush to Benefit Sage-Grouse (WGFD 2011, as updated) and BLM Washington Office Instruction Memorandum 2013-128 (Sage-grouse Conservation Related to Wildland Fire and Fuels Management). These recommended protocols will be used in determining whether proposed treatment constitutes a "disturbance" that will contribute toward the 5 percent threshold within PHMA maintenance. Additionally, these protocols will be used to determine whether the proposed treatment configuration is expected to have neutral or beneficial impacts for PHMA (core only) populations or if they represent additional habitat loss or fragmentation.<br>Treatments to enhance sagebrush/grasslands habitat for Greater Sage-Grouse will be evaluated based on habitat quality and the functionality/use of treated habitats post-treatment.<br>The BLM will work collaboratively with partners at the state and local level to maintain and enhance Greater Sage-Grouse habitats. Seasonal restriction would be applied, as needed, for implementing fuels management treatments according to the type of seasonal habitat present.<br>Outside of PHMA and/or for values other than Greater Sage-Grouse, the following RMP decisions remain in effect with the modification described above:<br><u>Green River RMP:</u><br>Prescribed burns generally will be conducted in areas having greater than 35 percent sagebrush composition, 20 percent desirable grass composition, and greater than 10 inches of precipitation. Other vegetation manipulation methods will be considered on a case-by-case basis depending on objectives and cost benefits. | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |

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| Casper RMP:<br>Decision 4053: The areas (Bates Hole and Fish Creek/Willow Creek) will have priority for vegetative treatments to improve Greater Sage-Grouse habitats and for vegetation monitoring to ensure residual herbaceous vegetation is maintained for nesting cover on public lands. | *(See above.)* | *(See above.)* |
| MD VEG 4: Within PHMA, grazing will be deferred on treated areas for two full growing seasons unless vegetation objectives or vegetation recovery indicates a shorter or longer rest period is necessary based on vegetation monitoring results. | No changes made. | Potential change under Alternative 3. |
| MD VEG 5: Reclamation of surface disturbances in PHMA will be consistent with the Wyoming Reclamation Policy (BLM 2009a), vegetation objectives (Table 2-2 and 2-3), and Appendix M. A monitoring plan will be developed for each restoration or reclamation project and will report progress and changes in resource condition. | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |
| MD VEG 6: Areas for vegetation restoration and/or restoration criteria that include state Greater Sage-Grouse conservation plans and appropriate local information will be identified. The use of native plants and seeds for restoration will be required unless the probability for success is low (nonnative plants and seeds may be used as long as they meet Greater Sage-Grouse habitat objectives), and restoration management will be designed to obtain long-term persistence based on ESD.<br>Reestablishment of sagebrush cover and desirable understory plants will be the highest priority for restoration efforts.<br>Landscape patterns that most benefit Greater Sage-Grouse will be restored and created, considering potential changes in climate. | No changes made. | No change proposed. |
| MD VEG 7: Within PHMA, implementation of restoration projects will be prioritized based on environmental variables that improve chances for project success in areas most likely to benefit Greater Sage-Grouse. Restoration will be prioritized in seasonal habitats that are thought to be limiting Greater Sage-Grouse distribution and/or abundance. | No changes made. | No change proposed. |

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| MD VEG 8: Within PHMA, specific to management for Greater Sage-Grouse, all RMPs are amended as follows:<br>Where probability of success or native seed availability is low or where there is a specific identified purpose that cannot be met with natives, nonnative seeds can be used provided they meet Greater Sage-Grouse habitat conservation and vegetation (see Tables 2-2 and 2-3) objectives. The use of native seeds for fuels management treatment will be prioritized based on availability, adaptation (site potential), and probability of success.<br>Where probability of success or native seed availability is low, non- native seeds may be used to meet Greater Sage-Grouse habitat objectives to trend toward restoring the fire regime. When reseeding, use fire resistant native and nonnative species, as appropriate, to provide for fuel breaks.<br>Native seed allocation will be prioritized for use in Greater Sage-Grouse habitat.<br>Outside of PHMA and/or for values other than Greater Sage-Grouse, the following RMP decisions remain in effect with the modification described above:<br><u>Kemmerer RMP:</u><br>Require the use of certified weed-free seed and mulch for rehabilitation projects.<br><u>Pinedale RMP:</u><br>Disturbed areas will be reclaimed to native site plant composition. If reclamation of original plant composition is impossible or not desirable, reclamation will achieve a native plant community that meets the Wyoming Standards for Rangeland Health. | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |
| MD VEG 9: Post emergency stabilization and rehabilitation (ES&R) and burn area emergency rehabilitation (BAER) management will be designed to ensure long-term persistence of seeded or pre-burn native plants. This may require temporary or long-term changes in livestock grazing, wild horse, and travel management, etc., to achieve and maintain the desired condition of ES&R and BAER projects to benefit Greater Sage-Grouse (Eiswerth and Shonkwiler 2006). | No changes made. | No change proposed. |

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| MD VEG 10: Evaluate the role of existing seedings that are currently composed of primarily introduced perennial grasses in and adjacent to Greater Sage-Grouse habitat to determine if they should be restored to sagebrush or habitat of higher quality for Greater Sage-Grouse. If these seedings provide value in conserving or enhancing Greater Sage-Grouse habitats, then no restoration would be necessary. Assess the compatibility of these seedings for Greater Sage-Grouse habitat during the land health assessments. | No changes made. | No change proposed. |
| MD VEG 11: Priority will be given for implementing specific Greater Sage-Grouse habitat restoration projects in areas invaded by annual grasses first to sites that are adjacent to or surrounded by PHMA. Areas invaded by annual grasses will be second priority for restoration when the sites are not adjacent to PHMA, but are within 2 miles of PHMA. The third priority for areas invaded by annual grasses habitat restoration projects will be sites beyond 2 miles of PHMA. The intent will be to focus restoration outward from existing, intact habitat. | No changes made. | No change proposed. |
| MD VEG 12: In fire prone areas where sagebrush seed is required for Greater Sage-Grouse habitat restoration, the BLM will consider establishing seed harvest areas that are managed for seed production and are a priority for protection from outside disturbances. | No changes made. | No change proposed. |
| MD VEG 13: Vegetation treatment proposals must include evaluation of soils, precipitation, invasive/exotic plants, as well as the current condition of PHMA. Avoid aerial pesticide/herbicide spraying in favor of ground applications to minimize drift into nontarget areas in Greater Sage-Grouse habitat unless benefits of treatments are likely to outweigh impacts. | No changes made. | No change proposed. |
| MD VEG 14: Treat areas that contain cheatgrass and other invasive or noxious species to minimize competition and favor establishment of desired species. | No changes made. | No change proposed. |

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| MD VEG 15: Within PHMA, specific to management for Greater Sage-Grouse, all RMPs are amended as follows:<br>The BLM can implement treatments within PHMA where outbreaks of grasshopper or Mormon cricket populations are expected to rise above economic levels. Treatments must be conducted only following reduced agent-area treatments protocols. The BLM will work collaboratively with partners at the federal, state, and local levels, including the Wyoming Weed and Pest Districts within the counties where the treatment is to occur, to maintain and enhance Greater Sage-Grouse habitats in a manner consistent with the core population area strategy for conservation.<br>The BLM will be directed to utilize the Wyoming Grasshopper and Mormon Cricket Control website as a resource for updated information when conducting analysis of grasshopper and Mormon cricket control in Greater Sage-Grouse habitats.<br>Avoid aerial pesticide/herbicide spraying in favor of ground applications to minimize drift into nontarget areas in Greater Sage-Grouse habitat unless benefits of treatments are likely to outweigh impacts.<br>Outside of PHMA and/or for values other than Greater Sage-Grouse, the following RMP decisions remain in effect with the modification described above:<br><u>Casper RMP:</u><br>Work with Animal and Plant Health Inspection Service to control outbreaks of grasshoppers and Mormon crickets on public lands in the planning area in accordance with the MOU between U.S. Department of the Interior and Animal and Plant Health Inspection Service. | No changes made. | No change proposed. |
| MD FIRE 1: Within PHMA, specific to management for Greater Sage-Grouse, all RMPs are amended as follows: For Wildland Fire Management, the protection of human life is the single, overriding priority. Setting priorities among protecting human communities and community infrastructure, other property and improvements, and natural and cultural resources will be done based on the values to be protected, human health and safety, and the costs of protection. The goal is to restore, enhance, and maintain areas suitable for Greater Sage-Grouse. Greater Sage-Grouse habitat (GHMA) will be | No changes made. | No change proposed. |

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| prioritized commensurate with local fire plans, property values and other important habitat to be protected, with the goal to restore, enhance, and maintain areas suitable for Greater Sage-Grouse.<br>PHMA (and Priority Areas for Conservation, if so determined by individual RMP efforts) will be the highest priority for conservation and protection during fire operations and fuels management decision-making. The PHMA will be viewed as more valuable than GHMA when priorities are established. When suppression resources are widely available, maximum efforts will be placed on limiting fire growth in GHMA polygons as well. These priority areas will be further refined following completion of the Greater Sage-Grouse Landscape Wildfire and Invasive Species Habitat Assessments described in Appendix L.<br>Outside of PHMA and/or for values other than Greater Sage-Grouse, the following RMP decisions remain in effect with the modification described above:<br>Casper RMP:<br>Appropriate management response will be used on all wildfires in the planning area. Full protection strategies and tactics will be used in the following areas:<br>1. Wildland Urban Interface (WUI)<br>2. Wildland industrial interface<br>3. Developed recreation sites<br>4. Developed electronics sites of all types.<br>In all other areas appropriate management response (AMR) strategies and tactics will be determined by (but not limited to) the following:<br>1. Firefighter and public safety<br>2. Resource values at risk<br>3. Proximity to private land<br>4. Firefighting resource availability.<br>Tactical constraints follow:<br>1. The use of retardant within 300 feet of surface water (standing or running) is prohibited.<br>2. No trees are to be cut during suppression activities within 200 yards of an identified bald eagle roost.<br>No heavy equipment will be used within the following areas, except when human safety is at risk:<br>1. Areas of cultural resource sensitivity<br>2. Riparian/wetland habitats<br>3. Big game crucial winter range habitats | *(See above.)* | *(See above.)* |

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| 4. Greater Sage-Grouse leks<br>5. Areas of highly erosive soils.<br>In areas not identified as full protection, heavy equipment usage will be limited to existing roads and trails or immediately adjacent to them.<br><u>Kemmerer RMP:</u><br>In areas of high-density urban and (or) industrial interface with intermingled BLM-administered lands, suppression objectives will follow the AMR in an approved fire management plan for the planning area to provide first for human health and safety, while minimizing loss of property and threats to other surface owners. Generally, wildland fires are suppressed in these areas. In areas of low-density urban and (or) industrial interface where BLM-administered lands occur in large contiguous blocks, fire suppression objectives will follow the AMR in an approved fire management plan for the planning area to provide first for human health and safety, while allowing for achievement of resource objectives.<br><u>Newcastle RMP:</u><br>Full suppression will be used on fires endangering human life or that spread to within 0.25 miles of state or private lands, structures and facilities, oil and gas fields, important riparian habitat, or other sensitive resources. All wildfires will be evaluated to determine the need for rehabilitation or restoration measures. Restoration of burned areas will be by natural succession unless a special need is identified to prevent further resource damage.<br><u>Pinedale RMP:</u><br>Wildland fire mitigation and fuels activities will be managed to provide for firefighter and public safety as a first priority. Public lands within intermixed land ownership areas will be managed in association with the adjoining and nearby private and state lands.<br>Areas of mixed land ownership, communities at risk as identified in the *Federal Register*, Volume 66, Number 160, 2001 (Antelope Run, Beaver Creek area, Boulder, Cottonwood Creek, Daniel, Forty Rod, Hoback Ranches, New Fork, Pinedale, Pocket Creek, and Upper Green); urban and industrial interface areas; and areas containing high-priority resource values have high priority for response to wildland fires and/or | *(See above.)* | *(See above.)* |

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| for fuels reduction and mitigation. Wildland fire suppression activities will be based on the AMR.<br>Rawlins RMP:<br>A high priority for fire management activities will be given to areas identified as communities at risk, industrial interface areas, and areas containing resource values considered high priority within the RMP planning area.<br>Green River RMP:<br>Wildfire suppression will emphasize AMR. Immediate control actions will be used only in cases of arson, direct threat to public safety, or a strong potential threaten structural property.<br>Fire suppression actions will be based on achieving the most efficient control and allowing historical acres burned to increase. Activity plans will be developed for designated fire management areas defining specific parameters for all fire occurrences.<br>JMH CAP:<br>Appropriate management response to protect the basin big sagebrush/lemon scurfpea plant communities will be applied. Wildland and prescribed fires will be managed in all vegetation types to maintain or improve biological diversity and the overall health of the public lands. In particular, plant species and age class diversity will be a priority; thus, AMR for all wildland fires will be identified and implemented depending on the resources and management objectives for the area. Suppression techniques and hazardous fuels reduction activities will be identified to reduce wildland fire severity and occurrence on portions of the landscape where fire causes undesirable changes in plant community composition and structure. A site-specific analysis will be prepared for sensitive resource areas, such as special status plant species sites, heritage sites, historic trails, and areas of critical environmental concern (ACECs), to determine the type of fire suppression activity that will be acceptable. Fire equipment and fire suppression techniques, such as vegetation clearing, will be limited to existing roads and trails in special status plant species habitat. As appropriate, the Fire Management Plan will be updated to reflect the appropriate suppression activity in sensitive resource areas. | *(See above.)* | *(See above.)* |

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| MD FIRE 2: In PHMA, fuels treatments will be designed and implemented with an emphasis on protecting existing sagebrush ecosystems and enhancing and protecting future sagebrush ecosystems (refer to WGFD Protocols for Treating Sagebrush to Benefit Sage-grouse [WGFD 2011, as updated]) and 2015 ARMPA Appendix H.<br>These recommended protocols will be used in determining whether proposed treatment constitutes a "disturbance" that will contribute toward the 5 percent threshold for habitat maintenance.<br>Fuel treatments will be designed through an interdisciplinary process to expand, enhance, maintain, and protect Greater Sage-Grouse habitat. Green strips (using native fire resistant/resilient species) and/or fuel breaks will be used, where appropriate, to protect seeding efforts from subsequent fire events.<br>In coordination with the USFWS and relevant state agencies, BLM planning units (Districts) with large blocks of Greater Sage-Grouse habitat will develop, using the assessment process described in 2015 ARMPA Appendix L, a fuels management strategy which considers an up-to-date fuels profile, land use plan direction, current and potential habitat fragmentation, sagebrush and Greater Sage-Grouse ecological factors, and active vegetation management steps to provide critical breaks in fuel continuity, where appropriate. When developing this strategy, planning units will consider the risk of increased habitat fragmentation from a proposed action versus the risk of large scale fragmentation posed by wildfires if the action is not taken.<br>Utilizing an interdisciplinary approach, a full range of fuel reduction techniques will be available. Fuel reduction techniques such as grazing, prescribed fire, chemical, biological, and mechanical treatments will be acceptable.<br>Upon project completion, fuels projects will be monitored and managed to ensure long-term success, including persistence of seeded species and/or other treatment components. Invasive vegetation post-treatment will be controlled.<br>Wildfire prevention plans will be developed that explain the resource value of Greater Sage-Grouse habitat and include fire prevention messages and actions to reduce human-caused ignitions. | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |

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| MD FIRE 3: Within PHMA, specific to management for Greater Sage-Grouse, all RMPs are amended as follows:<br>For fuels management, the BLM will consider multiple tools for fuels reduction and will analyze in NEPA compliance documentation before electing to implement prescribed fire in PHMA.<br>If prescribed fire is used in Greater Sage-Grouse habitat, the NEPA analysis for the Burn Plan will address:<br>• Why alternative techniques were not selected as a viable options<br>• How Greater Sage-Grouse goals and objectives will be met by its use<br>• How the COT (Conservation Objectives Team) report objectives will be addressed and met<br>• A risk assessment to address how potential threats to Greater Sage-Grouse habitat will be minimized.<br>Prescribed fire as a vegetation or fuels treatment shall only be considered after the NEPA analysis for the Burn Plan has addressed the four bullets outlined above. Prescribed fire can be used to meet specific fuels objectives that protect Greater Sage-Grouse habitat in PHMA (e.g., creation of fuel breaks that disrupt the fuel continuity across the landscape in stands where annual invasive grasses are a minor component in the understory, burning slash piles from conifer reduction treatments, used as a component with other treatment methods to combat annual grasses and restore native plant communities).<br>Prescribed fire in known winter range shall only be considered after the NEPA analysis for the Burn Plan has addressed the four bullets outlined above. Any prescribed fire in winter habitat will need to be designed to strategically reduce wildfire risk around and/or in the winter range and designed to protect winter range habitat quality. Refer to 2015 ARMPA Appendix H, WGFD Protocols for Treating Sagebrush to Benefit Sage-grouse (WGFD 2011, as updated) and BLM Washington Office Instruction Memorandum 2013-128. If prescribed fire activities are not in compliance with these protocols, the treatment will be considered a PHMA disturbance. | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |

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| Outside of PHMA and/or for values other than Greater Sage-Grouse, the following RMP decisions remain in effect with the modification described above:<br>Casper RMP:<br>Use prescribed burning to achieve measurable 5th-order watershed objectives from (1) other resources, including, but not limited to, forestry, wildlife, range, vegetation, and watershed; (2) the reduction of hazardous fuels; and (3) the introduction of fire into fire-adapted ecosystems.<br>Green River RMP/JMH CAP:<br>Prescribed fire will generally be the preferred method of vegetation manipulation to convert decadent stands of brushland to grasslands and to stimulate sprouting of old, decadent aspen stands and/or shrub species. Prescribed burns are preferred in areas having greater than 35 percent sagebrush composition, 20 percent desirable grass composition, and greater than 10 inches of precipitation.<br>Rawlins RMP:<br>Fuel treatments, including prescribed fire, mechanical, chemical, and biological treatments will be used for fuels reduction and to meet other multiple-use resource objectives, including returning fire to its natural role in the ecosystem. WUIs and communities at risk will receive priority for fuels reduction. | *(See above.)* | *(See above.)* |

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| MD FIRE 4: Within PHMA, specific to management for Greater Sage-Grouse, all RMPs are amended as follows:<br>Remove conifers encroaching into sagebrush habitats in a manner that considers tribal cultural values. Prioritize treatments closest to occupied Greater Sage-Grouse habitats and near occupied leks, and where juniper encroachment is phase 1 or phase 2. Use of site-specific analysis and principles like those included in the FIAT (Fire and Invasive Species Assessment) report (Chambers et. al., 2014) and other ongoing modeling efforts to address conifer encroachment will help refine the location for specific priority areas to be treated.<br>Outside of PHMA and/or for values other than Greater Sage-Grouse, the following RMP decisions remain in effect with the modification described above:<br>Casper RMP: Treat woodland encroachment in grassland, sagebrush, aspen, and other vegetative communities where it is determined to be detrimental to other resource values or uses. Manage 630,180 acres of sagebrush communities toward Desired Plant Community. | No changes made. | No change proposed. |
| MD FIRE 5: The following RMP decisions remain in effect for both PHMA and GHMA:<br><u>Pinedale RMP:</u><br>In the WUI or industrial interface, fuels reduction methods best suited to the area will be used to reduce the risk of catastrophic fire to these areas.<br><u>Casper RMP:</u><br>Use prescribed burning to achieve measurable 5th-order watershed objectives from (1) other resources, including, but not limited to, forestry, wildlife, range, vegetation, and watershed; (2) the reduction of hazardous fuels; and (3) the introduction of fire into fire-adapted ecosystems.<br>Utilize an integrated management technique approach (defined as prescribed fire, mechanical, chemical, or biological, followed by desired reseeding) to reduce fuels to protect high priority areas or resource values defined as, but not limited to the following:<br>• Urban and industrial interface areas<br>• Developed recreation areas<br>• Commercial timber areas<br>• Wildlife habitats<br>• Range-improvement facilities | No changes made. | No change proposed. |

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| • Communication sites<br>• Municipal watersheds. Decision 3008 Fuels Management.<br><u>Rawlins RMP:</u><br>A high priority for fire management activities will be given to areas identified as communities at risk, industrial interface areas, and areas containing resource values considered high priority within the RMP planning area.<br><u>JMH CAP:</u><br>Appropriate management response to protect the basin big sagebrush/lemon scurfpea plant communities will be applied. Wildland and prescribed fires will be managed in all vegetation types to maintain or improve biological diversity and the overall health of the public lands. In particular, plant species and age class diversity will be a priority; thus, AMR for all wildland fires will be identified and implemented depending on the resources and management objectives for the area. Suppression techniques and hazardous fuels reduction activities will be identified to reduce wildland fire severity and occurrence on portions of the landscape where fire can cause undesirable changes in plant community composition and structure. A site-specific analysis will be prepared for sensitive resource areas, such as special status plant species sites, heritage sites, historic trails, and ACECs, to determine the type of fire suppression activity that will be acceptable. Fire equipment and fire suppression techniques, such as vegetation clearing, will be limited to existing roads and trails in special status plant species habitat. As appropriate, the Fire Management Plan will be updated to reflect the appropriate suppression activity in sensitive resource areas. | *(See above.)* | *(See above.)* |

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| MD FIRE 6: Within PHMA, specific to management for Greater Sage-Grouse, all RMPs are amended as follows:<br>Burned areas within PHMA will be restored to suitable habitat with consideration given to ESDs, reference sites, site potential, habitat objectives and local variability.<br>Outside of PHMA and/or for values other than Greater Sage-Grouse, the following RMP decisions remain in effect with the modification described above:<br>Kemmerer RMP:<br>Implement BLM Emergency Stabilization and Rehabilitation standards located in the DOI Interagency Burned Area Emergency Response Guidebook and BLM Burned Area Emergency Stabilization and Rehabilitation Handbook on wildland fires to protect and sustain healthy ecosystems and protect life and property.<br>Newcastle RMP:<br>All wildfires will be evaluated to determine the need for rehabilitation or restoration measures. Restoration of burned areas will be by natural succession unless a special need is identified to prevent further resource damage.<br>Rawlins RMP:<br>Rehabilitation and restoration efforts specific to a fire event will be undertaken to protect and sustain ecosystems, public health and safety, and to help communities protect infrastructure. | No changes made. | No change proposed. |
| MD FIRE 7: Within PHMA, post fuels management projects will be designed to ensure long-term persistence of seeded or pre-treatment native plants (while controlling for erosion and treating infestation of invasive plant species), to return to suitable sage-grouse habitat. | No changes made. | No change proposed. |

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| MD LG 1: The BLM policy in WO-IM-2009-007 and BLM Handbook H-4180-1 will be used to evaluate land health standards achievement in PHMA (core only) and, where not achieved, to determine if existing grazing management practices or levels of grazing use on public lands are significant factors in failing to achieve the standards and conform with the guidelines, which through this process will identify appropriate actions to address nonachievement and nonconformance. When determining appropriate actions to address nonachievement of land health standards and nonconformance with the guidelines due to existing grazing management practices or levels of grazing use, management actions including but not limited to the following will be considered singly or in combination:<br>1. Season or timing of use<br>2. Numbers of livestock (includes temporary nonuse or livestock removal)<br>3. Distribution of livestock use<br>4. Intensity of use<br>5. Kind of livestock (e.g., cattle, sheep, horses, llamas, alpacas and goats)<br>6. Class of livestock (e.g., yearlings versus cow calf pairs)<br>7. Range improvements.<br>Refer to the document, "Grazing Influence, Management, and Objective Development in Wyoming's Greater Sage-Grouse Habitat" (Cagney et al. 2010) for guidance when considering appropriate management actions to achieve conformance. | No changes made. | No change proposed. |
| MD LG 2: Within PHMA the BLM will work cooperatively with permittees, lessees, and other landowners to develop voluntary grazing management strategies that integrate both public and private lands into single management units to improve Greater Sage-Grouse habitat. | No changes made. | No change proposed. |

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| MD LG 3: The following RMP decisions remain in effect:<br>Casper RMP:<br>Grazing leases will be adjusted where an evaluation of monitoring, field observations, or other data indicate changes, and either increases or decreases, in forage allocation are needed or when necessary or required by other applicable law or regulation.<br>Kemmerer RMP:<br>Vegetative communities will be managed in accordance with Wyoming Standards for Healthy Rangelands.<br>Appropriate livestock grazing management actions will be developed and integrated to address rangeland health standards, improve forage for livestock, and enhance rangeland health.<br>Newcastle RMP:<br>Any adjustments in livestock grazing use will be made as a result of monitoring and consultation with grazing permittees. Monitoring studies will be conducted using the current BLM-approved methodology.<br>Pinedale RMP:<br>Monitoring of the range and the vegetation resource will be conducted at a level sufficient to detect changes in grazing use, trend, and range conditions. Monitoring will be tied to land health standards and indicators that help determine change in status and progress toward meeting objectives. Data will be used to direct and support grazing management decisions consistent with national policy.<br>Rawlins RMP:<br>Livestock grazing will be managed to meet the Wyoming Standards for Healthy Rangelands.<br>Green River RMP/JMH CAP:<br>The kinds and seasons of livestock grazing use will continue to be licensed until monitoring, negotiation, consultation, or a change in resources conditions indicate that a modification is needed. Monitoring will be continued or initiated following adjustments in grazing use to assure that grazing and other management objectives are being met. | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |

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| MD LG 4: Within PHMA, all BLM use authorizations will contain terms and conditions regarding the actions needed to meet or progress toward meeting the habitat objectives. If monitoring data show the habitat objectives have not been met nor progress being made toward meeting them, there will be an evaluation and a determination made as to the cause. If it is determined that the authorized use is a significant factor in failing to achieve the standards for healthy rangelands, the use will be adjusted by the response specified in the instrument that authorized the use.<br>The NEPA analysis for renewals and modifications of livestock grazing permits/leases that includes lands within SFAs and PHMA will include specific management thresholds based on GRSG habitat objectives (Tables 2-2 and 2-3) and Land Health Standards (43 CFR 4180.2), and one or more defined responses that will allow the authorizing officer to make adjustments to livestock grazing that have already been subjected to NEPA analysis. | Within PHMA, if monitoring data show the wildlife/special status species standard has not been met nor progress being made toward meeting that standard, there would be an evaluation and a determination made as to the cause. If it is determined that the current authorized livestock use is a significant causal factor in failing to achieve the wildlife/special status species standards, the BLM would address the achievement or progress toward achieving the LHSs (43 CFR 4180.2) and, if needed, Greater Sage-Grouse habitat maintenance or improvement.<br>When NEPA analysis is required for a specific implementation action, one alternative would include mechanisms to make adjustments to meet or make progress toward meeting the wildlife/special status species standard. The analysis should also identify the BLM-approved data collection methodologies used for monitoring conditions and determining when adjustments are necessary. If current grazing management meets land health standards and provides for Greater Sage-Grouse habitat, there would be no need to analyze an alternative for Greater Sage-Grouse.<br>Authorized uses in PHMA that incorporate habitat objectives for Greater Sage-Grouse must develop desired conditions based on Greater Sage-Grouse habitats present in the allotment and the ecological potential of sites that supports these habitats. Metrics used to monitor for objectives must be developed and inform the wildlife/SSS portion of the Standards for Healthy Rangelands.<br>Within PHMA, seasonal habitat objectives for Greater Sage- | Potential change under Alternatives 3, 4, 5, and 6. |

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| *(See above.)* | Grouse apply only to those habitats delineated within an allotment during the specific season (e.g., breeding season objectives during breeding season). Data needed to inform the relationship between the authorized use and habitat condition would come from sample locations that appropriately reflect the impact of the authorized use on habitat conditions. Data points should fall within Greater Sage-Grouse seasonal habitat areas and be collected on ecological sites that have the potential to produce Greater Sage-Grouse habitat. | *(See above.)* |
| MD LG 5: Within PHMA, specific to management for Greater Sage-Grouse, all RMPs are amended as follows:<br>BLM monitoring would be used to evaluate progress toward achieving land health standards within PHMA and, where not achieved, to determine if existing grazing management practices or levels of grazing use on public lands are significant factors in failing to meet, maintain or make progress toward achieving the standards and conform with the guidelines, which through this process will identify appropriate actions to address nonachievement and nonconformance.<br>Allotments within SFAs, followed by those within PHMA, and focusing on those containing riparian areas, including wet meadows, will be prioritized for field checks to help ensure compliance with the terms and conditions of the grazing permits. Field checks include monitoring for actual use, utilization, and use supervision.<br>The BLM would prioritize (1) the review of grazing permits/leases, in particular to determine if modification is necessary prior to renewal, and (2) the processing of grazing permits/leases in SFAs followed by PHMA outside of the SFAs. In setting workload priorities, precedence would be given to existing permits/leases in these areas not meeting LHSs, with focus on those containing riparian areas, including wet meadows. The BLM may use other criteria for prioritization to respond to urgent natural resource concerns (e.g., fire) and legal obligations. | Within PHMA, specific to management for Greater Sage-Grouse, all RMPs are amended as follows:<br>BLM monitoring would be used to evaluate progress toward achieving land health standards within PHMA and, where not achieved, to determine if existing grazing management practices or levels of grazing use on public lands are significant factors in failing to meet, maintain or make progress toward achieving the standards and conform with the guidelines, which through this process will identify appropriate actions to address nonachievement and nonconformance.<br>The BLM would prioritize (1) the review of grazing permits/leases, in particular to determine if modification is necessary prior to renewal, and (2) the processing of grazing permits/leases in PHMA. In setting workload priorities, precedence would be given to existing permits/leases in these areas not meeting LHSs, with focus on those containing riparian areas, including wet meadows. The BLM may use other criteria for prioritization to respond to urgent natural | Potential change under Alternatives 3, 4, 5, and 6. |

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| Outside of PHMA and/or for values other than Greater Sage-Grouse, the following RMP decisions remain in effect with the modification described above:<br>Casper RMP:<br>Conversions in kinds of livestock and changes in season of use will be considered on a case-by-case basis through an environmental analysis. Such changes will be consistent with rangeland health objectives. Grazing leases will be adjusted to accurately reflect the kind of livestock use on public land in all allotments.<br>Kemmerer RMP:<br>Current amounts, kinds, and seasons of livestock grazing uses will be authorized until rangeland health standards assessment results and (or) monitoring indicates a grazing use adjustment is necessary, or that a kind and (or) class of livestock or season of use modification can be accommodated.<br>Newcastle RMP:<br>Any adjustments in livestock grazing use will be made as a result of monitoring and consultation with grazing permittees. Monitoring studies will be conducted using the current BLM-approved methodology.<br>Pinedale RMP:<br>Conversions from one type of livestock to another will be evaluated on a case-by-case basis, including an environmental analysis, and will be authorized in conformance with the goals and objectives of the RMP.<br>Rawlins RMP:<br>The current amounts, kinds, and seasons of livestock grazing use will be authorized until monitoring, field observations, ecological site inventory, or other data acceptable to BLM indicates a grazing use adjustment is needed, as appropriate. Requests for changes in season-of use or kind-of-livestock will be considered on a case-by-case basis. Any decision regarding changes in grazing use will include cooperation, consultation, and coordination with the grazing permittees and the interested public.<br>Green River RMP:<br>The Wyoming Standards for Healthy Rangelands (BLM 1997a) will apply to all resource uses on BLM- administered lands. These standards are the minimal acceptable conditions that address the health, productivity, and sustainability of the | resource concerns (e.g., fire) and legal obligations.<br>Outside of PHMA and/or for values other than Greater Sage-Grouse, the following RMP decisions remain in effect with the modification described above:<br>Casper RMP:<br>Conversions in kinds of livestock and changes in season of use will be considered on a case-by-case basis through an environmental analysis. Such changes will be consistent with rangeland health objectives. Grazing leases will be adjusted to accurately reflect the kind of livestock use on public land in all allotments.<br>Kemmerer RMP:<br>Current amounts, kinds, and seasons of livestock grazing uses will be authorized until rangeland health standards assessment results and (or) monitoring indicates a grazing use adjustment is necessary, or that a kind and (or) class of livestock or season of use modification can be accommodated.<br>Newcastle RMP:<br>Any adjustments in livestock grazing use will be made as a result of monitoring and consultation with grazing permittees. Monitoring studies will be conducted using the current BLM-approved methodology.<br>Pinedale RMP:<br>Conversions from one type of livestock to another will be evaluated on a case-by-case basis, including an environmental analysis, and will be authorized in conformance with the goals and objectives of the RMP.<br>Rawlins RMP:<br>The current amounts, kinds, and seasons of livestock grazing use will be authorized until monitoring, field observations, ecological site inventory, or other data acceptable to BLM | *(See above.)* |

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| rangeland. The standards describe healthy rangelands rather than rangeland by-products. Achievement of a standard is determined through observing, measuring, and monitoring appropriate indicators. An indicator is a component of a system whose characteristics (e.g., presence, absence, quantity, and distribution) can be observed, measured, or monitored based on sound scientific principles. The standards will direct the management of public lands and focus the implementation of this activity plan toward the maintenance or attainment of healthy rangelands. | indicates a grazing use adjustment is needed, as appropriate. Requests for changes in season-of use or kind-of-livestock will be considered on a case-by-case basis. Any decision regarding changes in grazing use will include cooperation, consultation, and coordination with the grazing permittees and the interested public.<br>Green River RMP:<br>The Wyoming Standards for Healthy Rangelands (BLM 1997a) will apply to all resource uses on BLM- administered lands. These standards are the minimal acceptable conditions that address the health, productivity, and sustainability of the rangeland. The standards describe healthy rangelands rather than rangeland by-products.<br>Achievement of a standard is determined through observing, measuring, and monitoring appropriate indicators. An indicator is a component of a system whose characteristics (e.g., presence, absence, quantity, and distribution) can be observed, measured, or monitored based on sound scientific principles. The standards will direct the management of public lands and focus the implementation of this activity plan toward the maintenance or attainment of healthy rangelands. | *(See above.)* |
| MD LG 6: At the time a permittee or lessee voluntarily relinquishes a permit or lease, the BLM will consider whether the public lands where that permitted use was authorized should remain available for livestock grazing or be used for other resource management objectives, such as reserve common allotments or fire breaks. This does not apply to or impact grazing preference transfers, which are addressed in 43 CFR 4110.2-3. | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |

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| MD LG 7: Within PHMA, specific to management for Greater Sage-Grouse, all RMPs are amended as follows: When periods of drought occur, where appropriate, the AO will evaluate strategies to address drought through coordination with grazing permittee/lessee and annual billings processes. In cooperation with livestock grazing permittees/lessees, drought contingency plans will be developed at the appropriate landscape unit that provide for a consistent/appropriate BLM response. Contingency plans shall establish strategies for addressing ongoing drought and post-drought recovery.<br>Outside of PHMA and/or for values other than Greater Sage-Grouse, the following RMP decisions remain in effect with the modification described above:<br><u>Casper RMP:</u><br>Other management considerations for use of stock driveway withdrawals (SDW) will include providing emergency use for relief from fire, drought, or other natural causes or to meet management objectives in adjoining allotments that require rest. These other uses will be addressed on a case-by-case basis and may occur any time during the year provided the AO has determined adequate forage is available and it does not interfere with regular trail use. The decision determining there is adequate forage will be documented and filed in the appropriate SDW file. Consultation and coordination with livestock owners who regularly use the respective SDW will be made prior to authorizing this type of use. This use will be authorized in accordance with federal grazing regulations (also see MD LG 9).<br>A drought contingency plan will be developed to maintain adequate habitat components for viable fish, wildlife, and SSS populations. | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |

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| MD LG 8: In GHMA and PHMA, existing range improvements (e.g., fences, livestock/wildlife watering facilities) would continue to be evaluated and modified when necessary.<br>The potential risk to Greater Sage-Grouse and its habitats from existing structural range improvements will be evaluated. The potential for modification of those structural range improvements identified as posing a risk will be addressed.<br>Supplements and supplemental feeding would continue to be authorized where appropriate.<br>Outside of PHMA and GHMA, and/or for values other than Greater Sage-Grouse, the following RMP decisions remain in effect with the modification described above:<br><u>Casper RMP:</u><br>Identified hazard fences will be modified and new fences will be constructed in accordance with the BLM Fencing Handbook 1741-1. Decision 4010.<br>Placement of salt, mineral, or forage supplements for livestock will not be allowed within 0.25 miles of water, wetlands, and riparian areas, unless written analysis shows that watershed, riparian, wetland, wildlife, and vegetative values will not be adversely affected. Forage supplements will be required to be "certified weed- free."<br><u>Kemmerer RMP:</u><br>BLM fencing standards will be applied to newly constructed fences on BLM-administered lands within the planning area. Existing fences will be eliminated or modified to reduce conflicts on a case-by-case basis.<br>Livestock salt or mineral supplements will be located a minimum of 0.25 miles away from water sources, riparian areas, and aspen stands. Buffers will be based on resource concerns on a case-by-case basis.<br><u>Newcastle RMP:</u><br>Fence construction will be required to meet current BLM fence standards.<br>Fences on BLM-administered land surface that cause documented wildlife conflicts will be removed, reconstructed, or modified, as appropriate or necessary, to eliminate or reduce the conflict.<br>Construction of fences that interfere with movements of big game species in crucial big game winter range will not be allowed on BLM-administered land surface. | In PHMA, existing range improvements (e.g., fences, livestock/wildlife watering facilities) would continue to be evaluated and modified when necessary.<br>Supplements and supplemental feeding would continue to be authorized where appropriate.<br>Outside of PHMA and GHMA, and/or for values other than Greater Sage-Grouse, the following RMP decisions remain in effect with the modification described above:<br><u>Casper RMP:</u><br>Identified hazard fences will be modified and new fences will be constructed in accordance with the BLM Fencing Handbook 1741-1. Decision 4010.<br>Placement of salt, mineral, or forage supplements for livestock will not be allowed within 0.25 miles of water, wetlands, and riparian areas, unless written analysis shows that watershed, riparian, wetland, wildlife, and vegetative values will not be adversely affected. Forage supplements will be required to be "certified weed- free."<br><u>Kemmerer RMP:</u><br>BLM fencing standards will be applied to newly constructed fences on BLM-administered lands within the planning area. Existing fences will be eliminated or modified to reduce conflicts on a case-by-case basis.<br>Livestock salt or mineral supplements will be located a minimum of 0.25 miles away from water sources, riparian areas, and aspen stands. Buffers will be based on resource concerns on a case-by-case basis.<br><u>Newcastle RMP:</u><br>Fence construction will be required to meet current BLM fence standards.<br>Fences on BLM-administered land surface that cause documented | Potential change under Alternatives 3, 4, 5, and 6. |

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| Pinedale RMP:<br>Mineral supplement blocks will be placed in locations that promote proper grazing distribution and prevent inappropriate livestock use on riparian habitat; for example, by locating supplements on ridgetops and/or approximately 0.25 miles from riparian habitat. Placement of supplements near water sources, such as wells and reservoirs, will consider rangeland objectives, such as grazing distribution, wildlife habitat requirements, and reclamation success. Mineral supplement blocks will not be placed within 0.25 miles of an occupied Greater Sage-Grouse lek. Mineral supplement blocks will not be placed within 0.25 miles of known Special Status Plant Species locations.<br>Rawlins RMP:<br>New fence construction will be authorized according to BLM standards unless modified following consultation with affected parties. Existing fences will be modified according to current BLM standards and according to wildlife and livestock management needs.<br>Green River RMP/JMH CAP:<br>Where documented wildlife conflicts with fencing on public lands occur, fences will be modified, reconstructed, or, if necessary, removed. Herding control of livestock will be encouraged as an alternative to fencing. Fence construction will be in accordance with BLM design standards and located so as not to overly impede wildlife movement. Consideration will also be given to SSS and wild horse movement.<br>Green River RMP:<br>Livestock water developments and range improvements will be considered to maintain or improve resource conditions, enhance livestock distribution, or both. Compatibility with special status plant species will be required. Water developments and/or range improvements proposed in sensitive areas will be considered only if wildlife habitat and resource conditions are maintained or improved and no significant or irreversible adverse effects will occur.<br>Salt or nutritional supplements will be prohibited within 500 feet of riparian habitat and National Historic and Scenic Trails unless analysis shows that these resources will not be adversely affected. These supplements also will be prohibited on areas inhabited by | wildlife conflicts will be removed, reconstructed, or modified, as appropriate or necessary, to eliminate or reduce the conflict. Construction of fences that interfere with movements of big game species in crucial big game winter range will not be allowed on BLM-administered land surface.<br>Pinedale RMP:<br>Mineral supplement blocks will be placed in locations that promote proper grazing distribution and prevent inappropriate livestock use on riparian habitat; for example, by locating supplements on ridgetops and/or approximately 0.25 miles from riparian habitat. Placement of supplements near water sources, such as wells and reservoirs, will consider rangeland objectives, such as grazing distribution, wildlife habitat requirements, and reclamation success. Mineral supplement blocks will not be placed within 0.25 miles of an occupied Greater Sage-Grouse lek. Mineral supplement blocks will not be placed within 0.25 miles of known Special Status Plant Species locations.<br>Rawlins RMP:<br>New fence construction will be authorized according to BLM standards unless modified following consultation with affected parties. Existing fences will be modified according to current BLM standards and according to wildlife and livestock management needs.<br>Green River RMP/JMH CAP:<br>Where documented wildlife conflicts with fencing on public lands occur, fences will be modified, reconstructed, or, if necessary, removed. Herding control of livestock will be encouraged as an alternative to fencing. Fence construction will be in accordance with BLM | *(See above.)* |

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| special status plant species. Placement of supplements at least 500 feet away from wells, troughs, and other human-made water sources will be encouraged to better distribute livestock.<br>JMH CAP:<br>Livestock water developments and range improvements will be considered to maintain or improve resource conditions, enhance livestock distribution, or both. Compatibility with special status plant species will be required. Water developments and/or range improvements proposed in sensitive areas will be considered only if wildlife habitat and resource conditions were maintained or improved and no significant or irreversible adverse effects will occur.<br>Salt or nutritional supplements will be prohibited within 500 feet of riparian habitat and National Historic and Scenic Trails unless analysis shows that these resources will not be adversely affected. These supplements also will be prohibited on areas inhabited by special status plant species. Placement of supplements at least 500 feet away from wells, troughs, and other human-made water sources will be encouraged to better distribute livestock. | design standards and located so as not to overly impede wildlife movement. Consideration will also be given to SSS and wild horse movement.<br>Green River RMP:<br>Livestock water developments and range improvements will be considered to maintain or improve resource conditions, enhance livestock distribution, or both. Compatibility with special status plant species will be required. Water developments and/or range improvements proposed in sensitive areas will be considered only if wildlife habitat and resource conditions are maintained or improved and no significant or irreversible adverse effects will occur.<br>Salt or nutritional supplements will be prohibited within 500 feet of riparian habitat and National Historic and Scenic Trails unless analysis shows that these resources will not be adversely affected. These supplements also will be prohibited on areas inhabited by special status plant species. Placement of supplements at least 500 feet away from wells, troughs, and other human-made water sources will be encouraged to better distribute livestock.<br>JMH CAP:<br>Livestock water developments and range improvements will be considered to maintain or improve resource conditions, enhance livestock distribution, or both. Compatibility with special status plant species will be required. Water developments and/or range improvements proposed in sensitive areas will be considered only if wildlife habitat and resource conditions were maintained or improved and no significant or irreversible adverse effects will occur. | *(See above.)* |

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| *(See above.)* | Salt or nutritional supplements will be prohibited within 500 feet of riparian habitat and National Historic and Scenic Trails unless analysis shows that these resources will not be adversely affected. These supplements also will be prohibited on areas inhabited by special status plant species. Placement of supplements at least 500 feet away from wells, troughs, and other human-made water sources will be encouraged to better distribute livestock. | *(See above.)* |
| MD LG 9: Within PHMA, specific to management for Greater Sage-Grouse, all RMPs are amended as follows:<br>Livestock trailing that is authorized will include a trailing plan to utilize non-habitat to the extent possible, include specific routes and timeframes for trailing, utilize existing trails, and avoid stopovers on occupied leks, as appropriate.<br>The following RMP decisions remain in effect with the modification described above:<br><u>Casper RMP:</u><br>The revocation of withdrawals for those trails that are no longer active will be reviewed and recommended and these lands will be incorporated into adjacent allotments (46,050 acres). Grazing leases will be offered to the respective grazing lessees. All remaining SDW lands for trail use (55,680 acres) will be retained.<br><u>Kemmerer RMP:</u><br>Current livestock trails will be retained. Livestock trailing use will occur within 0.5 miles of the mapped centerline.<br><u>Pinedale RMP:</u><br>Adequate stock trails will be maintained to support livestock trailing needs. | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |

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| MD LG 10: Within PHMA, specific to management for Greater Sage-Grouse, all RMPs are amended as follows:<br>Grazing between riparian habitats and upland habitats will be balanced to promote the production and availability of beneficial forbs to GRSG for use during nesting and brood-rearing. Grazing in meadows, mesic habitats, and riparian pastures also will be balanced to promote the production and availability of beneficial grasses and forbs for use during late brood-rearing within PHMA, while maintaining upland conditions and functions.<br>Outside of PHMA and/or for values other than Greater Sage-Grouse, the following RMP decisions remain in effect with the modification described above:<br><u>Casper RMP:</u><br>Lotic and lentic wetland/riparian areas will be managed toward Proper Functioning Condition (PFC).<br>The BLM will manage toward PFC and identified Desired Plant Community on 350 miles of lotic and adjacent riparian habitat and 10,000 acres of lentic habitat to meet fish, wildlife, and SSS habitat requirements.<br><u>Kemmerer RMP:</u><br>Livestock conversions will be allowed in allotments with riparian concerns only when a plan is approved to address riparian issues. Management actions and range improvements proposed to address riparian issues will have to be implemented prior to authorizing the conversion. Livestock conversions may be approved only after completion of a suitability study for the conversion. The conversion may be authorized if it is determined that riparian habitats will be maintained or improved by the conversion.<br><u>Pinedale RMP:</u><br>Meet the Wyoming Standards for Rangeland Health and maintain or enhance wetland and riparian vegetation to achieve PFC.<br>Grazing systems will be designed to maintain or improve watershed and range condition; for example, through changing seasons of use, implementing rotational or other grazing management systems, or developing infrastructure for livestock management.<br>In allotments with riparian habitat, grazing management actions will be designed to maintain or achieve proper functioning condition. | Within PHMA, specific to management for Greater Sage-Grouse, all RMPs are amended as follows:<br>In PHMA, for riparian habitats and/or wet meadow communities utilized by Greater Sage-Grouse, livestock grazing would be managed to promote the production and availability of beneficial forbs for use during brood-rearing, while maintaining upland conditions and functions.<br>Outside of PHMA and/or for values other than Greater Sage-Grouse, the following RMP decisions remain in effect with the modification described above:<br><u>Casper RMP:</u><br>Lotic and lentic wetland/riparian areas will be managed toward Proper Functioning Condition (PFC).<br>The BLM will manage toward PFC and identified Desired Plant Community on 350 miles of lotic and adjacent riparian habitat and 10,000 acres of lentic habitat to meet fish, wildlife, and SSS habitat requirements.<br><u>Kemmerer RMP:</u><br>Livestock conversions will be allowed in allotments with riparian concerns only when a plan is approved to address riparian issues. Management actions and range improvements proposed to address riparian issues will have to be implemented prior to authorizing the conversion. Livestock conversions may be approved only after completion of a suitability study for the conversion. The conversion may be authorized if it is determined that riparian habitats will be maintained or improved by the conversion.<br><u>Pinedale RMP:</u><br>Meet the Wyoming Standards for Rangeland Health and maintain or | Potential change under Alternatives 3, 4, 5, and 6. |

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| Green River RMP:<br>Range improvements will be directed at resolving or reducing resource concerns, improvement of wetland/riparian areas, and overall improvement of vegetation/ground cover. New range improvements may be implemented in "I" and "M" category allotments. Maintenance of range improvements will be required in accordance with the BLM Rangeland Improvement Policy.<br>JMH CAP:<br>Implementation of grazing management systems will assist in improving or maintaining the desired range condition. Approved AMPs, or other activity plans intended to serve as the functional equivalent to an AMP, for each of the designated grazing allotments will provide the necessary guidance for achieving grazing management objectives.<br>Appropriate actions for improving degraded rangeland and riparian habitat (i.e., meeting Wyoming Standards for Healthy Rangelands (BLM 1997a)) include, but will not be limited to, reduction of permitted animal unit months, modified turnout dates, livestock water developments, range improvements, modified grazing periods, growing season rest, riparian pastures, exclosures, implementation of forage utilization levels, and livestock conversions. These improvements will be considered individually using the method outlined in Appendix 2 of the JMH CAP ROD to ensure conformance with management objectives for the planning area and other resource values. | enhance wetland and riparian vegetation to achieve PFC.<br>Grazing systems will be designed to maintain or improve watershed and range condition; for example, through changing seasons of use, implementing rotational or other grazing management systems, or developing infrastructure for livestock management.<br>In allotments with riparian habitat, grazing management actions will be designed to maintain or achieve proper functioning condition.<br>Green River RMP:<br>Range improvements will be directed at resolving or reducing resource concerns, improvement of wetland/riparian areas, and overall improvement of vegetation/ground cover. New range improvements may be implemented in "I" and "M" category allotments. Maintenance of range improvements will be required in accordance with the BLM Rangeland Improvement Policy.<br>JMH CAP:<br>Implementation of grazing management systems will assist in improving or maintaining the desired range condition. Approved AMPs, or other activity plans intended to serve as the functional equivalent to an AMP, for each of the designated grazing allotments will provide the necessary guidance for achieving grazing management objectives.<br>Appropriate actions for improving degraded rangeland and riparian habitat (i.e., meeting Wyoming Standards for Healthy Rangelands (BLM 1997a)) include, but will not be limited to, reduction of permitted animal unit months, modified turnout dates, livestock water developments, range improvements, modified grazing periods, growing season rest, | *(See above.)* |

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| *(See above.)* | riparian pastures, exclosures, implementation of forage utilization levels, and livestock conversions. These improvements will be considered individually using the method outlined in Appendix 2 of the JMH CAP ROD to ensure conformance with management objectives for the planning area and other resource values. | *(See above.)* |
| MD LG 11: Within PHMA, specific to management for Greater Sage-Grouse, all RMPs are amended as follows:<br>Range improvement projects will be planned and authorized in a way that contributes to rangeland health and maintains and/or improves Greater Sage-Grouse and its habitat.<br>Outside of PHMA and/or for values other than Greater Sage-Grouse, the following RMP decisions remain in effect with the modification described above:<br><u>Green River RMP:</u><br>Water sources may be developed in crucial wildlife winter ranges only when consistent with wildlife habitat needs. Such sources will be designed to benefit livestock, wild horses, and wildlife. Alternative water supplies or facilities for livestock may be provided to relieve livestock grazing pressure along stream bottoms and improve livestock distribution.<br><u>JMH CAP:</u><br>Livestock water developments and range improvements will be considered to maintain or improve resource conditions, enhance livestock distribution, or both. Compatibility with special status plant species will be required. Water developments and/or range improvements proposed in sensitive areas will be considered only if wildlife habitat and resource conditions are maintained or improved and no significant or irreversible adverse effects will occur. | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |
| MD LG 12: Existing water developments associated with springs and seeps will be evaluated and associated pipelines/structures to those developments having a negative effect on PHMA will be modified. | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |

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| MD WHB 1: Within PHMA, specific to management for Greater Sage-Grouse, all RMPs are amended as follows:<br>Manage herd management areas (HMAs) in Greater Sage-Grouse habitat within established appropriate management level range to achieve and maintain Greater Sage-Grouse habitat (see Tables 2-2 and 2-3). Outside of PHMA and/or for values other than Greater Sage-Grouse, the following RMP decisions remain in effect with the modification described above:<br>Green River RMP/JMH CAP:<br>Specific habitat objectives for herd management areas will be developed. Consideration will be given to desired plant communities, wildlife, watershed, livestock grazing, and other resource needs. | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |
| MD WHB 2: PHMA (core only) management objectives will be considered when evaluating appropriate management levels. | No changes made. | Potential change under Alternative 3. |
| MD WHB 3: PHMA (core only) management objectives will be considered when conducting land health assessments in BLM HMAs. | No changes made. | Potential change under Alternative 3. |
| MD WHB 4: When conducting NEPA analysis for wild horse management activities, water developments or other rangeland improvements for wild horses in PHMA, the direct and indirect effects on Greater Sage-Grouse populations and habitat will be addressed. Water developments or rangeland improvements will be implemented using the criteria identified for domestic livestock identified above in PHMA. | No changes made. | Potential change under Alternative 3. |
| MD WHB 5: Coordinate with other resources (Range, Wildlife, and Riparian) to conduct land health assessments within all BLM HMAs. | No changes made. | Potential change under Alternative 3. |

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| MD MR 1: Fluid Minerals (Unleased Estate)<br>Within PHMA, specific to management for Greater Sage-Grouse, all RMPs are amended as follows:<br>The BLM will allow oil and gas leasing consistent and subject to the leasing stipulations analyzed in the timing, distance, disturbance, and density restrictions sections (Map 2-2) (see Appendix B – Fluid Mineral Stipulations). Ensure that leasing activities in PHMA comply with Greater Sage-Grouse resource management plan decisions and remain in compliance with laws, regulations and policy.<br>Fluid mineral leasing will be allowed in PHMA (core only), except in areas that are closed to leasing due to the need to protect other sensitive resources. | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |
| MD MR 2: Fluid Minerals (Unleased Estate)<br>Within PHMA, specific to management for Greater Sage-Grouse, all RMPs are amended as follows:<br>Geophysical exploration projects that are designed to minimize habitat fragmentation within PHMA will be allowed, except where prohibited or restricted by existing RMP decisions, and in conformance with timing and distances Management Decisions (see Decisions MD SSS 5 through MD SSS 10).<br>Outside of PHMA and/or for values other than Greater Sage-Grouse, the following RMP decisions remain in effect with the modification described above:<br><u>Casper RMP:</u><br>The blocks of public land identified as mapped in the Casper Field Office GIS database will be managed to retain intact blocks of native vegetation (192,550 acres, of which 131,880 acres are BLM-administered surface). In these areas, the following restrictions apply:<br>1. These blocks are (1) unavailable for oil and gas leasing, and (2) a geophysical operation on public surface for the life of the plan. Activities for existing oil and gas leases are managed intensively (see Appendix U of the Casper RMP). Existing leases will be allowed to expire and not be renewed.<br>2. Within these blocks, a withdrawal from the operation of the public land laws, including the mining laws will be pursued.<br>3. These blocks are closed to mineral material disposal. Existing permits will be | No changes made. | Potential change under Alternative 3. |

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| allowed to expire without renewal or expansion.<br>4. These blocks are not open to wind/renewable energy development.<br>5. These blocks remain open to livestock grazing.<br>6. All allowed surface-disturbing activities within the designated blocks are subject to a Controlled Surface Use restriction, minimizing surface disturbance to meet management objectives. Decision 4024<br>The North Platte River Special Recreation Management Area will continue to be open to oil and gas leasing and geophysical operations. Decision 7039<br>The area is unavailable for oil and gas leasing and geophysical exploration is not allowed. Decision 7047<br>The MA is unavailable for new oil and gas leasing. No geophysical operations will be allowed on public surface.<br>Activities on existing leases will be managed intensively to meet the objectives of the MA (see Appendix U of the Casper RMP – Intensive Management). To minimize surface-disturbing activities, oil and gas exploration and development will use directional drilling techniques and well twinning whenever practicable. Decision 7059<br>The Red Wall/Gray Wall complex is located entirely within the South Bighorns/Red Wall Management Area and is unavailable for new oil and gas leasing. No geophysical operations will be allowed on public surface. Activities on existing leases will be intensively managed to meet the objectives of the MA (see Appendix U of the Casper RMP– Intensive Management). To minimize surface-disturbing activities, oil and gas exploration and development will use directional drilling techniques and well twinning whenever practicable. Decision 7063<br>Those lands currently open to oil and gas leasing will continue to be open to geophysical operations. Those lands open to oil and gas leasing, but subject to a NSO restriction, may be open to geophysical operations should site specific NEPA analysis disclose a finding of no significant impact. No geophysical operations are allowed in areas closed for oil and gas leasing. Decision 2019 | *(See above.)* | *(See above.)* |

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| Kemmerer RMP:<br>Allow for geophysical exploration on lands throughout the planning area subject to identified conditions of approval.<br>Newcastle RMP:<br>Surface-disturbing and disruptive activities associated with all types of minerals exploration and development and with geophysical exploration will be subject to appropriate mitigation measures determined through, but not limited to, use of MD SSS 4.<br>Pinedale RMP:<br>Vehicle-based geophysical activities will be assessed on a case-by-case basis.<br>The use of surface and/or aboveground (Poulter shot) explosive charges for geophysical exploration will be assessed case by case.<br>Geophysical projects, including projects proposed in areas with an NSO restriction, will be analyzed and mitigation developed on a case-by-case basis.<br>Geophysical activities that are considered casual use actions are allowed within 0.25 miles of active Greater Sage-Grouse leks provided that:<br>• Operations are conducted on designated roads and trails.<br>• Operations during the breeding season (March 1 through May 15) are conducted between the hours of 8:00 a.m. and 8:00 p.m.<br>• A 150-foot wide strip of undisturbed sagebrush is maintained around the perimeter of the lek for hiding and escape cover.<br>Rawlins RMP:<br>All lands open to oil and gas leasing consideration will also be open to geophysical exploration, subject to appropriate resource surveys, surface protection measures, adequate bonding, and adherence to State of Wyoming standards for geophysical operations.<br>Vehicular use for "necessary tasks" (as defined in the glossary), such as geophysical exploration including project survey and layout, will be permitted except where specifically prohibited (e.g., some SD/MAs).<br>Green River RMP:<br>Geophysical exploration (vehicles and detonation) activities will be prohibited within 0.5 miles of the Pinnacles Geologic Feature. | *(See above.)* | *(See above.)* |

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| Areas of sensitive heritage resources and geologic features, such as Boars Tusk, White Mountain Petroglyphs, special status plant species, wilderness study areas (WSAs), and historic trails, will remain closed. Receiver lines may be laid using foot traffic within these areas. Exceptions to these restrictions may be granted on a case-by-case basis subject to appropriate site-specific analysis and mitigation requirements.<br>The remainder of the planning area will be open to geophysical exploration, with application of appropriate mitigation. Rights-of-way limitations in the planning area apply to on- and off-road vehicle traffic used for geophysical activities. Exploration activities will be allowed in sensitive resource areas only if they can be performed with acceptable mitigation of impacts.<br><u>JMH CAP:</u><br>Geophysical exploration (vehicles and detonation) activities will be prohibited within 0.5 miles of the Pinnacles Geologic Feature.<br>Areas of sensitive heritage resources and geologic features, such as Boars Tusk, White Mountain Petroglyphs, special status plant species, WSAs, and historic trails, will remain closed. Receiver lines may be laid using foot traffic within these areas. Exceptions to these restrictions may be granted on a case-by-case basis subject to appropriate site-specific analysis and mitigation requirements.<br>The remainder of the planning area will be open to geophysical exploration, with application of appropriate mitigation. ROW limitations in the planning area apply to on- and off-road vehicle traffic used for geophysical activities. Exploration activities will be allowed in sensitive resource areas only if they can be performed with acceptable mitigation of impacts. | *(See above.)* | *(See above.)* |

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| MD MR 3, Fluid Minerals, Leased Estate:<br>Within PHMA, specific to management for Greater Sage-Grouse, all RMPs are amended as follows:<br>In cases where federal oil and gas leases have been issued with stipulations varying from those in Appendix B for the protection of Greater Sage-Grouse or their habitats, as provided in the applicable RMP decision, as revised or amended, their inclusion as APD COAs will be considered when approving exploration and development activities through completion of the environmental record of review (43 CFR 3162.5 and 36 CFR 228.108), including appropriate documentation of compliance with NEPA. Overall consideration shall be given to minimizing the impact on Greater Sage-Grouse through a project design that avoids, minimizes, reduces, rectifies, and/or adequately compensates for direct and indirect impacts on PHMA or use and includes applicable and technical COAs. Selection and application of these measures shall be based on current science and research on the effects on important breeding, nesting, brood-rearing, and wintering areas. For proposed operations in PHMA, the Surface Use Plan of Operations (see 43CFR 3162.3-1(f)) shall address, at a minimum, the anticipated noise, density and amount of disturbance, mechanical movement (e.g., pump jacks), permanent and temporary facilities, traffic, phases of development over time, off-site mitigation, and expected periods of use associated with the proposed project. Seasonal habitats or project features related to potential Greater Sage-Grouse impacts that are not addressed in the Surface Use Plan of Operations based on site- specific or project-specific considerations shall be noted in the project file, along with a rationale for not including them.<br>In this process the BLM will evaluate, among other things:<br>Whether the conservation measure is "reasonable" (43 CFR 3101.1-2) and consistent with valid existing rights<br>Whether the action is in conformance with the approved LUP; and the effectiveness of the proposed mitigation measures (See MD SSS 4). | No changes made. | Potential change under Alternative 3. |

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| The BLM will work with project proponents in these situations to promote measurable Greater Sage-Grouse conservation objectives such as, but not limited to, consolidation of project related infrastructure to reduce habitat fragmentation and loss and to promote effective conservation of seasonal habitats and PHMA (connectivity only) that support population management objectives set by the state.<br>The BLM will continue to work with project proponents and the WGFD to site their projects in locations that meet the purpose and need for their project, but have been determined to contain the least sensitive habitats (based on vegetation, topography, or other habitat features) and resources whether inside or outside of PHMA (utilizing DDCT analysis process). Valid existing rights will be recognized and respected.<br>For values other than Greater Sage-Grouse, the following RMP decisions remain in effect with the modification described above:<br><u>Kemmerer RMP:</u><br>Choose and implement appropriate mitigation in a timely manner to minimize decreases in habitat function.<br>Utilize appropriate voluntary off-site compensatory mitigation to reduce impacts. This will be necessary if (1) all on-site mitigation has been accomplished and adverse effects have not been mitigated; or (2) if on-site mitigation is not feasible.<br><u>Pinedale RMP:</u><br>Off-site mitigation proposed by oil and gas or other operators can be considered and analyzed in future environmental documents as mitigation for proposed activities within the planning area. Proposed off-site mitigation will be described and analyzed for effectiveness in detail on a project-specific basis. Off-site mitigation will conform to requirements in the Pinedale RMP regarding the order of use of mitigation methods, stipulations applied to off-site mitigation measures, and priority order for mitigating resource impacts on-site or off-site.<br><u>Green River RMP:</u><br>Development actions will be analyzed on a case-by-case basis to identify mitigation needs to meet RMP objectives, provide for resource protection, and provide for logical development. Limitations on the amount, | *(See above.)* | *(See above.)* |

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| sequence, timing, or level of development may occur. This may result in transportation planning and in limitations in the number of roads and drill pads, or deferring development in some areas until other areas have been restored to previous uses.<br>JMH CAP:<br>COAs attached to an APD will be based on site-specific NEPA or other analysis and will establish specific, necessary mitigation measures not covered by stipulations for resource and environmental protection. Some areas will need more intensive mitigation measures to protect sensitive resources and provide for public health and safety. These intensive mitigation measures or COAs will mostly apply to areas with overlapping sensitive resources (e.g., Areas 2 and 3). Examples of intensive mitigation that can apply to all activities based on site-specific analysis include off-site placement of facilities, remote control monitoring, restricted or prohibited surface use including road construction, multiple wells from a single pad, central tank batteries/facilities, and pipelines and power lines concentrated in specific areas. In addition, refer to Section 3.12.3 for additional mitigation measures that may apply as part of the transportation plan. | *(See above.)* | *(See above.)* |
| MD MR 4: Within PHMA, field offices will work with project proponents (including those within BLM) to site their projects in locations that minimize impacts on sensitive resources. | No changes made. | No change proposed. |
| MD MR 5: Master Development Plans will be considered and encouraged for projects involving multiple proposed disturbances within PHMA. | No changes made. | No change proposed. |
| MD MR 6: Within PHMA, unitization will be encouraged as a means of minimizing adverse impacts on Greater Sage-Grouse to reduce fragmentation and surface-disturbing and disruptive activities. | No changes made. | No change proposed. |

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| MD MR 7: The BLM shall closely examine the applicability of categorical exclusions in PHMA and GHMA. If extraordinary circumstances review is applicable, the BLM shall determine whether those circumstances exist. For proposed actions in PHMA, determine whether a categorical exclusion is applicable and if so, closely examine the extraordinary circumstances, if applicable, to determine whether one or more exists that will require preparation of a NEPA analysis. If a categorical exclusion applies, and no extraordinary circumstances exist, determine whether preparing a NEPA analysis will help inform decision making. | No changes made. | No change proposed. |
| MD MR 8: Federal Regulations, 43 CFR 3104.1 requires that a bond be furnished before any drilling or surface disturbance activities begin. The lessee, sublessee or the operator must furnish a surety or personal bond in the amount of at least $10,000 to ensure compliance with all the lease terms, including protection of the environment.<br>With the consent of the surety and principal, the operator may use the bond of another party, such as the lessee. Each time there is a new operator, that operator must notify the BLM that he/she is the responsible operator, giving the particulars of the bond under which he/she will operate. The BLM can require an increase in a bond amount any time conditions warrant such an increase.<br>A reclamation bond will be required on all projects that is commensurate with the scope, scale, size of the project within PHMA. Partial bonding may be appropriate depending on these factors. | No changes made. | No change proposed. |

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| MD MR 9: Within PHMA, specific to management for Greater Sage-Grouse, all RMPs are amended as follows:<br>Produced water from coalbed natural gas wells will be treated and disposed of in collaboration and consistent with the requirements of the state, and RDFs specified in Management Action 10 (Appendix C).<br>Outside of PHMA and/or for values other than Greater Sage-Grouse, the following RMP decisions remain in effect with the modification described above:<br><u>Pinedale RMP:</u><br>Produced water from coalbed natural gas wells will be treated and disposed of in collaboration and consistent with the requirements of the state. | No changes made. | No change proposed. |
| MD MR 10: Specific to management for Greater Sage-Grouse, within PHMA (core only), all RMPs are amended as follows:<br>Where the federal government owns the mineral estate, and the surface is in nonfederal ownership, apply the same stipulations, COAs, and/or conservation measures and RDFs applied if the mineral estate is developed on BLM-administered lands in that management area, to the maximum extent permissible under existing authorities, and in coordination with the landowner.<br>Within PHMA (non-core only) and outside of PHMA and/or for values other than Greater Sage-Grouse, the following RMP decisions remain in effect with the modification described above:<br><u>Pinedale RMP:</u><br>BLM-permitted actions on split estate lands are subject to the same stipulations as leased federal mineral estate on federal surface lands, provided the stipulations do not adversely affect the surface owner's land use or actions. Exceptions to surface development restrictions may be granted if requested or agreed to by the surface owner. | No changes made. | No change proposed. |
| MD MR 11: Within PHMA where the federal government owns the surface and the mineral estate is in nonfederal ownership, apply appropriate surface use COAs, stipulations, and mineral RDFs through ROW grants or other surface management instruments, to the maximum extent permissible under existing authorities, in coordination with the mineral estate owner/lessee. | No changes made. | No change proposed. |

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| MD MR 12: Locatable Minerals<br>Within PHMA, specific to management for Greater Sage-Grouse, all RMPs are amended as follows:<br>252,160 acres within SFAs (see MD SSS 14 for identification of SFAs) will be recommended for withdrawal from the General Mining Act of 1872, subject to valid existing rights. A total of approximately 21,251,690 acres are open to locatable mineral location and entry (Map 2-3). Operators may be requested to submit modifications to the accepted notice or approved plan of operations so that the operations minimally impact PHMA. The AO may convey to the operator suggested conservation measures, based on the notice or plan level operations and the geographic area of those operations (also called the project area which is defined in 43 CFR 3809.5 and 36 CFR 228.3).<br>These suggested conservation measures include measures that support the overall goals and objectives of the core population area strategy, though measures listed for protection of Greater Sage-Grouse breeding, nesting, brood- rearing, and wintering may not be reasonable or applicable to the BLM's determination of whether the proposed operations will cause unnecessary or undue degradation under 43 CFR 3809.5 and 36 CFR 228.3. The request containing the suggested conservation measures must make clear that the operator's compliance is not mandatory.<br>Notices or Plans of Operation, or modifications thereto, submitted following the issuance of this guidance: As part of the 15-day completeness review of notices [or modifications thereto] and 30-day completeness review of plans of operations [or modifications thereto], the proposed project area(s) where exploration, development, mining, access and reclamation will take place shall be reviewed for overlap of PHMA in the corporate GIS database. If there is overlap, the BLM AO may notify the operator of ways that they may minimize impacts on PHMA and request the operator to amend its notice or plan to include such measures. The request to amend the submitted notice or plan of operations must make clear that the operator's compliance is | Locatable Minerals<br>Within PHMA, specific to management for Greater Sage-Grouse, all RMPs are amended as follows:<br>A total of approximately 21,251,690 acres are open to locatable mineral location and entry (Map 2-3). Operators may be requested to submit modifications to the accepted notice or approved plan of operations so that the operations minimally impact PHMA. The AO may convey to the operator suggested conservation measures, based on the notice or plan level operations and the geographic area of those operations (also called the project area which is defined in 43 CFR 3809.5 and 36 CFR 228.3).<br>These suggested conservation measures include measures that support the overall goals and objectives of the core population area strategy, though measures listed for protection of Greater Sage-Grouse breeding, nesting, brood- rearing, and wintering may not be reasonable or applicable to the BLM's determination of whether the proposed operations will cause unnecessary or undue degradation under 43 CFR 3809.5 and 36 CFR 228.3. The request containing the suggested conservation measures must make clear that the operator's compliance is not mandatory.<br>Notices or Plans of Operation, or modifications thereto, submitted following the issuance of this guidance: As part of the 15-day completeness review of notices [or modifications thereto] and 30-day completeness review of plans of operations [or modifications thereto], the proposed project area(s) where exploration, development, mining, access and reclamation will take | Potential change under Alternatives 3, 4, 5, and 6. |

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| not mandatory and that including such measures is not a requirement for completeness of either the notice or a plan of operations, nor is it a condition of acceptance of the notice or approval of the plan of operations.<br>For values other than Greater Sage-Grouse, the following RMP decisions remain in effect: 1,785,230 acres are withdrawn from mineral entry for the protection of sensitive resources. | place shall be reviewed for overlap of PHMA in the corporate GIS database. If there is overlap, the BLM AO may notify the operator of ways that they may minimize impacts on PHMA and request the operator to amend its notice or plan to include such measures. The request to amend the submitted notice or plan of operations must make clear that the operator's compliance is not mandatory and that including such measures is not a requirement for completeness of either the notice or a plan of operations, nor is it a condition of acceptance of the notice or approval of the plan of operations.<br>(see also MD SSS 4 through MD SSS 10 and MD SSS 12)<br>For values other than Greater Sage-Grouse, the following RMP decisions remain in effect: 1,785,230 acres are withdrawn from mineral entry for the protection of sensitive resources. | *(See above.)* |
| MD MR 13: Salable Minerals<br>PHMA will be open to mineral material exploration, sales, and free use permits, except in areas that are unavailable due to the need to protect other resource values.<br>All salable mineral activities within PHMA will be considered, provided they can be completed in compliance within surface occupancy, seasonal restrictions, and disturbance and density stipulations (Map 2-4 and MD SSS 2, 3,5 through 10) analyzed through the DDCT process. | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |
| MD MR 14: Salable Minerals<br>Within PHMA closure and restoration of salable mineral pits no longer in use will be considered to meet Greater Sage-Grouse habitat conservation objectives. Emphasis will be given to reclamation/restoration of PHMA as a viable long term goal to improve Greater Sage-Grouse habitat. | No changes made. | No change proposed. |

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| MD MR 15: Nonenergy Leasable Minerals<br>Within PHMA, specific to management for Greater Sage-Grouse, all RMPs are amended as follows:<br>All nonenergy leasable mineral activities will be considered in PHMA, provided that the activities can be completed in compliance with all occupancy, timing, density and disturbance restrictions (Map 2-5).<br>Exploration licenses and prospecting permits will be considered with appropriate mitigating measures.<br>Outside of PHMA and/or for values other than Greater Sage-Grouse, the following RMP decisions remain in effect with the modification described above:<br>Portions of PHMA will be unavailable for leasing in accordance with existing RMP decisions for resource values other than Greater Sage-Grouse.<br><u>Kemmerer RMP:</u><br>Sodium: All public lands (outside of the Raymond Mountain WSA and exceptions identified below) within the planning area are available for sodium leasing consideration. Exploration for sodium will be considered on a case-by-case basis. Limited surface occupancy criteria contained in the Sodium Mineral Development Environmental Assessment will be applied on a case-by-case basis. No new sodium leases or exploration licenses may be issued on lands within the Raymond Mountain WSA. No new sodium exploration and leasing will be considered for Rock Creek/Tunp and Bear River Divide management areas.<br>Phosphate: All public lands (outside of the Raymond Mountain WSA and exceptions identified below) within the planning area are available for phosphate leasing consideration. Exploration for phosphate will be considered on a case-by-case basis. No new phosphate exploration and leasing will be considered for Rock Creek/Tunp and Bear River Divide management areas.<br><u>Pinedale RMP:</u><br>Should interest in other leasable minerals materialize in the future, leasing will be considered on a case-by- case basis, and the RMP will be amended as appropriate and necessary. The same surface disturbance restrictions will be used in analyzing leasing proposals and determining the issuance of any | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |

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| leases (for example, geothermal steam, coal, sodium, oil shale, and phosphate).<br>Green River RMP/JMH CAP:<br>The known sodium leasing area is open to exploration and consideration for leasing and developments, but is closed to prospecting permits.<br>The remainder of the planning area is open to sodium prospecting except for areas that are closed to mineral leasing, surface mining, or mechanical prospecting type activities (areas closed to drilling, off road vehicle use, and explosive charges).<br>Sodium (trona) leasing will be considered on a case-by-case basis, and is subject to the same conditional requirements as oil and gas and coal, and the general management direction applied in this RMP. | *(See above.)* | *(See above.)* |
| MD MR 16: Solid Leasable Minerals<br>Within PHMA, specific to management for Greater Sage-Grouse, all RMPs are amended as follows:<br>At the time an application for a new coal lease or lease modification is submitted to the BLM, the BLM will determine whether the lease application area is "unsuitable" for all or certain coal mining methods pursuant to 43 CFR 3461.5. PHMA is essential habitat for maintaining Greater Sage-Grouse for purposes of the suitability criteria set forth at 43 CFR 3461.5(o)(1). The BLM will also consider that USFWS has found "the core area strategy…if implemented by all landowners via regulatory mechanisms, would provide adequate protection for Greater Sage-Grouse and their habitats in the state" when considering leasing coal in PHMA under the criteria set for at 43 CFR 3461.5(o)(1).<br>Outside of PHMA and/or for values other than Greater Sage-Grouse, the following RMP decisions remain in effect with the modification described above:<br>Casper RMP:<br>If coal development potential is shown to exist, all BLM-administered lands outside the Coal Development Potential Area (CDPA) will be considered for coal leasing, unless specifically closed to mineral leasing. The coal-screening process will be completed on all newly identified lands having coal development potential.<br>All BLM-administered lands within the CDPA identified in the 2001 Buffalo RMP | No changes made. | No change proposed. |

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| maintenance action are acceptable for further consideration for coal leasing. The only exceptions are those lands determined unacceptable within the area or those lands that fall within PHMA. The coal unsuitability criteria are re- evaluated whenever new coal lease applications are received.<br>Kemmerer RMP:<br>Process new coal lease applications by using the coal screening process. The coal screening process results will determine which lands may be available for further consideration for coal leasing and development. Appropriate NEPA analysis will be required prior to leasing. Federal land within the proposed Haystack project area outside of the PHMA is determined acceptable for further consideration for coal leasing and development. No coal LBAs will be considered for Rock Creek/Tunp and Bear River Divide management areas.<br>Pinedale RMP:<br>Decisions on lands acceptable for leasing consideration for coal development will be made after an application is received and the coal screening process is conducted.<br>Rawlins RMP:<br>Federal coal lease applications will be accepted only on those federal coal lands with development potential identified as suitable for further leasing consideration after application of the coal unsuitability criteria (the above-mentioned approximately 51,250 acres and 2,318.7 million tons of surface minable federal coal).<br>Green River RMP/JMH CAP:<br>Federal coal lands within the Coal Occurrence and Development Potential area (about 422,000 acres) are open to further consideration for coal leasing and development (i.e., new competitive leasing, emergency leasing, lease modifications, and exchange proposals, under the Federal Coal Management Program) with appropriate and necessary conditions and requirements for protection of other land and resource values and uses. | *(See above.)* | *(See above.)* |

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| MD MR 17: Solid Leasable Minerals<br>Within PHMA, specific to management for Greater Sage-Grouse, all RMPs are amended as follows:<br>Upon receipt of a coal lease application proposing underground mining methods that include surface operations and impacts within PHMA, Criterion 15 will be applied and the area will be identified as suitable for further coal leasing consideration after consultation with the state and, where applicable, surface management agency to determine that all or certain stipulated methods of coal mining will not have a significant long-term impact on Greater Sage-Grouse. Stipulated methods may include, but not limited to, underground mining methods with no placement of surface facilities except for purposes of health and human safety.<br>Unsuitability is not applied to underground operations without surface impacts (43 CFR 3461.1) This will be consistent with IM WY-2012-019 says that the BLM will assess potential impacts on Greater Sage-Grouse through the NEPA process, and that the state regulatory agency will apply this mitigation, as well as protective measures consistent with the state policy for solid leasable mining action at the permitting stage.<br>Outside of PHMA and/or for values other than Greater Sage-Grouse, the following RMP decisions remain in effect with the modification described above:<br><u>Casper RMP:</u><br>If coal development potential is shown to exist, all BLM-administered lands outside the CDPA will be considered for coal leasing, unless specifically closed to mineral leasing. The coal-screening process will be completed on all newly identified lands having coal development potential.<br>All BLM-administered lands within the CDPA identified in the 2001 Buffalo RMP maintenance action are acceptable for further consideration for coal leasing. The only exceptions are those lands determined unacceptable within the area. The coal unsuitability criteria are re-evaluated whenever new coal lease applications are received.<br><u>Kemmerer RMP:</u><br>Process new coal lease applications by using the coal screening process. The coal | No changes made. | No change proposed. |

| 2015 Approved RMPAs | 2019 Approved RMPAs | Potential Change in 2023 Plan |
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| screening process results will determine which lands may be available for further consideration for coal leasing and development. Appropriate NEPA analysis will be required prior to leasing. Federal land within the proposed Haystack project area is determined acceptable for further consideration for coal leasing and development. No coal LBAs will be considered for Rock Creek/Tunp and Bear River Divide management areas.<br>Pinedale RMP:<br>Decisions on lands acceptable for leasing consideration for coal development will be made after an application is received and the coal screening process is conducted.<br>Rawlins RMP:<br>Federal coal lease applications will be accepted only on those federal coal lands with development potential identified as suitable for further leasing consideration after application of the coal unsuitability criteria (the above-mentioned approximately 51,250 acres and 2,318.7 million tons of surface minable federal coal).<br>Green River RMP/JMH CAP:<br>Federal coal lands within the Coal Occurrence and Development Potential area (about 422,000 acres) are open to further consideration for coal leasing and development (i.e., new competitive leasing, emergency leasing, lease modifications, and exchange proposals, under the Federal Coal Management Program) with appropriate and necessary conditions and requirements for protection of other land and resource values and uses. | *(See above.)* | *(See above.)* |
| MD MR 18: Coal exploration activities will be allowed in PHMA if they can be completed in compliance to surface occupancy and disturbance and density stipulations analyzed through the DDCT process. | No changes made. | No change proposed. |
| MD MR 19: Exceptions to lease stipulations, COA, and terms and conditions:<br>Exceptions waivers, and modifications to lease stipulations, COAs, and terms and conditions, for Greater Sage-Grouse will continue to be considered on a case-by-case basis consistent with approved LUPs and other BLM policy and regulations as they relate to exceptions within PHMA and GHMA. | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |

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| MD RE 1: Within PHMA, all RMPs are amended as follows:<br>Wind energy development would be avoided in PHMA (Map 2-6), and not allowed unless it can be sufficiently demonstrated that the development activity would not result in declines of PHMA populations. Sufficient demonstration of "no declines" should be coordinated with the WGFD and USFWS.<br>For values other than Greater Sage-Grouse, the following RMP decisions remain in effect:<br>Areas that are currently unavailable due to the need to protect sensitive resources would remain unavailable to wind energy development. | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |
| MD RE 2: Within PHMA, specific to management for Greater Sage-Grouse, all RMPs are amended as follows:<br>The use of guy wires for meteorological towers (MET) tower supports would be avoided within PHMA. All existing and any new unavoidable guy wires should be marked with recommended bird deterrent devices.<br>The siting of new temporary MET towers within PHMA would be avoided within 2 miles of occupied Greater Sage-Grouse leks, unless they are out of the direct line of sight of the occupied lek.<br>Outside of PHMA, the following RMP decisions remain in effect:<br><u>Kemmerer RMP:</u><br>New MET towers would be avoided within 1 mile of occupied sagebrush obligate habitats, unless anti-perch devices are installed. MET towers relying on guy wires for support would be prohibited in these habitats. Exceptions could be made if NEPA analysis shows little or no impact on sagebrush obligate species.<br><u>Rawlins RMP:</u><br>MET towers would be authorized on a case-by-case basis from 0.25 miles to 1 mile of an occupied Greater Sage-Grouse and sharp-tailed grouse lek. | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |

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| MD LR 1: *Land Use Authorizations*<br>Specific to management for Greater Sage-Grouse, all RMPs are amended as follows:<br>PHMA will be managed as ROW avoidance areas for new ROW or Special Use Authorization (SUA) permits (Map 2-7).<br>Within PHMA where new ROWs/SUAs are necessary, new ROWs/SUAs will be located within designated RMP corridors or adjacent to existing ROWs/SUAs where technically feasible. Subject to valid existing rights including nonfederal land inholdings, required new ROWs/SUAs will be located adjacent to existing ROWs/SUAs or where it best minimizes Greater Sage-Grouse impacts. Consider the likelihood of development of not-yet-constructed surface-disturbing activities, as defined in Table 2 of the Monitoring Framework (Appendix D under valid existing rights.<br>For values other than Greater Sage-Grouse, the following RMP decisions remain in effect:<br>Portions of PHMA will be managed as ROW exclusion areas in accordance with existing RMP decisions for resource values other than Greater Sage-Grouse. | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |
| MD LR 2: Specific to management for Greater Sage-Grouse, all RMPs are amended as follows:<br>Within GHMA where new ROWs/SUAs are necessary, new ROWs/SUAs will be collocated within existing ROWs/SUAs where technically feasible.<br>Appropriate Greater Sage-Grouse seasonal timing constraints will be applied.<br>For values other than Greater Sage-Grouse, the following RMP decisions remain in effect:<br>Portions of GHMA will be managed as ROW avoidance areas in accordance with existing RMP decisions for resource values other than Greater Sage-Grouse. | No changes made. | Potential change under Alternative 3. |

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| MD LR 3: Within PHMA, specific to management for Greater Sage-Grouse, all RMPs are amended as follows:<br><u>New Transmission Lines (greater than 115 kV):</u><br>New transmission lines greater than 115 kV in PHMA (core only) will be allowed only (1) within the 2-mile wide transmission line route through PHMA (core only) population areas in south-central and southwestern Wyoming (Attachment 1 from EO 2015-4); (2) when located within 0.5 miles or less of an existing 115 kV or greater transmission line constructed prior to 2008; or (3) in designated RMP corridors authorized for aboveground transmission lines. Transmission lines routed using one or more of the three criteria listed above will not be counted against the DDCT 5 percent disturbance cap. New transmission lines greater than 115 kV proposed outside of these areas will be considered where it can be demonstrated that declines in Greater Sage-Grouse populations can be avoided through project design and/or mitigation. These projects will be subject to the density and disturbance restrictions for PHMA.<br>Construction of new transmission lines will adhere to the restrictions associated with conducting activities within PHMA.<br>Review of transmission line proposals will incorporate the Framework for Sage-grouse Impacts Analysis for Interstate Transmission Lines and other appropriate documents consistent with the three routing criteria described above.<br>New projects within PHMA that may require future utility lines, including distribution and transmission lines or pipelines, will include the proposed utility lines in their DDCT as part of the proposed disturbance. Lines permitted but not located in the above mentioned routes or a designated corridor will be counted toward the 5 percent disturbance calculation (line disturbance is equal to the anticipated construction footprint or construction ROW width multiplied by length and includes all access roads, staging areas, and other surface disturbance associated with construction outside of the construction ROW). | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |

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| New Electric Distribution Lines (less than 115 kV):<br>New electric distribution lines will be buried where feasible and economically feasible. If not economically feasible, distribution lines may be authorized when effectively designed/mitigated to protect Greater Sage-Grouse and the AO determines that overhead installation is the action alternative with the fewest adverse impacts while still meeting the project need. Agricultural and residential lines will be considered to be adequately mitigated for Greater Sage-Grouse if constructed at least 0.6 miles from the lek perimeter with appropriate timing constraints and constructed to the latest APLIC guidance. These ROW authorizations will be subject to approval by the State Director.<br>Priority Transmission Lines:<br>PHMA are designated as avoidance areas for high voltage transmission line and pipeline ROWs, except for the transmission projects specifically identified below. All authorizations in these areas, other than the following identified projects, must comply with the conservation measures outlined in this proposed plan, including the RDF and avoidance criteria presented Appendix C of this document. The BLM is currently processing an application for Gateway South, Gateway West, and TransWest Express and the NEPA review for these projects is well underway. The BLM is analyzing Greater Sage-Grouse mitigation measures through the project's NEPA review process.<br>Pipelines:<br>New pipelines through PHMA will be allowed: (1) within an RMP corridor currently authorized for that use or designated through future RMP amendments; or (2) constructed in or adjacent to existing utilities (buried and aboveground) or roads. Pipelines constructed in RMP corridors or adjacent to existing utilities or roads will require completion of a DDCT analysis for baseline data collection but the project is not required to meet the threshold of 5 percent. However, within 6 months of the completion of construction, the project proponent will provide the AO with as-built drawings so that total disturbance within core area can be calculated annually. | *(See above.)* | *(See above.)* |

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| The following RMP decisions remain in effect with the modification described above:<br>Casper RMP:<br>No new corridor designations will be made in Bates Hole. When placement of a major ROW facility within a designated corridor is not possible, and for smaller ROW and other linear facilities, placement will be adjacent to existing facilities or disturbances. Cross-country placement of ROW and other linear facilities will be allowed only when placement in a designated corridor or adjacent to an existing facility is not practical or feasible. The extent of all surface disturbances will be minimized.<br>No new corridors will be established in the Sand Hills Management Area; ROWs will be allowed when management objectives for the area can still be achieved.<br>All currently designated corridors will be maintained. All special restrictions that apply to types of use/facilities on the corridors will be removed, except as noted for the Oregon Trail Road ROW Corridor, Segment A. The corridors include 351,020 acres, of which 94,580 acres are federal surface. The widths/size of designated corridors will not change. Special restrictions applying to types of use/facilities on the corridors will be removed on a case-by-case basis. Existing corridors include:<br>1. Oregon Trail Road Corridor, Segment A<br>2. Oregon Trail Road Corridor, Segment B<br>3. Oregon Trail Road Corridor, Segment C<br>4. Poison Spider/Gas Hills Road Corridor<br>5. Highway 20-26 Corridor<br>6. Wyoming Highway 259/U.S. 87 Corridor<br>7. Wyoming Highway 387 Corridor<br>8. Lost Cabin-Arminto Road Corridor<br>9. RMP Change No. 2012-03, including the West-Wide Energy Corridor<br>10. Cabin Creek Corridor<br>11. Existing Oregon Trail Road ROW Corridor, Segment A.<br>Oregon Trail Road ROW Corridor, Segment A allows additional ROW facilities provided they are subsurface, surface, or low profile developments. ROW facilities that introduce visual intrusions on the skyline along the corridor will not be allowed. Special restrictions applying to types of use/facilities on the corridors will be removed on a case- | *(See above.)* | *(See above.)* |

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| by-case basis, and a new corridor, to be called the Cabin Creek Corridor, will be designated.<br>Future Corridor Adjustments and New Corridor Designations:<br>Future corridor adjustments and new corridor designations will be made only when facility placement within an existing designated corridor is incompatible, unfeasible, or impractical and when the environmental consequences can be adequately mitigated. Problems of technical compatibility between facilities and spacing of facilities in corridors will be solved on a case-by-case basis. Special restrictions applying to types of use/facilities on the corridors will be removed on a case-by-case basis.<br>South Bighorns/Red Wall Management Area:<br>No corridors will be designated; however, ROWs will be allowed on a case-by-case basis when management objectives for the area can still be achieved.<br><u>Kemmerer RMP:</u><br>Utility corridors will be designated, based on use (i.e., power lines, pipelines, and fiber optic lines).<br>Preferred utility corridors will be 2 miles wide (width will be determined based on resource values) and designated as follows, but variances will be allowed based on application where conflicts with other resources were minimal or can be mitigated through resource-specific stipulations:<br>High-voltage power line corridors will be established north of and parallel to I-80, and along Wyoming State Highway 89 from the junction of I-80 and the Wyoming state line.<br>Fiber optic and low-voltage power line corridors will be located along currently established road systems (e.g., interstate or state highways and paved county roads).<br><u>Newcastle RMP:</u><br>Utility/transportation systems will be located adjacent to existing utility/transportation systems whenever practical. Areas to be avoided for new facility placement and routes will be identified on a case-by-case basis, rather than attempting to establish utility corridors.<br><u>Pinedale RMP:</u><br>Utility facilities will be restricted to existing routes and designated corridors where practicable, including environmental and socioeconomic considerations. Corridor | *(See above.)* | *(See above.)* |

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| routes include U.S. Highways 189 and 191 and State Highways 189, 191, 350, 351, 352, 353, and 354. New corridors may be established as oil and gas fields are developed.<br>Rawlins RMP:<br>All BLM-administered lands, except WSA and some SD/MAs (including ACEC/Special Interest Areas), will be open to consideration for placement of utility ROW systems. Each utility ROW will be located adjacent to existing facilities, when possible. Areas with important or sensitive resource values will be avoided.<br>Existing major transportation and utility ROW routes will be designated corridors. However, major transportation routes within the planning area that are located east of the Carbon County-Albany County line will not be considered for ROW corridor designation because of the scattered public land ownership pattern in the area. All corridors will be designated for power lines (aboveground and buried), telephone lines, and fiber optic lines.<br>Specific proposals will require site-specific environmental analysis and compliance with established permitting processes.<br>Activities generally excluded from ROW corridors include mineral materials disposal, range and wildlife habitat improvements involving surface disturbance and facility construction, campgrounds, and public recreation facilities and other facilities that will attract public use.<br>ROW facilities will not be placed adjacent to each other if issues with safety or incompatibility or resource conflicts were identified. The designated width, allowable uses, and excluded uses for each corridor may be modified during implementation of the Approved RMP.<br>Green River RMP:<br>Areas designated as utility windows will be preferred locations for future grants. Five windows have been identified: 2 east-west, 3 north-south. Other areas will be considered for rights-of-way on a case-by-case basis. Windows 0.5 miles in width have been identified for the placement of utilities. The northern east-west window will be for underground facilities only, and the southern east-west window will be for both above and below ground facilities. A 0.5-mile wide | *(See above.)* | *(See above.)* |

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| north-south window on the west side of Flaming Gorge, a window south along Highway 430, and a north-south window along the east side of Flaming Gorge have been identified for above and below ground utilities.<br>JMH CAP:<br>The planning area, with the exception of defined exclusion and avoidance areas, will be open to considering grants of rights-of-way if area objectives can be met. Exclusion areas are closed to rights-of-way. Avoidance and special management areas not identified as exclusion areas will be open to consideration only after site-specific analysis demonstrates area objectives can be met (see glossary) in Greater Sage-Grouse potential nesting habitat. | *(See above.)* | *(See above.)* |
| MD LR 4: Within PHMA, specific to management for Greater Sage-Grouse, all RMPs are amended as follows:<br>Maintenance/replacement of existing structures will be allowed subject to valid and existing rights. Upgrades will be considered, subject to mandatory RDFs (Appendix C). Existing guy wires shall be removed or appropriately marked with bird flight diverters to make them more visible to Greater Sage-Grouse in flight. Power lines (distribution and transmission) will be designed to minimize wildlife-related impacts and constructed to the latest APLIC standards.<br>Outside of PHMA the following RMP decisions remain in effect:<br>Kemmerer RMP:<br>New utility lines will be buried or BLM-approved anti-perch devices will be installed on all new utility lines within sagebrush and/or semiarid shrub-dominated habitats, unless NEPA analysis shows little or no impact without burial or modification. | No changes made. | No change proposed. |
| MD LR 5: Within PHMA where existing authorizations, ROWs, or SUAs have had some level of development (e.g., road, fence, and well) and are expired and are no longer in use, the site will be reclaimed by removing these features and restoring the habitat. Power lines (distribution and transmission) will be designed to minimize wildlife-related impacts and constructed to the latest APLIC standards. | No changes made. | No change proposed. |

| 2015 Approved RMPAs | 2019 Approved RMPAs | Potential Change in 2023 Plan |
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| MD LR 6: Within PHMA, specific to management for Greater Sage-Grouse, all RMPs are amended as follows:<br>The use of guy wires for MET tower supports will be avoided within PHMA. All existing and any new unavoidable guy wires shall be marked with recommended bird deterrent devices.<br>The siting of new temporary MET towers within PHMA will be avoided within 2 miles of occupied Greater Sage-Grouse leks, unless they are out of the direct line of sight of the occupied lek.<br>Outside of PHMA, the following RMP decisions remain in effect:<br><u>Kemmerer RMP:</u><br>New MET towers will be avoided within 1 mile of occupied sagebrush obligate habitats, unless anti-perch devices are installed. MET towers relying on guy wires for support will be prohibited in these habitats. Exceptions can be made if NEPA analysis shows little or no impact on sagebrush obligate species.<br><u>Rawlins RMP:</u><br>MET towers will be authorized on a case-by-case basis from 0.25 miles to 1 mile of an occupied Greater Sage-Grouse and sharp-tailed grouse lek. | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |
| MD LR 7: Within PHMA and GHMA, specific to management for Greater Sage-Grouse, all RMPs are amended as follows:<br>Lands classified as PHMA for Greater Sage-Grouse will be retained in federal management unless: (1) the agency can demonstrate that disposal of the lands, including land exchanges, that disposal of the parcel is in the public's best interest or (2) the agency can demonstrate that the disposal of the lands, including land exchanges, will have no direct or indirect adverse impact on conservation of the Greater Sage-Grouse. Exceptions will be considered where there is mixed ownership and land exchanges will allow for additional or more contiguous federal ownership patterns within PHMA. For PHMA with minority federal ownership, an additional, effective mitigation agreement will be included for any disposal of federal land. As a final preservation measure, consideration shall be given to pursuing a permanent conservation easement.<br>For lands in GHMA that are identified for disposal, the BLM will only dispose of such | No changes made. | No change proposed. |

| 2015 Approved RMPAs | 2019 Approved RMPAs | Potential Change in 2023 Plan |
|---|---|---|
| lands consistent with the goals and objectives of this plan, including, but not limited to, the RMP goal to conserve, recover, and enhance Greater Sage-Grouse habitat on a landscape scale.<br>For values other than Greater Sage-Grouse, the following RMP decisions remain in effect with the modification described above:<br><u>Casper RMP:</u><br>224,830 acres of public lands are identified as potentially suitable for disposal. At the implementation stage, site-specific analysis with public participation will be conducted. Based on the analysis and public comments received, a determination will be made on whether disposal of the parcel is in the public's best interest. If it is not in the public's best interest, the parcel will be retained in public ownership.<br>Restricted Disposal – dispose of 5,450 acres on a restricted basis.<br>Allow land-use authorizations under FLPMA Section 302(b) leases and permits to meet public demand.<br>Evaluate on a case-by-case basis as proposals are presented. Potential lease and permit areas may include, but are not limited to the following:<br>• Areas where there are documented or existing trespass facilities that can be resolved by an authorization under this section<br>• Areas along major highways where developments may facilitate public needs<br>• Areas in or adjacent to residential, agricultural, commercial, or industrial developments. The BLM will pursue acquisition of lands and interest in lands in the South Bighorns/Red Wall area. | *(See above.)* | *(See above.)* |

| 2015 Approved RMPAs | 2019 Approved RMPAs | Potential Change in 2023 Plan |
|---|---|---|
| MD LR 8: Within PHMA and GHMA, specific to management for Greater Sage-Grouse, all RMPs are amended as follows:<br>Areas where acquisitions (including subsurface mineral rights) or conservation easements will benefit Greater Sage-Grouse habitat will be identified.<br>Outside of PHMA and GHMA, and/or for values other than Greater Sage-Grouse, the following RMP decisions remain in effect with the modification described above:<br>Casper RMP:<br>The BLM will pursue acquisition of lands and interest in lands in the Bolton Creek Drainage and Bates Creek areas. | No changes made. | No change proposed. |
| MD LR 9: Greater Sage-Grouse habitat requirements will be utilized to prioritize parcels for exchange or acquisition within PHMA. | No changes made. | No change proposed. |
| MD LR 10: Within PHMA, non-mineral withdrawals will be evaluated to determine if the withdrawal action is consistent with Greater Sage-Grouse conservation. | No changes made. | No change proposed. |
| MD REC 1: Specific to management for Greater Sage-Grouse or PHMA, all RMPs are amended as follows:<br>BLM Special Recreation Permits will be allowed in PHMA, unless negative impacts on Greater Sage-Grouse cannot be adequately mitigated.<br>Outside of PHMA and/or for values other than Greater Sage-Grouse, the following RMP decisions remain in effect with the modification described above:<br>Casper RMP:<br>The entire planning area will remain open to dispersed recreation. The camping limit on public lands is set by BLM policy and is currently limited to 14 days. Emphasis will be placed on providing interpretive and information signs and materials for public land visitors, maintaining existing facilities to a high standard consistent with the recreational setting, and limiting development of additional facilities to those areas where public recreational use of surrounding public lands requires. Work with state, local groups, and adjacent landowners will be conducted to identify and develop recreational trails, both motorized and nonmotorized, when the opportunities presents themselves. Special Recreation Permits will be allowed for commercial, noncommercial, and competitive | No changes made. | No change proposed. |

| 2015 Approved RMPAs | 2019 Approved RMPAs | Potential Change in 2023 Plan |
|---|---|---|
| events on a case-by-case basis. Cooperation will be maintained with a variety of user groups, especially in the local area, to provide diverse recreational opportunities for enjoyment of public lands. BLM will pursue acquisition of lands and interest in lands in the Rattlesnake Range and Pine Ridge areas, as well as promote and support recreation-based tourism.<br>Kemmerer RMP:<br>Allow dispersed recreation and permit special recreational activities (e.g., outfitting and guiding permits and OHV events permitted on an annual basis after evaluation).<br>Green River RMP:<br>Special recreation permits will be considered on a case-by-case basis. Appropriate mitigation will be included in special recreation permits, commercial recreation uses, and major competitive recreation events to provide resource protection and public safety.<br>JMH CAP:<br>Special recreation use permits for managed activities that occur in the JMH CAP planning area will be reviewed and subject to recommendations made by the Rock Springs Field Office. This will allow the Rock Springs Field Office to track the amount, location, and timing of organized activity occurring within the planning area to monitor resource pressure. The permit evaluation process will consider the nature of the event, potential impacts on resources, conflicts with other events, and impacts on the quality of other visitors' experiences. Mitigation measures necessary to protect the resources will be included in any permit issued. A plan of operation will be required for all commercial recreational operators and outfitters. The plan will describe the type, extent, and location of the recreation use and the mechanisms by which the operator/outfitter will prevent impacts on environmental resources. Any requests in special recreation use permit applications to remove natural resources will be evaluated on a case-by-case basis after an environmental analysis process. | *(See above.)* | *(See above.)* |

| 2015 Approved RMPAs | 2019 Approved RMPAs | Potential Change in 2023 Plan |
|---|---|---|
| MD REC 2: Construction of recreation facilities within PHMA must conform with the avoidance and minimization measures of this plan. If it is determined that these conservation measures are inadequate for the conservation of Greater Sage-Grouse, the BLM will consider and ensure compensatory mitigation that provides a net conservation gain to the species. | Construction of recreation facilities within PHMA must conform to the avoidance and minimization measures of this plan. If it is determined that these conservation measures are inadequate for the conservation of Greater Sage-Grouse, the BLM will consider mitigation consistent with the applicable State management strategy (currently Governor of Wyoming's Executive Order 2015-4 (see also MD SSS 4). | Potential change under Alternatives 3, 4, 5, and 6. |
| MD TTM 1: Specific to management for Greater Sage-Grouse, all RMPs are amended as follows:<br>Within PHMA, designate the non-sand dune portions of the following OHV Open Areas as OHV Limited Area. The OHV limitation will ultimately be to "Designated Routes" as determined through a subsequent implementation/activity level Travel Management Plan. In the interim, motorized use on existing routes may occur; however, no new routes may be created without specific authorization: Rawlins Field Office: Dune Pond Cooperative Management Area. Rock Springs Field Office: Portion of the Greater Sand Dunes Recreation Area.<br>The following RMP decisions remain in effect: The Casper Field Office Poison Spider OHV Park (290 acres) will remain as an "open" OHV area. | No changes made. | No change proposed. |

| 2015 Approved RMPAs | 2019 Approved RMPAs | Potential Change in 2023 Plan |
|---|---|---|
| MD TTM 2: Within PHMA and GHMA, all motorized use (of which OHVs are a subset) will be limited to designated routes. Route designations will occur in subsequent implementation/activity level Travel Management Plans. In the interim motorized use on existing routes may occur; however, no new routes may be created without specific authorization. In PHMA and GHMA, temporary closures will be considered in accordance with 43 CFR subpart 8364 (Closures and Restrictions); 43 CFR subpart 8351 (Designated National Area); 43 CFR subpart 6302 (Use of Wilderness Areas, Prohibited Acts, and Penalties); 43 CFR subpart 8341 (Conditions of Use). Temporary closure or restriction orders under these authorities are enacted at the discretion of the AO to resolve management conflicts and protect persons, property, and public lands and resources. Where an AO determines that off-highway vehicles are causing or will cause considerable adverse effects upon soil, vegetation, wildlife, wildlife habitat, cultural resources, historical resources, threatened or endangered species, wilderness suitability, other authorized uses, or other resources, the affected areas shall be immediately closed to the type(s) of vehicle causing the adverse effect until the adverse effects are eliminated and measures implemented to prevent recurrence. (43 CFR 8341.2) A closure or restriction order shall be considered only after other management strategies and alternatives have been explored. The duration of temporary closure or restriction orders shall be limited to 24 months or less; however, certain situations may require longer closures and/or iterative temporary closures. This may include closure of routes or areas. | No changes made. | Potential change under Alternatives 4, 5, and 6. |
| MD TTM 3: New local or collector roads (as defined in BLM Manual 9113) will be avoided within 1.9 miles of the perimeter of occupied Greater Sage-Grouse leks within PHMA. All new roads will be prohibited within 0.6 miles of the perimeter of occupied Greater Sage-Grouse leks within PHMA. | No changes made. | No change proposed. |

| 2015 Approved RMPAs | 2019 Approved RMPAs | Potential Change in 2023 Plan |
|---|---|---|
| MD TTM 4: Within PHMA, no upgrading of existing routes that will change route category or capacity will be allowed unless the upgrading will have minimal impact on Greater Sage-Grouse in PHMA, was necessary for motorist safety, or eliminated the need to construct a new road. | No changes made. | No change proposed. |
| MD TTM 5: In PHMA, existing roads or realignments will be used to access valid existing rights that are not yet developed. If valid existing rights cannot be accessed via existing roads, any new road will be constructed to the absolute minimum standard necessary, and the surface disturbance will be added to the total disturbance in the PHMA. | No changes made. | No change proposed. |

| 2015 Approved RMPAs | 2019 Approved RMPAs | Potential Change in 2023 Plan |
|---|---|---|
| MD TTM 6: Specific to management for Greater Sage-Grouse or PHMA, all RMPs are amended as follows:<br>For roads, primitive roads and trails not designated in travel management plans within PHMA, natural reclamation of roads and trails will be allowed in appropriate situations where additional resource damage is not foreseeable.<br>This will include primitive route/roads that were not designated in wilderness study areas and within lands with wilderness characteristics that have been selected to be managed to retain those characteristics for protection.<br>In PHMA, locate new roads that will have relatively high levels of activity (accessing multiple wells, housing development) greater than 1.9 miles from the perimeter of occupied Greater Sage-Grouse leks. Locate new other roads used to provide facility site access and maintenance >0.6 miles from the perimeter of occupied Greater Sage-Grouse leks.<br>Outside of PHMA and/or for values other than Greater Sage-Grouse, the following RMP decisions remain in effect with the modification described above:<br>Kemmerer RMP:<br>Roads and two-track routes determined to be unauthorized or redundant and unnecessary for resource management purposes will be reclaimed to achieve surrounding native conditions.<br>Rawlins RMP:<br>Roads or trails that are eroding beyond a reasonable level will be fixed or closed. JMH CAP:<br>Transportation planning will provide for access to achieve multiple-use goals while providing maximum protection for crucial habitats and sensitive resources and will consider:<br>Closing and rehabilitating unused roads and trails and those causing resource damage. This will be subject to county review of existing rights-of-way needs. | No changes made. | No change proposed. |
| MD TTM 7: Within PHMA, when reseeding roads and trails, appropriate seed mixtures will be used and the use of transplanted sagebrush will be considered. | No changes made. | No change proposed. |

| 2015 Approved RMPAs | 2019 Approved RMPAs | Potential Change in 2023 Plan |
|---|---|---|
| MD Special Designations and Other Management Areas: New Greater Sage-Grouse conservation ACECs will not be designated. | No changes made. | Potential change under Alternatives 3 and 6. |

[From Tables A-2 through A-5 in Appendix A from the 2019 Wyoming Greater Sage-Grouse ARMPA]:

**Table 2. Seasonal Habitat Objectives for GRSG**

| Attribute | Indicators | Desired Condition[6] | Reference |
|---|---|---|---|
| **Breeding and Nesting (Seasonal Use Period March 1–June 15** (Doherty 2008; Holloran and Anderson 2005) | | | |
| Lek Security | Proximity of trees | Trees absent or uncommon shrub/grassland ecological sites within 1.8 miles (approximately 3 kilometers) of occupied leks | Baruch-Mordo et al. 2013; Stiver et al. 2015 |
| | Proximity of sagebrush to leks | Adjacent protective sagebrush cover within 330 feet (approximately 100 meters) of an occupied lek | Stiver et al. 2015 |
| Cover | % of seasonal habitat meeting desired conditions | >80% of the nesting habitat meets the recommended vegetation characteristics, where appropriate (relative to ecological site potential, etc.). | Connelly et al. 2000 |
| | Sagebrush cover[2] | 5 to 25% | Connelly et al. 2000; Connelly et al. 2003; Hagen et al. 2007 |
| | Sagebrush height<br>Arid sites[3]<br>Mesic sites[4] | <br>4–31 inches (10–80 centimeters)<br>12–31 inches (30–80 centimeters) | Connelly et al. 2000 |
| | Predominant sagebrush shape | Predominantly spreading shape[5] | Stiver et al. 2015 |
| | Perennial grass cover (such as native bunchgrass)[2]<br>Arid sites[3]<br>Mesic sites[4] | <br>>10%<br>>15%<br>Cool-season bunchgrasses preferred | Connelly et al. 2000; Stiver et al. 2015; Cagney et al. 2010 |
| | Perennial grass and forb height (including residual grasses) | Adequate nesting cover ~~of >7" or~~ **would be** as determined by ESD site potential ~~and~~ **or best available science in consideration of** local variability. | Connelly et al. 2000; Connelly et al. 2003; Doherty et al. 2014; Hagen et al. 2007; Stiver et al. 2015 |
| | Perennial forb cover[2]<br>Arid sites[3]<br>Mesic sites[4] | <br>>5%<br>>10% | Connelly, J. W., M. A. Schroeder, A. R. Sands, and C. E. Braun 2000. |

| Attribute | Indicators | Desired Condition[6] | Reference |
|---|---|---|---|
| **Brood-Rearing/Summer[1] (Seasonal Use Period June 16–October 31)** | | | |
| Cover | % of seasonal habitat meeting desired condition | >40% of the summer/brood habitat meets recommended brood habitat characteristics where appropriate (relative to ecological site potential, etc.) | Connelly et al. 2000 |
| | Sagebrush cover[2] | 5–25% | Connelly et al. 2000 |
| | Sagebrush height | 4–32 inches (20.3–80 centimeters) | Connelly et al. 2000 |
| | Perennial grass cover and forbs[2] | >5% arid sites<br>>10% mesic sites | Connelly et al. 2000 |
| | Riparian areas/mesic meadows[2] | Proper functioning condition | Preferred forbs are listed in Stiver et al. 2015 |
| | Upland and riparian perennial forb availability | Preferred forbs are common with several preferred species present | Stiver et al. 2015 |
| **Winter (Seasonal Use Period November 1–February 28)** | | | |
| Cover and Food | % of seasonal habitat meeting desired conditions | >80% of the wintering habitat meets winter habitat characteristics where appropriate (relative to ecological site, etc.). | Connelly et al. 2000 |
| | Sagebrush cover above snow[2] | >5% | Connelly et al. 2000; Stiver et al. 2015 |
| | Sagebrush height above snow | >10 inches (>25 centimeters) | Connelly et al. 2000 |

Notes:

1 Where credible data support different seasonal dates than those identified, dates may be shifted, but the amount of days cannot be shortened or lengthened by the local unit.

2 Absolute cover is the actual recorded cover and can exceed 100% when recorded across all species and all layers. It is not relative cover, which is the proportions of each species, and equals 100%. Note that cover is reported for only those species (e.g., sagebrush and preferred forbs) that are sampled to determine suitability of habitat for Greater Sage-Grouse. Overall cover at the site will be greater than that sampled for Greater Sage-Grouse habitat, due to other species present. 3 Arid corresponds to the 10-12-inch precipitation zone; *Artemisia tridentata wyomingensis* is a common big sagebrush subspecies for this type site (Stiver et al. 2015).

4 Mesic corresponds to the ≥12-inch precipitation zone; *Artemisia tridentata vaseyana* is a common big sagebrush subspecies for this type site (Stiver et al. 2015).

5 Collectively, the indicators for sagebrush (cover, height, and shape), perennial grass, and perennial forb (cover, height, and/or availability) represent the desired condition range for nesting/early brood-rearing habitat characteristics, consistent with the breeding habitat suitability matrix identified in Stiver et al. 2015. Sagebrush plants that are more tree or columnar shaped provide less protective cover near the ground than sagebrush plants with a spreading shape (Stiver et al. 2015). Some sagebrush plants are naturally columnar (e.g., Great Basin big sagebrush) and a natural part of the plant community; however, a predominance of columnar shape arising from animal impacts may warrant management investigation or adjustments at site-specific scales.

6 All desired conditions will be dependent upon site capability and local variation (e.g., weather patterns, localized drought, and ESD state).

### 2.16.2 Relevant Appendices

The following table shows which appendices from the 2015 and 2019 plans have management direction that may change through this RMP amendment. If 2019 is not listed in the year, then no change was made to the appendix between the 2015 and 2019 plans. The appendices can be found on the Wyoming GRSG ePlanning website.

| ARMPA Appendix Name | Year | Potential for Change in 2023 Plan |
|---|---|---|
| A: Approved RMP Amendment Maps | 2015 | Yes |
| A: Approved RMP Amendment with Management Goals, Objectives, and Decisions | 2019 | Yes |
| B: Fluid Mineral Stipulations | 2015 | Yes |
| C: Required Design Features | 2015 | Yes |
| B: Required Design Features | 2019 | Yes |
| D: The Greater Sage-Grouse Habitat Management Strategy | 2015 | Yes |
| C: Greater Sage-Grouse Habitat Management Strategy | 2019 | Yes |
| E: Federal Laws, Regulations, Policies, and Guidance | 2015 | No |
| F: Mitigation Guidelines for Surface-Disturbing and Disruptive Activities on Wyoming BLM Lands | 2015 | No |
| G: Federal Oil and Gas Operations on Split Estate Lands | 2015 | No |
| H: Wyoming Game and Fish Department Protocols for Treating Sagebrush in Greater Sage-Grouse Habitat | 2015 | No |
| I: Areas of Critical Environmental Concern Criteria | 2015 | No |
| J: Disturbance Density Calculation Tool Manual | 2015 | No |
| K: Biological Assessment and U.S. Fish and Wildlife Service Concurrence Letter | 2015 | No |
| L: Greater Sage-Grouse Wildfire and Invasive Species Habitat Assessment | 2015 | No |
| M: Reclamation Plan | 2015 | No |
| N: Predator Management | 2015 | Yes |

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# Appendix 2.17
# Buffalo, Wyoming RMP Revisions

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## 2.17 BUFFALO, WYOMING RMP REVISIONS

This appendix presents the approved RMP revision language from the record of decision for the Buffalo RMP that relate to GRSG management. The table below notes which goals, objectives, appendices, and management decisions/actions have a to change as a result of the current planning effort and if so, under which alternatives changes are being considered. Note that any references to tables and appendices are to those applicable RMP appendices that are listed in **Section 2.17.2** of this appendix.

### 2.17.1 Existing GRSG RMP Management – Buffalo RMP Revisions

**Table 1. Summary of Goals, Objectives, and Management Actions to the Buffalo RMP**

| 2014/2015 Approved RMPs | 2019 Approved RMPs | Potential Change in 2023 Plan |
|---|---|---|
| MG BR:10: Distribution and abundance of all special status species are optimized. | No changes made. | No change proposed. |
| MO BR:10.1: Maintain or enhance special status species plant communities and habitats. | No changes made. | No change proposed. |
| MO:10.2: Manage BLM-administered lands to maintain or restore populations and habitat consistent with conservation requirements for special status species. | No changes made. | No change proposed. |
| MO:10.3: Develop effective conservation and cooperative management plans, strategies, and agreements with stakeholders. | No changes made. | No change proposed. |
| MG BR:11: Sustainable sagebrush habitats that provide the quantity, quality, and connectivity that is necessary to maintain sustainable populations of Greater Sage-Grouse and other special status species. | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |
| MO BR:11.1: Maintain large patches of high quality interconnected sagebrush habitats, with emphasis on patches occupied by Greater Sage-Grouse. | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |
| MO BR:11.2: Maintain connectivity between and within sagebrush habitats with emphasis on communities occupied by Greater Sage-Grouse. | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |
| MO BR:11.3: In all PHMA, the desired condition is to maintain all lands ecologically capable of producing sagebrush (but no less than 70%) with a minimum of 15% sagebrush cover or as consistent with specific ecological site conditions. The attributes necessary to sustain these habitats are described in Interpreting Indicators of Rangeland Health (BLM Tech Ref 1734-6). | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |
| MG BR:12: Successful restoration and rehabilitation of potential Greater Sage-Grouse habitat across the planning area. | No changes made. | No change proposed. |
| MO BR:12.1: Reestablish sagebrush corridors, where feasible, between Greater Sage-Grouse occupied habitats. | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |

| 2014/2015 Approved RMPs | 2019 Approved RMPs | Potential Change in 2023 Plan |
|---|---|---|
| MO BR:12.2: Reconnect large patches of sagebrush habitat with emphasis on reconnecting patches occupied by stronghold and isolated populations of Greater Sage-Grouse. | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |
| MD SS WL-4001: Utilize current research, management and conservation plans, and similar related documents to guide special status species habitat management. | No changes made. | No change proposed. |
| MD SS WL-4002: Implement actions set forth in recovery plans, conservation measures, terms and conditions, protection measures, and appropriate BMPs and reasonable and prudent measures within biological opinions for Threatened and/or Endangered wildlife species, including those specific to this RMP and any future statewide programmatic biological opinions. | No changes made. | No change proposed. |
| MD SS WL-4003: Maintain (size and quality) or enhance current habitat utilized by special status species. Enlarge/restore habitat on a site-specific basis. | No changes made. | No change proposed. |
| MD SS WL-4004: Maintain or enhance the integrity of identified special status wildlife species migration corridors. Manage identified special status wildlife species travel corridors consistent with other resource values. | No changes made. | No change proposed. |
| MD SS WL-4005: Locate and manage facilities to mitigate noise impacts on special status species. | No changes made. | No change proposed. |
| MD SS WL-4006: Manage surface-disturbing and disruptive activities to mitigate impacts on special status wildlife species and their habitats. | No changes made. | No change proposed. |
| MD SS WL-4007: Apply a CSU stipulation to fluid mineral leases containing special status species habitat. Surveys required for clearance. | No changes made. | Potential change under Alternative 3. |

| 2014/2015 Approved RMPs | 2019 Approved RMPs | Potential Change in 2023 Plan |
|---|---|---|
| *MD SS WL-4010: The BLM will coordinate new recommendations, mitigation, and Greater Sage-Grouse habitat objectives and management considerations with the WGFD and other appropriate agencies, local government cooperators, and the Wyoming SGIT. These measures will be analyzed in site-specific NEPA documents, as necessary.<br>The Greater Sage-Grouse adaptive management plan (Appendix D (p. 325)) provides regulatory assurance that unintended negative impacts to Greater Sage-Grouse habitat will be addressed before consequences become severe or irreversible. Projects requiring an EIS shall develop adaptive management strategies in support of the population management objectives for Greater Sage-Grouse set by the State of Wyoming (State of WY EO 2015-4). Adaptive management triggers are essential for identifying when potential management changes are needed in order to continue meeting Greater Sage-Grouse conservation objectives.<br>With respect to Greater Sage-Grouse, all regulatory entities in Wyoming, including the BLM, use soft and hard triggers. Soft and hard triggers are focused on three metrics: (1) number of active leks, (2) acres of available habitat, and (3) population trends based on annual lek counts.<br>**Soft Triggers Response**: Soft triggers require immediate monitoring and surveillance to determine causal factors and may require curtailment of activities in the short- or long-term, as allowed by law. The project level adaptive management strategies will identify appropriate responses where the project's activities are identified as the causal factor. The management agency (BLM) and the Adaptive Management Working Group will implement an appropriate response strategy to address causal factors not attributable to a specific project or to make adjustments at a larger regional or statewide level.<br>**Hard Trigger Response**: Upon determination that a hard trigger has been tripped, the BLM will immediately defer issuance of discretionary authorizations for new actions within the Biologically Significant Unit for a period of 90 days. In addition, | The BLM will coordinate new recommendations, mitigation, and Greater Sage-Grouse habitat objectives and management considerations with the WGFD and other appropriate agencies, local government cooperators, and the Wyoming Sage-Grouse Implementation Team. These measures will be analyzed in site-specific NEPA documents, as necessary.<br>The Greater Sage-Grouse adaptive management plan (2019 Wyoming GrSG ARMPA Appendix C) provides regulatory assurance that unintended negative impacts to Greater Sage-Grouse habitat will be addressed before consequences become severe or irreversible. Projects requiring an EIS shall develop adaptive management strategies in support of the population management objectives for Greater Sage-Grouse set by the State of Wyoming (State of WY EO 2015-4). Adaptive management triggers are essential for identifying when potential management changes are needed in order to continue meeting Greater Sage-Grouse conservation objectives.<br>With respect to Greater Sage-Grouse, all regulatory entities in Wyoming, including the BLM, use soft and hard triggers. Soft and hard triggers are focused on three metrics: (1) number of active leks, (2) acres of available habitat, and (3) population trends based on annual lek counts.<br><u>Soft Triggers Response</u>:<br>Soft triggers require immediate monitoring and surveillance to determine causal factors and may require curtailment of activities in the short- or long-term, as allowed by law. The project level adaptive management strategies will identify appropriate responses where the project's activities are identified as the causal factor. The management agency (BLM) and the Adaptive Management Working Group will implement an appropriate response strategy to address causal factors not attributable to a specific project or to make adjustments at a larger regional or statewide level.<br><u>Hard Trigger Response</u>:<br>Upon determination that a hard trigger has been tripped, the BLM will immediately defer issuance of discretionary authorizations for new actions within the Biologically Significant Unit for a period of 90 days. In addition, | Potential change under Alternatives 3, 4, 5, and 6. |

| 2014/2015 Approved RMPs | 2019 Approved RMPs | Potential Change in 2023 Plan |
|---|---|---|
| within 14 days of a determination that a hard trigger has been tripped, the Adaptive Management Working Group will convene to develop an interim response strategy and initiate an assessment to determine the causal factor or factors (hereafter called the causal factor assessment). | within 14 days of a determination that a hard trigger has been tripped, the Adaptive Management Working Group will convene to develop an interim response strategy and initiate an assessment to determine the causal factor or factors (hereafter called the causal factor assessment).<br>The Adaptive Management Working Group would define a process to review and reverse adaptive management actions once the identified causal factor is resolved (e.g., returning to previous management once objectives of interim management strategy have been met). | *(See above.)* |
| MD SS WL-4011: Develop avoidance areas restricting the application of broad-spectrum pesticides in areas containing Greater Sage-Grouse nesting and brood-rearing habitats. | No changes made. | No change proposed. |
| MD SS WL-4012: Restore Greater Sage-Grouse brood-rearing habitats in wetland/riparian areas. Maintain seeps, springs, wet meadows, and riparian vegetation in a functional and diverse condition for young Greater Sage-Grouse and other species that depend on forbs and insects associated with these areas. | No changes made. | No change proposed. |

| 2014/2015 Approved RMPs | 2019 Approved RMPs | Potential Change in 2023 Plan |
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| **MD SS WL-4013: Manage vegetation composition, diversity and structure, as determined by ecological site description and WGFD protocol, to achieve Greater Sage-Grouse habitat management objectives, in cooperation with stakeholders.<br>Vegetation treatments in nesting and wintering habitat that would reduce sagebrush canopy cover to less than 15% would not be conducted unless it can be shown to be beneficial to Greater Sage-Grouse habitat and removal of sagebrush canopy cover below 15% will be subject to the DDCT.<br>For vegetation treatments in sagebrush within PHMAs, refer to Appendix A, WGFD Protocols for Treating Sagebrush to Benefit Sage-Grouse (WGFD 2011, as updated). These recommended protocols, subject to seasonal conditions of approval, would be used in determining whether proposed treatment constitutes a "disturbance" that would contribute toward the 5% threshold for habitat maintenance.<br>Additionally, these protocols would be used to determine whether the proposed treatment configuration would be expected to have neutral or beneficial impacts for PHMA (core only) populations or if they represent additional habitat loss or fragmentation. Treatments to enhance sagebrush/grasslands habitat for Greater Sage-Grouse would be evaluated based upon habitat quality and the functionality/use of treated habitats post-treatment.<br>The BLM would work collaboratively with partners at the state and local level to maintain and enhance Greater Sage-Grouse habitats. Seasonal restrictions would be applied, as needed, for implementing fuels management treatments according to the type of seasonal habitat present.<br>Wildland fire burns will be treated as disturbance if sagebrush is reduced below 5% canopy cover, unless there is an implementation plan outlining restoration efforts and 3 years of data showing a trend back to suitable habitat. Burned areas within PHMAs would be restored to suitable habitat with consideration given to ESDs, reference sites, site potential and local variability. | Manage vegetation composition, diversity and structure, as determined by ecological site description and WGFD protocols, to achieve Greater Sage-Grouse habitat management objectives, in cooperation with stakeholders.<br>Vegetation treatments in nesting and wintering habitat that would reduce sagebrush canopy cover to less than 15% would not be conducted unless it can be shown to be beneficial to sage-grouse habitat and removal of sagebrush canopy cover below 15% will be subject to the DDCT.<br>For vegetation treatments in sagebrush within PHMAs, refer to 2015 Buffalo RMP Appendix A, WGFD Protocols for Treating Sagebrush to Benefit Sage-Grouse (WGFD 2015, as updated). These recommended protocols, subject to seasonal conditions of approval, would be used in determining whether proposed treatment constitutes a "disturbance" that would contribute toward the 5% threshold for habitat maintenance.<br>Additionally, these protocols would be used to determine whether the proposed treatment configuration would be expected to have neutral or beneficial impacts for PHMA (core only) populations or if they represent additional habitat loss or fragmentation. Treatments to enhance sagebrush/grasslands habitat for sage-grouse would be evaluated based upon habitat quality and the functionality/use of treated habitats post-treatment.<br>The BLM would work collaboratively with partners at the state and local level to maintain and enhance sage-grouse habitats. Seasonal restrictions would be applied, as needed, for implementing fuels management treatments according to the type of seasonal habitat present.<br>Wildland fire burns will be treated as disturbance if sagebrush is reduced below 5% canopy cover, unless there is an implementation plan outlining restoration efforts and 3 years of data showing a trend back to suitable habitat. Burned areas within PHMAs would be restored to suitable habitat with consideration given to ESDs, reference sites, site potential and local variability. | Potential change under Alternatives 3, 4, 5, and 6. |

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| MD SS WL-4014: Minimize disturbances that would result in alterations to springs and riparian Greater Sage-Grouse habitat. In coordination with stakeholders, develop alternative water sources to replace natural sources that have been affected or destroyed. | No changes made. | No change proposed. |
| MD SS WL-4015: Manage stored water to control mosquitoes and prevent the spread of WNv to Greater Sage-Grouse. | No changes made. | No change proposed. |
| MD SS WL-4016: Design water facilities with protective features to reduce mortality of Greater Sage-Grouse from drowning or entrapment. | No changes made. | No change proposed. |
| MD SS WL-4017: Design and locate fences to reduce impacts to important Greater Sage-Grouse habitat. | No changes made. | No change proposed. |
| MD SS WL-4018: Use the Fire Management Plan to incorporate the most current sagebrush habitat information and to guide fire suppression priorities in sagebrush habitats. | No changes made. | No change proposed. |
| MD SS WL-4019: Remove conifers where they have encroached upon Greater Sage-Grouse habitat in cooperation with stakeholders. Reduce the density of conifers that have encroached into, but do not yet dominate sagebrush plant communities. | No changes made. | No change proposed. |
| MD SS WL-4020: Inventory, record, and report existing type and condition of BLM fences. Prioritize areas and annually implement modifications to existing fences to reduce hazards to flying Greater Sage-Grouse, in cooperation with stakeholders. All new fences, in priority areas, will be properly designed and located to avoid hazards to flying Greater Sage-Grouse. | No changes made. | No change proposed. |
| MD SS WL-4021: Avoid renewable energy (solar and wind) projects in Greater Sage-Grouse Core Population Areas unless it can be demonstrated that the activity would not result in declines of core Greater Sage-Grouse populations. Sufficient demonstration of "no declines" should be coordinated with the WGFD and USFWS. | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |

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| **MD SS WL-4022: Powerlines (distribution and transmission) will be designed to minimize wildlife related impacts. This action includes but is not limited to:<br>• Avoid areas of high avian use such as water bodies (including ponds, lakes, rivers, streams and wetlands), ridge tops, prairie dog colonies, Greater Sage-Grouse Core Population and Core Population Connectivity Corridors, and sharp-tailed grouse leks (PRB Final EIS, EO 2011-05).<br>• Prohibit above ground distribution powerlines unless identified in an approved distribution plan.<br>• PHMA:<br>o New transmission lines greater than 115 kV in PHMA (core only) would be allowed only: (1) when located within 0.5 mile or less of an existing 115 kV or greater transmission line or constructed prior to 2008; or (2) in designated<br>RMP corridors authorized for aboveground transmission lines. Transmission lines routed using one or more of the two criteria listed above will not be counted against the DDCT 5% disturbance cap.<br>New transmission lines greater than 115 kV proposed outside of these areas would be considered where it can be demonstrated that declines in Greater Sage-Grouse populations could be avoided through project design and/or mitigation. These projects will be subject to the density and disturbance restrictions for PHMA. Construction of new transmission lines will adhere to the restrictions associated with conducting activities within PHMAs. Review of transmission line proposals would incorporate the Framework for Sage-grouse Impacts Analysis for Interstate Transmission Lines and other appropriate documents consistent with the three routing criteria described above.<br>o New electric distribution lines (less than 115 kV) would be buried where feasible and economically feasible. If not economically feasible, distribution lines may be authorized when effectively designed/mitigated to protect Greater Sage-Grouse and the authorized officer determines that overhead installation is the action alternative with the fewest | Powerlines (distribution and transmission) will be designed to minimize wildlife related impacts. This action includes but is not limited to:<br>• Avoid areas of high avian use such as water bodies (including ponds, lakes, rivers, streams and wetlands), ridge tops, prairie dog colonies, Greater Sage-Grouse Core Population and Core Population Connectivity Corridors, and sharp-tailed grouse leks (PRB Final EIS, EO 2015-4).<br>• Prohibit above ground distribution powerlines unless identified in an approved distribution plan.<br>• PHMA:<br>o New transmission lines greater than 115 kV in PHMA (core only) would be allowed only: (1) when located within 0.5 mile or less of an existing 115 kV or greater transmission line or constructed prior to 2008; or (2) in designated RMP corridors authorized for aboveground transmission lines. Transmission lines routed using one or more of the two criteria listed above will not be counted against the DDCT 5% disturbance cap.<br>New transmission lines greater than 115 kV proposed outside of these areas would be considered where it can be demonstrated that declines in Greater Sage-Grouse populations could be avoided through project design and/or mitigation. These projects will be subject to the density and disturbance restrictions for PHMA. Construction of new transmission lines will adhere to the restrictions associated with conducting activities within PHMAs. Review of transmission line proposals would incorporate the Framework for Sage-grouse Impacts Analysis for Interstate Transmission Lines and other appropriate documents consistent with the three routing criteria described above.<br>o New electric distribution lines (less than 115 kV) would be buried where feasible and economically feasible. If not economically feasible, distribution lines may be authorized when effectively designed/mitigated to protect Greater Sage-Grouse and the authorized officer determines that overhead installation is the action alternative with the fewest | Potential change under Alternatives 3, 4, 5, and 6. |

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| adverse impacts while still meeting the project need. Agricultural and residential lines will be considered to be adequately mitigated for Greater Sage-Grouse if constructed at least 0.6 mile from the lek perimeter with appropriate timing constraints and constructed to the latest APLIC guidance. These ROW authorizations will be subject to approval by the State Director.<br>Within GHMA: Within general Greater Sage-Grouse habitat (outside core population and connectivity areas) overhead<br>• powerlines will be located at least 0.5 mile from occupied Greater Sage-Grouse leks (modified from PRB Final EIS). Any new powerlines authorized within the above identified areas will be buried or if overhead then constructed to the latest APLIC guidance (modified from PRB Final EIS).<br>• New pipelines through PHMA would be allowed: (1) within an RMP corridor currently authorized for that use or designated through future RMP amendments; or (2) constructed in or adjacent to existing utilities (buried and above-ground) or roads. Pipelines constructed in RMP corridors or adjacent to existing utilities or roads will require completion of a DDCT analysis for baseline data collection but the project is not required to meet the threshold of 5%. However, within 6 months of the completion of construction, the project proponent will provide the authorized officer with as-built drawings so that total disturbance within core area can be calculated annually. PHMA is designated as avoidance areas for high voltage transmission line and pipeline ROWs. All authorizations must comply with the conservation measures outlined in this approved plan, including the RDFs and avoidance criteria presented in Appendix C (p. 285) of this document. | adverse impacts while still meeting the project need. Agricultural and residential lines will be considered to be adequately mitigated for Greater Sage-Grouse if constructed at least 0.6 mile from the lek perimeter (or lek center if no perimeter is yet mapped) with appropriate timing constraints and constructed to the latest APLIC guidance. These ROW authorizations will be subject to approval by the State Director.<br>Within GHMA: Within general Greater Sage-Grouse habitat (outside core population and connectivity areas) overhead powerlines will be located at least 0.5 mile from occupied Greater Sage-Grouse leks (modified from PRB Final EIS). Any new powerlines authorized within the above identified areas will be buried or if overhead then constructed to the latest APLIC guidance (modified from PRB Final EIS). New pipelines through PHMA would be allowed: (1) within an RMP corridor currently authorized for that use or designated through future RMP amendments; or (2) constructed in or adjacent to existing utilities (buried and above-ground) or roads. Pipelines constructed in RMP corridors or adjacent to existing utilities or roads will require completion of a DDCT analysis for baseline data collection but the project is not required to meet the threshold of 5%. However, within 6 months of the completion of construction, the project proponent will provide the authorized officer with as-built drawings so that total disturbance within core area can be calculated annually. PHMA is designated as avoidance areas for high voltage transmission line and pipeline ROWs. All authorizations must comply with the conservation measures outlined in this approved plan, including the RDF and avoidance criteria presented in 2019 Wyoming GrSG ARMPA Appendix B. | *(See above.)* |

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| **MD SS WL-4023: Lease fluid minerals dependent upon lease location and habitat suitability. Ensure that leasing activities in PHMA comply with Greater Sage-Grouse RMP decisions and remain in compliance with laws, regulations and policy. | Lease fluid minerals dependent upon lease location and habitat suitability. Ensure that leasing activities in PHMA comply with Greater Sage-Grouse resource management plan decisions and remain in compliance with laws, regulations and policy (see also MD SS WL-4024 and MS SS WL-4036). | Potential change under Alternative 3. |
| *MD SS WL-4024: Apply the following stipulations to fluid mineral leases within Greater Sage-Grouse Core Population Areas:<br>• NSO prohibiting surface occupancy and disturbing activities, within 0.6 mile of the perimeter of occupied Greater Sage-Grouse leks (independent of habitat suitability).<br>• CSU within Greater Sage-Grouse Core Population Areas<br>o In Greater Sage-Grouse core population areas, the density of disturbance of a facility (oil and gas or mining) would be limited to an average of one site per square mile (640 acres) within the DDCT, subject to valid existing rights and applicable law. The one location and cumulative value of existing disturbances will not exceed 5% of suitable habitat of the DDCT area using the DDCT process. Inside Greater Sage-Grouse (priority habitat) core population areas, all suitable habitat disturbed (any program area) will not exceed 5% of suitable habitat within the DDCT area using the DDCT process.<br>o Design and manage facilities to prevent WNv transmission.<br>o Locate new Local or Collector roads (as defined in BLM Manual 9113) greater than 1.9 miles from the perimeter of occupied Greater Sage-Grouse leks. Locate new roads greater than 0.6 mile from the perimeter of occupied Greater Sage-Grouse leks.<br>o Restore disturbed sagebrush communities on BLM surface to meet the Wyoming DEQ community-specific full shrub density standard (Chapter 4 Rules and Regulations, option III) for all predisturbance shrub species and 5% minimum canopy cover of sagebrush. A 90% confidence interval is required to demonstrate achievement of the | Apply the following stipulations to fluid mineral leases within Greater Sage-Grouse Core Population Areas:<br>• NSO prohibiting surface occupancy and disturbing activities, within 0.6 mile of the perimeter of occupied Greater Sage-Grouse leks (or lek center if no perimeter is yet mapped) (independent of habitat suitability).<br>• CSU within Greater Sage-Grouse Core Population Areas:<br>o In Greater Sage-Grouse core population areas, the density of disturbance of a facility (oil and gas or mining) would be limited to an average of one site per square mile (640 acres) within the DDCT, subject to valid existing rights and applicable law. The one location and cumulative value of existing disturbances will not exceed 5% of suitable habitat of the DDCT area using the DDCT process. Inside Greater Sage-Grouse (priority habitat) core population areas, all suitable habitat disturbed (any program area) will not exceed 5% of suitable habitat within the DDCT area using the DDCT process.<br>o Design and manage facilities to prevent WNv transmission.<br>o Locate new Local or Collector roads (as defined in BLM Manual 9113) greater than 1.9 miles from the perimeter of occupied Greater Sage-Grouse leks (or lek center if no perimeter is yet mapped). Locate new roads greater than 0.6 mile from the perimeter of occupied Greater Sage-Grouse leks (or lek center if no perimeter is yet mapped).<br>o Restore disturbed sagebrush communities on BLM surface to meet the Wyoming DEQ community-specific full shrub density standard (Chapter 4 Rules and Regulations, option III) for all predisturbance shrub species and 5% | Potential change under Alternatives 3 and 6. |

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| standard. The standard must be demonstrated the last year of the responsibility period, and all planted shrubs shall have been in place for at least two years.<br>• TLS prohibiting surface-disturbing and/or disruptive activities from March 15 to June 30 (independent of habitat suitability). Activities in unsuitable habitats would be evaluated under the exception and modification criteria and could be allowed on a case-by-case basis. Where credible data support different timeframes for this seasonal restriction, dates may be adjusted by up to 14 days prior to or subsequent to the above dates.<br>• TLS prohibiting surface-disturbing and disruptive activities within mapped Greater Sage-Grouse winter concentration areas, from December 1 to March 14. Activities in unsuitable habitats within PHMAs would be evaluated under the exception and modification criteria and could be allowed on a case-by-case basis. Where credible data support different timeframes for this seasonal restriction, dates may be adjusted by up to 14 days prior to or subsequent to the above dates.<br>Apply the following stipulations to fluid mineral leases within Greater Sage-Grouse Core Population Connectivity Corridors:<br>• NSO prohibiting surface occupancy and disturbing activities, within 0.6 mile of the perimeter of occupied Greater Sage-Grouse leks (independent of habitat suitability).<br>• CSU within Greater Sage-Grouse Population Connectivity Corridors.<br>o Inside Greater Sage-Grouse (priority habitat) core population area connectivity corridors, all suitable habitat disturbed (any program area) will not exceed 5% of suitable habitat within the DDCT area using the DDCT process.<br>o Design and manage facilities to prevent WNv transmission.<br>o Restore disturbed sagebrush communities on BLM surface to meet the Wyoming DEQ community-specific full shrub density standard (Chapter 4 Rules and Regulations, option III) for all | minimum canopy cover of sagebrush. A 90% confidence interval is required to demonstrate achievement of the standard. The standard must be demonstrated the last year of the responsibility period, and all planted shrubs shall have been in place for at least two years.<br>• TLS prohibiting surface-disturbing and/or disruptive activities from March 15 to June 30 (independent of habitat suitability). The authorized officer may grant an exception on a case-by-case basis subject to appropriate site-specific analysis, mitigation requirements, and consultation with the State of Wyoming and consistent with the applicable State management strategy (currently Governor of Wyoming's Executive Order 2015-4) (see MD SS WL-4036). Where credible data support different timeframes for this seasonal restriction, dates may be expanded by up to 14 days prior to or subsequent to the above dates.<br>• TLS prohibiting surface-disturbing and disruptive activities within mapped Greater Sage-Grouse winter concentration areas, from December 1 to March 14. The authorized officer may grant an exception on a case-by-case basis subject to appropriate site-specific analysis, mitigation requirements, and consultation with the State of Wyoming and consistent with the applicable State management strategy (currently Governor of Wyoming's Executive Order 2015-4) (see MD SS WL-4036). Protection of additional mapped winter concentration areas in GHMA would be implemented where winter concentration areas are mapped and designated by the State of Wyoming. Appropriate seasonal timing restrictions and habitat protection measures would be considered and evaluated in consultation with the WGFD in all identified winter concentration areas. Where credible data support different timeframes for this seasonal restriction, dates may be expanded by up to 14 days prior to or subsequent to the above dates.<br>Apply the following stipulations to fluid mineral leases within Greater Sage-Grouse Core Population Connectivity Corridors: | *(See above.)* |

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| predisturbance shrub species and 5% minimum canopy cover of sagebrush. A 90% confidence interval is required to demonstrate achievement of the standard. The standard must be demonstrated the last year of the responsibility period, and all planted shrubs shall have been in place for at least two years.<br>• TLS prohibiting surface-disturbing and/or disruptive activities within 4.0 miles of an occupied Greater Sage-Grouse lek, from March 15 to June 30 (independent of habitat suitability and restricted to within Population Connectivity Corridors). Activities in unsuitable habitats would be evaluated under the exception and modification criteria and could be allowed on a case by case basis. Where credible data support different timeframes for this seasonal restriction, dates may be adjusted by up to 14 days prior to or subsequent to the above dates.<br>• TLS prohibiting surface-disturbing and/or disruptive activities within mapped Greater Sage-Grouse winter concentration areas, from December 1 to March 14. Activities in unsuitable habitats would be evaluated under the exception and modification criteria and could be allowed on a case by case basis. Where credible data support different timeframes for this seasonal restriction, dates may be adjusted by up to 14 days prior to or subsequent to the above dates.<br>Apply the following stipulations to fluid mineral leases within Greater Sage-Grouse habitat outside of Core Population Areas and Core Population Connectivity Corridors:<br>• NSO prohibiting surface occupancy and disturbing activities, within 0.25 mile of the perimeter of occupied Greater Sage-Grouse leks.<br>• CSU within 0.25 mile of occupied Greater Sage-Grouse leks.<br>o Design and manage facilities to prevent WNv transmission.<br>• CSU – Restore disturbed sagebrush communities on BLM surface to meet the Wyoming DEQ community-specific full shrub density standard (Chapter 4 Rules and Regulations, option III) for all | • NSO prohibiting surface occupancy and disturbing activities, within 0.6 mile of the perimeter of occupied Greater Sage-Grouse leks (or lek center if no perimeter is yet mapped) (independent of habitat suitability).<br>• CSU within Greater Sage-Grouse Population Connectivity Corridors.<br>o Inside Greater Sage-Grouse (priority habitat) core population area connectivity corridors, all suitable habitat disturbed (any program area) will not exceed 5% of suitable habitat within the DDCT area using the DDCT process.<br>o Design and manage facilities to prevent WNv transmission.<br>o Restore disturbed sagebrush communities on BLM surface to meet the Wyoming DEQ community-specific full shrub density standard (Chapter 4 Rules and Regulations, option III) for all predisturbance shrub species and 5% minimum canopy cover of sagebrush. A 90% confidence interval is required to demonstrate achievement of the standard. The standard must be demonstrated the last year of the responsibility period, and all planted shrubs shall have been in place for at least two years.<br>• TLS prohibiting surface-disturbing and/or disruptive activities within 4.0 miles of an occupied Greater Sage-Grouse lek, from March 15 to June 30 (independent of habitat suitability and restricted to within Population Connectivity Corridors). The authorized officer may grant an exception on a case-by-case basis subject to appropriate site-specific analysis, mitigation requirements, and consultation with the State of Wyoming and consistent with the applicable State management strategy (currently Governor of Wyoming's Executive Order 2015-4) (see MD SS WL-4036). Where credible data support different timeframes for this seasonal restriction, dates may be expanded by up to 14 days prior to or subsequent to the above dates.<br>• TLS prohibiting surface-disturbing and/or disruptive activities within mapped Greater Sage-Grouse winter | *(See above.)* |

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| predisturbance shrub species and 5% minimum canopy cover of sagebrush. A 90% confidence interval is required to demonstrate achievement of the standard. The standard must be demonstrated the last year of the responsibility period, and all planted shrubs shall have been in place for at least two years.<br>Recommend for all surface-disturbing activities on BLM surface adjacent to Core or Connectivity Population Areas, or within or adjacent to lands involved in Greater Sage-Grouse conservation projects.<br>• TLS prohibiting surface-disturbing and disruptive activities within 2.0 miles of occupied Greater Sage-Grouse leks, from March 15 to June 30 (independent of habitat suitability). Activities in unsuitable habitats would be evaluated under the exception and modification criteria and could be allowed on a case by case basis. Where credible data support different timeframes for this seasonal restriction, dates may be adjusted by up to 14 days prior to or subsequent to the above dates.<br>• TLS protecting mapped winter concentration areas, from December 1 to March 14, in GHMA would be implemented only where winter concentration areas are identified as supporting biologically significant numbers of Greater Sage-Grouse nesting in PHMA and/or attending leks within PHMA (core only). Appropriate seasonal timing restrictions and habitat protection measures would be considered and evaluated in consultation with the WGFD in all identified winter concentration areas. Where credible data support different timeframes for this seasonal restriction, dates may be adjusted by up to 14 days prior to or subsequent to the above dates. In cases where federal oil and gas leases are or have been issued without stipulated restrictions or requirements that are later found to be necessary, or with stipulated restrictions or requirements later found to be insufficient, consider their inclusion before approving subsequent exploration and development activities. Include these | concentration areas, from December 1 to March 14. The authorized officer may grant an exception on a case-by-case basis subject to appropriate site-specific analysis, mitigation requirements, and consultation with the State of Wyoming and consistent with the applicable State management strategy (currently Governor of Wyoming's Executive Order 2015-4) (see MD SS WL-4036). Protection of additional mapped winter concentration areas in GHMA would be implemented where winter concentration areas are mapped and designated by the State of Wyoming. Appropriate seasonal timing restrictions and habitat protection measures would be considered and evaluated in consultation with the WGFD in all identified winter concentration areas. Where credible data support different timeframes for this seasonal restriction, dates may be expanded by up to 14 days prior to or subsequent to the above dates.<br>Apply the following stipulations to fluid mineral leases within Greater Sage-Grouse habitat outside of Core Population Areas and Core Population Connectivity Corridors:<br>• NSO prohibiting surface occupancy and disturbing activities, within 0.25 mile of the perimeter of occupied Greater Sage-Grouse leks (or lek center if no perimeter is yet mapped).<br>• CSU within 0.25 mile of occupied Greater Sage-Grouse leks.<br>  ○ Design and manage facilities to prevent WNv transmission.<br>• CSU – Restore disturbed sagebrush communities on BLM surface to meet the Wyoming DEQ community-specific full shrub density standard (Chapter 4 Rules and Regulations, option III) for all predisturbance shrub species and 5% minimum canopy cover of sagebrush. A 90% confidence interval is required to demonstrate achievement of the standard. The standard must be demonstrated the last year of the responsibility period, and all planted shrubs shall have been in place for at least two years.<br>Recommend for all surface-disturbing activities on BLM surface adjacent to Core or Connectivity Population Areas, or within | *(See above.)* |

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| restrictions or requirements only as reasonable measures or as conditions of approval in authorizing APDs or Master Development Plans.<br>Conversely, in cases where leases are or have been issued with stipulated restrictions or requirements that are later found to be excessive or unnecessary, the stipulated restrictions or requirements may be appropriately modified, excepted or waived in authorizing actions. Both the application of reasonable measures or COAs and the modification or exception of stipulated restrictions or requirements must first be based upon site-specific analysis including the necessary supporting NEPA.<br>**Note (PHMA and GHMA):** The authorized officer may grant an exception if an environmental record of review determines that the action, as proposed or conditioned, would not impair the function or utility of the site for the current or subsequent seasonal habitat, life-history, or behavioral needs of Greater Sage-Grouse. | or adjacent to lands involved in Greater Sage-Grouse conservation projects.<br>• TLS prohibiting surface-disturbing and disruptive activities within 2.0 miles of occupied Greater Sage-Grouse leks, from March 15 to June 30 (independent of habitat suitability). The authorized officer may grant an exception on a case-by-case basis subject to appropriate site-specific analysis, mitigation requirements, and consultation with the State of Wyoming and consistent with the applicable State management strategy (currently Governor of Wyoming's Executive Order 2015-4) (see MD SS WL-4036). Where credible data support different timeframes for this seasonal restriction, dates may be expanded by up to 14 days prior to or subsequent to the above dates.<br>• TLS protecting mapped winter concentration areas, from December 1 to March 14, in GHMA would be implemented only where winter concentration areas are identified. Protection of additional mapped winter concentration areas in GHMA would be implemented where winter concentration areas are mapped and designated by the State of Wyoming. Appropriate seasonal timing restrictions and habitat protection measures would be considered and evaluated in consultation with the WGFD in all identified winter concentration areas. Where credible data support different timeframes for this seasonal restriction, dates may be expanded by up to 14 days prior to or subsequent to the above dates.<br>In cases where federal oil and gas leases are or have been issued without stipulated restrictions or requirements that are later found to be necessary, or with stipulated restrictions or requirements later found to be insufficient, consider their inclusion before approving subsequent exploration and development activities. Include these restrictions or requirements only as reasonable measures or as conditions of approval in authorizing APDs or Master Development Plans.<br>Conversely, in cases where leases are or have been issued with stipulated restrictions or requirements that are later found to be | *(See above.)* |

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| *(See above.)* | excessive or unnecessary, the stipulated restrictions or requirements may be appropriately modified, excepted or waived in authorizing actions. Both the application of reasonable measures or COAs and the modification or exception of stipulated restrictions or requirements must first be based upon site-specific analysis including the necessary supporting NEPA.<br>**Note (PHMA and GHMA):** The authorized officer may grant an exception on a case-by-case basis subject to appropriate site-specific analysis, mitigation requirements, and consultation with the State of Wyoming and consistent with the applicable State management strategy (currently Governor of Wyoming's Executive Order 2015-4) (see MD SS WL-4036). | *(See above.)* |
| *MD SS WL-4025: Manage Greater Sage-Grouse Core Population Areas as follows:<br>• Prohibit surface-disturbing activities and occupancy within 0.6 mile of the perimeter of occupied Greater Sage-Grouse leks (independent of habitat suitability).<br>• In Greater Sage-Grouse core population areas, the density of disturbance of a facility (oil and gas or mining) would be limited to an average of one site per square mile (640 acres) within the DDCT, subject to valid existing rights and applicable law. The one location and cumulative value of existing disturbances will not exceed 5 percent of suitable habitat of the DDCT area using the DDCT process.<br>• Inside Greater Sage-Grouse (priority habitat) core population areas and connectivity corridors, all suitable habitat disturbed (any program area) will not exceed 5% of suitable habitat within the DDCT area using the DDCT process.<br>o Design and manage facilities to prevent WNv transmission.<br>o New project noise levels, either individual or cumulative, should not exceed 10 dBA (as measured by L50) above baseline noise at the perimeter of the lek from 6:00 pm to 8:00 am during the breading season (March 1- May 15). | Manage Greater Sage-Grouse Core Population Areas as follows:<br>• Prohibit surface-disturbing activities and occupancy within 0.6 mile of the perimeter of occupied Greater Sage-Grouse leks (or lek center if no perimeter is yet mapped) (independent of habitat suitability).<br>• In Greater Sage-Grouse core population areas, the density of disturbance of a facility (oil and gas or mining) would be limited to an average of one site per square mile (640 acres) within the DDCT, subject to valid existing rights and applicable law. The one location and cumulative value of existing disturbances will not exceed 5 percent of suitable habitat of the DDCT area using the DDCT process.<br>• Inside Greater Sage-Grouse (priority habitat) core population areas and connectivity corridors, all suitable habitat disturbed (any program area) will not exceed 5% of suitable habitat within the DDCT area using the DDCT process.<br>o Design and manage facilities to prevent WNv transmission.<br>o New project noise levels, either individual or cumulative, should not exceed 10 dBA (as measured by L50) above baseline noise at the perimeter of the lek (or lek center if no perimeter is yet mapped) from 6:00 pm to 8:00 am during the breading season (March 1- May 15). Specific noise protocols for | Potential change under Alternatives 3, 4, 5, and 6. |

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| • Specific noise protocols for measurement and implementation will be developed as additional research and information emerges.<br>  ○ Locate new Local or Collector roads (as defined in BLM Manual 9113) greater than 1.9 miles from the perimeter of occupied Greater Sage-Grouse leks. Locate new Resource roads greater than 0.6 mile from the perimeter of occupied Greater Sage-Grouse leks.<br>  ○ Restore disturbed sagebrush communities on BLM surface to meet the Wyoming DEQ community-specific full shrub density standard (Chapter 4 Rules and Regulations, option III) for all predisturbance shrub species and 5% minimum canopy cover of sagebrush. A 90% confidence interval is required to demonstrate achievement of the standard. The standard must be demonstrated the last year of the responsibility period, and all planted shrubs shall have been in place for at least two years.<br>• Prohibit surface-disturbing and disruptive activities from March 15 to June 30 (independent of habitat suitability). Activities in unsuitable habitats would be evaluated under the exception and modification criteria and could be allowed on a case by case basis. Where credible data support different timeframes for this seasonal restriction, dates may be expanded by up to 14 days prior to or subsequent to the above dates.<br>• Prohibit surface-disturbing and disruptive activities within mapped Greater Sage-Grouse winter concentration areas, from December 1 to March 14. Activities in unsuitable habitats within PHMAs would be evaluated under the exception and modification criteria and could be allowed on a case-by-case basis. Where credible data support different timeframes for this seasonal restriction, dates may be expanded by up to 14 days prior to or subsequent to the above dates.<br>To the extent necessary to prevent unnecessary or undue degradation, manage as follows within Greater Sage-Grouse Core Population Connectivity Corridors: | measurement and implementation will be developed as additional research and information emerges. These measure would be considered at the site-specific project level where and when appropriate.<br>  ○ Locate new Local or Collector roads (as defined in BLM Manual 9113) greater than 1.9 miles from the perimeter of occupied Greater Sage-Grouse leks. Locate new Resource roads greater than 0.6 mile from the perimeter of occupied Greater Sage-Grouse leks (or lek center if no perimeter is yet mapped).<br>  ○ Restore disturbed sagebrush communities on BLM surface to meet the Wyoming DEQ community-specific full shrub density standard (Chapter 4 Rules and Regulations, option III) for all predisturbance shrub species and 5% minimum canopy cover of sagebrush. A 90% confidence interval is required to demonstrate achievement of the standard. The standard must be demonstrated the last year of the responsibility period, and all planted shrubs shall have been in place for at least two years.<br>• Prohibit surface-disturbing and disruptive activities from March 15 to June 30 (independent of habitat suitability). The authorized officer may grant an exception on a case-by-case basis subject to appropriate site-specific analysis, mitigation requirements, and consultation with the State of Wyoming and consistent with the applicable State management strategy (currently Governor of Wyoming's Executive Order 2015-4) (see MD SS WL-4036). Where credible data support different timeframes for this seasonal restriction, dates may be expanded by up to 14 days prior to or subsequent to the above dates.<br>• Prohibit surface-disturbing and disruptive activities within mapped Greater Sage-Grouse winter concentration areas, from December 1 to March 14. The authorized officer may grant an exception on a case-by-case basis subject to appropriate site-specific analysis, mitigation requirements, and consultation with the State of | *(See above.)* |

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| • Prohibit surface occupancy and disturbing activities, within 0.6 mile of the perimeter of occupied Greater Sage-Grouse leks (independent of habitat suitability).<br>• In Greater Sage-Grouse Core Population Connectivity Corridors, subject to valid existing rights and applicable law, the cumulative value of existing disturbances will not exceed 5% of suitable habitat of the DDCT area using the DDCT process. Inside Greater Sage-Grouse (priority habitat) core population areas and connectivity corridors, all suitable habitat disturbed (any program area) will not exceed 5% of suitable habitat within the DDCT area using the DDCT process.<br>o Design and manage facilities to prevent WNv transmission.<br>o Restore disturbed sagebrush communities on BLM surface to meet the Wyoming DEQ community-specific full shrub density standard (Chapter 4 Rules and Regulations, option III) for all predisturbance shrub species and 5% minimum canopy cover of sagebrush. A 90% confidence interval is required to demonstrate achievement of the standard. The standard must be demonstrated the last year of the responsibility period, and all planted shrubs shall have been in place for at least two years.<br>• Prohibit surface-disturbing and disruptive activities within 4.0 miles of occupied Greater Sage-Grouse leks from March 15 to June 30 (independent of habitat suitability and restricted to within Population Connectivity Areas). Activities in unsuitable habitats would be evaluated under the exception and modification criteria and could be allowed on a case by case basis. Where credible data support different timeframes for this seasonal restriction, dates may be expanded by up to 14 days prior to or subsequent to the above dates.<br>• Prohibit surface-disturbing and disruptive activities within mapped Greater Sage-Grouse winter concentration areas, from December 1 to March 14. Activities in unsuitable habitats within PHMAs would be evaluated under the exception and modification criteria and could be allowed | Wyoming and consistent with the applicable State management strategy (currently Governor of Wyoming's Executive Order 2015-4) (see MD SS WL-4036). Protection of additional mapped winter concentration areas in GHMA would be implemented where winter concentration areas are mapped and designated by the State of Wyoming. Appropriate seasonal timing restrictions and habitat protection measures would be considered and evaluated in consultation with the WGFD in all identified winter concentration areas. Where credible data support different timeframes for this seasonal restriction, dates may be expanded by up to 14 days prior to or subsequent to the above dates.<br>To the extent necessary to prevent unnecessary or undue degradation, manage as follows within Greater Sage-Grouse Core Population Connectivity Corridors:<br>• Prohibit surface occupancy and disturbing activities, within 0.6 mile of the perimeter of occupied Greater Sage-Grouse leks (or lek center if no perimeter is yet mapped) (independent of habitat suitability).<br>• In Greater Sage-Grouse Core Population Connectivity Corridors, subject to valid existing rights and applicable law, the cumulative value of existing disturbances will not exceed 5% of suitable habitat of the DDCT area using the DDCT process. Inside Greater Sage- Grouse (priority habitat) core population areas and connectivity corridors, all suitable habitat disturbed (any program area) will not exceed 5% of suitable habitat within the DDCT area using the DDCT process.<br>o Design and manage facilities to prevent WNv transmission.<br>o Restore disturbed sagebrush communities on BLM surface to meet the Wyoming DEQ community-specific full shrub density standard (Chapter 4 Rules and Regulations, option III) for all predisturbance shrub species and 5% minimum canopy cover of sagebrush. A 90% confidence interval is required to demonstrate achievement of the standard. The standard must be demonstrated the last year of the responsibility period, and all planted | *(See above.)* |

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| on a case-by-case basis. Where credible data support different timeframes for this seasonal restriction, dates may be expanded by up to 14 days prior to or subsequent to the above dates.<br>Manage as follows within occupied Greater Sage-Grouse habitat outside of Core Population and Core Population Connectivity Corridors:<br>• Prohibit or restrict surface occupancy and disturbing activities within 0.25 mile of the perimeter of occupied Greater Sage-Grouse leks.<br>• Reduce surface disturbance for authorizations within 0.25 mile of occupied Greater Sage-Grouse leks by:<br>  ○ Design and manage facilities to prevent WNv transmission.<br>• Restore disturbed sagebrush communities on BLM surface to meet the Wyoming DEQ community-specific full shrub density standard (Chapter 4 Rules and Regulations, option III) for all predisturbance shrub species and 5% minimum canopy cover of sagebrush. A 90% confidence interval is required to demonstrate achievement of the standard. The standard must be demonstrated the last year of the responsibility period, and all planted shrubs shall have been in place for at least two years. Recommend for all surface-disturbing activities on BLM surface adjacent to core or connectivity population areas, within or adjacent to lands involved in Greater Sage-Grouse conservation projects. BLM parcels less than 640 acres that only meet the population density factor may be excluded.<br>• Prohibit surface-disturbing and/or disruptive activities within 2.0 miles of occupied Greater Sage-Grouse leks, from March 15 to June 30 (independent of habitat suitability). Activities in unsuitable habitats would be evaluated under the exception and modification criteria and could be allowed on a case by case basis. Where credible data support different timeframes for this seasonal restriction, dates may be expanded by up to 14 days prior to or subsequent to the above dates. | shrubs shall have been in place for at least two years.<br>• Prohibit surface-disturbing and disruptive activities within 4.0 miles of occupied Greater Sage-Grouse leks from March 15 to June 30 (independent of habitat suitability and restricted to within Population Connectivity Areas). The authorized officer may grant an exception on a case-by-case basis subject to appropriate site-specific analysis, mitigation requirements, and consultation with the State of Wyoming and consistent with the applicable State management strategy (currently Governor of Wyoming's Executive Order 2015-4) (see MD SS WL-4036).Where credible data support different timeframes for this seasonal restriction, dates may be expanded by up to 14 days prior to or subsequent to the above dates.<br>• Prohibit surface-disturbing and disruptive activities within mapped Greater Sage-Grouse winter concentration areas, from December 1 to March 14. The authorized officer may grant an exception on a case-by-case basis subject to appropriate site-specific analysis, mitigation requirements, and consultation with the State of Wyoming and consistent with the applicable State management strategy (currently Governor of Wyoming's Executive Order 2015-4) (see MD SS WL-4036). Protection of additional mapped winter concentration areas in GHMA would be implemented where winter concentration areas are mapped and designated by the State of Wyoming. Appropriate seasonal timing restrictions and habitat protection measures would be considered and evaluated in consultation with the WGFD in all identified winter concentration areas. Where credible data support different timeframes for this seasonal restriction, dates may be expanded by up to 14 days prior to or subsequent to the above dates.<br>Manage as follows within occupied Greater Sage-Grouse habitat outside of Core Population and Core Population Connectivity Corridors:<br>• Prohibit or restrict surface occupancy and disturbing activities within 0.25 mile of the | *(See above.)* |

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| • Protect mapped winter concentration areas, from December 1 to March 14, in GHMA would be implemented only where winter concentration areas are identified as supporting biologically significant numbers of Greater Sage-Grouse nesting in PHMA and/or attending leks within PHMA (core only). Appropriate seasonal timing restrictions and habitat protection measures would be considered and evaluated in consultation with the WGFD in all identified winter concentration areas. Where credible data support different timeframes for this seasonal restriction, dates may be expanded by up to 14 days prior to or subsequent to the above dates.<br>**Note (PHMA and GHMA):** The authorized officer may grant an exception if an environmental record of review determines that the action, as proposed or conditioned, would not impair the function or utility of the site for the current or subsequent seasonal habitat, life-history, or behavioral needs of Greater Sage-Grouse. | perimeter of occupied Greater Sage-Grouse leks (or lek center if no perimeter is yet mapped).<br>• Reduce surface disturbance for authorizations within 0.25 mile of occupied Greater Sage-Grouse leks by:<br>○ Design and manage facilities to prevent WNv transmission.<br>• Restore disturbed sagebrush communities on BLM surface to meet the Wyoming DEQ community-specific full shrub density standard (Chapter 4 Rules and Regulations, option III) for all predisturbance shrub species and 5% minimum canopy cover of sagebrush. A 90% confidence interval is required to demonstrate achievement of the standard. The standard must be demonstrated the last year of the responsibility period, and all planted shrubs shall have been in place for at least two years. Recommend for all surface-disturbing activities on BLM surface adjacent to core or connectivity population areas, within or adjacent to lands involved in Greater Sage-Grouse conservation projects. BLM parcels less than 640 acres that only meet the population density factor may be excluded.<br>• Prohibit surface-disturbing and/or disruptive activities within 2.0 miles of occupied Greater Sage-Grouse leks, from March 15 to June 30 (independent of habitat suitability). The authorized officer may grant an exception on a case-by-case basis subject to appropriate site- specific analysis, mitigation requirements, and consultation with the State of Wyoming and consistent with the applicable State management strategy (currently Governor of Wyoming's Executive Order 2015-4) (see MD SS WL-4036). Where credible data support different timeframes for this seasonal restriction, dates may be expanded by up to 14 days prior to or subsequent to the above dates.<br>• Protect mapped winter concentration areas, from December 1 to March 14, in GHMA, only where winter concentration areas are identified. Protection of additional mapped winter concentration areas in GHMA would be implemented where winter concentration areas are | *(See above.)* |

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| *(See above.)* | mapped and designated by the State of Wyoming. Appropriate seasonal timing restrictions and habitat protection measures would be considered and evaluated in consultation with the WGFD in all identified winter concentration areas. Where credible data support different timeframes for this seasonal restriction, dates may be expanded by up to 14 days prior to or subsequent to the above dates.<br>**Note (PHMA and GHMA):** The authorized officer may grant an exception on a case-by-case basis subject to appropriate site-specific analysis, mitigation requirements, and consultation with the State of Wyoming and consistent with the applicable State management strategy (currently Governor of Wyoming's Executive Order 2015-4) (see MD SS WL-4036). | *(See above.)* |
| No similar action. | *MD SS WL-4035: The BLM will update its Greater Sage-Grouse habitat management areas, including biologically significant units (BSUs), in conjunction with the State of Wyoming's core areas, upon issuance of any Wyoming Governor's Executive Order revising or amending the core area boundaries and upon completion of appropriate NEPA analysis and process. The BLM will complete the appropriate NEPA documentation (including appropriate public comment) prior to adopting any revised core area boundaries (e.g., maintenance action or plan amendment, environmental assessment, etc.). | Potential change under Alternatives 3, 4, 5, and 6. |
| No similar action. | *MD SS WL-4036: Specific to management for Greater Sage-Grouse, all RMPs are amended as follows:<br>Adopt the State of Wyoming's Greater Sage-Grouse Compensatory Mitigation Framework to the extent consistent with federal law, regulations, and policy.<br>In all Greater Sage-Grouse habitat, when authorizing third-party actions in designated Greater Sage-Grouse habitat, the BLM will seek to achieve the planning-level Greater Sage-Grouse management goals and objectives through implementation of mitigation and management actions, consistent with valid existing rights and applicable law. Under this Plan Amendment, management would be consistent with the Greater Sage-Grouse goals and objectives, | Potential change under Alternatives 3, 4, 5, and 6. |

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| *(See above.)* | and in conformance with BLM Manual 6840, Special Status Species Management. In accordance with BLM Manual 6840, the BLM will undertake planning decisions, actions and authorizations "to minimize or eliminate threats affecting the status of [Greater Sage-Grouse] or to improve the condition of [Greater Sage-Grouse] habitat" across the planning area.<br>Accordingly, before authorizing third-party actions that result in habitat loss and degradation, the BLM will complete the following steps, in alignment with the Governor of Wyoming's Executive Order 2015-4 (July 29, 2015):<br>1. Work jointly with the WGFD to evaluate projects and recommend mitigation in the form of avoidance and minimization.<br>2. The WGFD will determine if the State requires or recommends any additional mitigation – including compensatory mitigation – under State regulations, policies, or programs related to the conservation of Greater Sage-Grouse.<br>3. Incorporate state required or recommended mitigation into the BLM's NEPA decision-making process, if the WGFD determines that compensatory mitigation is required to address impacts to GRSG habitat as a part of State policy or authorization, or if a proponent voluntarily offers mitigation.<br>4. Analyze whether the compensatory mitigation (deferring to the appropriate State authority to quantify habitat offsets, durability, and other aspects used to determine the recommended compensatory mitigation action):<br>• achieves measurable outcomes for Greater Sage-Grouse habitat function on a landscape scale as determined by WGFD that are at least equal to the lost or degraded values in accordance with the Governor of Wyoming's Executive Order 2015-4.<br>• provides benefits that are in place for at least the duration of the impacts<br>• accounts for a level of risk that the mitigation action may fail or not persist for the full duration of the impact<br>5. Ensure mitigation outcomes are consistent with the State of Wyoming's mitigation strategy and principles outlined in 2019 | *(See above.)* |

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| *(See above.)* | Wyoming GrSG ARMPA Appendix C, The Greater Sage-Grouse Habitat Management Strategy.<br>The BLM has determined that compensatory mitigation must be voluntary unless required by other applicable law and in recognition that State authorities may also require compensatory mitigation (IM 2019-018, *Compensatory Mitigation*, December 6, 2018). Therefore, consistent with valid existing rights and applicable law, when authorizing third-party actions that result in habitat loss and degradation, the BLM will consider voluntary compensatory mitigation actions only as a component of compliance with a State mitigation plan, program, or authority, or when offered voluntarily by a project proponent.<br>Project-specific analysis will be necessary to determine how a compensatory mitigation proposal addresses impacts from a proposed action. The BLM will cooperate with the State to determine appropriate project design and alignment with State policies and requirements, including those regarding compensatory mitigation. When the BLM is considering compensatory mitigation as a component of the project proponent's submission or based on a mitigation requirement from the State, the BLM's NEPA analysis would evaluate the need to avoid or minimize impacts of the proposed project and achieve the goals and objectives of this RMPA. The BLM will defer to the appropriate State authority to quantify habitat offsets, durability, and other aspects used to determine the recommended compensatory mitigation action. | *(See above.)* |
| MO PR:2.1: Achieve and maintain Standards for Healthy Rangelands and Guidelines for Livestock Grazing Management for the Public Lands Administered by the BLM in the State of Wyoming (Appendix I (p. 419)). | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |
| MO PR:2.3: Rehabilitate all surface-disturbing activities consistent with applicable laws, regulations, and policies. | No changes made. | No change proposed. |
| MD Soil-1002: Authorized surface-disturbing activities will include plans for reclamation; site-specific reclamation actions should reflect the complexity of the project, environmental concerns, and the reclamation potential of the site. | No changes made. | No change proposed. |

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| MG PR:3: Watershed, surface water, and groundwater resources are consistent with applicable state and federal standards and regulations. | No changes made. | No change proposed. |
| MO PR:3.1: BLM actions maintain or improve watershed, wetland, and riparian functions to support desired surface-flow regimes and water quality. | No changes made. | No change proposed. |
| MD Water-1007: Design and manage land use and surface-disturbing activities to reduce channel and bank erosion and the associated loss of riparian habitats. | No changes made. | No change proposed. |
| MD Water-1013: Allow surface disturbance within 500 feet of springs, non-CBNG reservoirs, water wells, or perennial streams with an approved site-specific plan that ensures construction, stabilization and reclamation methods are meeting water and other resource objectives including, but not limited to soil, slope, and vegetation, and wildlife habitat. | No changes made. | No change proposed. |
| MD Water-1016: Evaluate unneeded reservoirs for removal and reclamation. | No changes made. | No change proposed. |
| MO MR:1.1: Provide opportunities for the exploration and development of locatable minerals, as well as mill and tunnel site operations, while avoiding or mitigating the effects of these activities on other resource values so that unnecessary or undue degradation is prevented. | No changes made. | Potential change under Alternative 3. |
| MO MR:2.1: Maintain coal leasing and exploration, while minimizing impacts to other resource values. | No changes made. | No change proposed. |

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| MD Coal-2001: Coal planning was completed as part of the April 2001 BFO RMP update. At that time the four coal planning screens (i.e., coal development potential, unsuitability, multiple use and surface owner consultation) were applied to certain federal coal lands within the BFO planning area. The result of this planning effort was a decision identifying lands acceptable for further coal leasing consideration. The coal management decisions made in the BFO RMP update will be carried forward in this Approved RMP. Federal coal lands identified acceptable for further coal leasing consideration are available for Lease By Applications, lease modifications, emergency leases, and exchanges. Prior to offering a coal tract for sale, the need to reapply the unsuitability criteria will be reviewed, a tract specific NEPA analysis will be completed, and there will be opportunity for public comment. At the time an application for a new coal lease or lease modification is submitted to the BLM, the BLM will determine whether the lease application area is "unsuitable" for all or certain coal mining methods pursuant to 43 CFR 3461.5. Priority habitat (core population areas and core population connectivity corridors) is essential habitat for maintaining Greater Sage-Grouse for purposes of the suitability criteria set forth at 43 CFR 3461.5(o)(1). | No changes made. | Potential change under Alternative 3. |

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| MO MR:3.4: Priority will be given to leasing and development of fluid mineral resources, including geothermal, outside of Greater Sage-Grouse habitat.<br>When analyzing leasing and authorizing development of fluid mineral resources, including geothermal, in priority habitat (core population areas and core population connectivity corridors) and general habitat, and subject to applicable stipulations for the conservation of Greater Sage-Grouse, priority will be given to development in non-habitat areas first and then in the least suitable habitat for Greater Sage-Grouse. The implementation of these priorities will be subject to valid existing rights and any applicable law or regulation, including, but not limited to, 30 U.S.C. 226(p) and 43 CFR 3162.3-1(h). Where a proposed fluid mineral development project on an existing lease could adversely affect Greater Sage-Grouse populations or habitat, the BLM will work with the lessees, operators, or other project proponents to avoid, reduce and mitigate adverse impacts to the extent compatible with lessees' rights to drill and produce fluid mineral resources. The BLM will work with the lessee, operator, or project proponent in developing an APD for the lease to avoid and minimize impacts to Greater Sage-Grouse or its habitat and will ensure that the best information about the Greater Sage-Grouse and its habitat informs and helps to guide development of such federal leases. | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |

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| **MD O&G-2001: Continue to require lessees to conduct operations in a manner that minimizes adverse impacts to other resources and other land uses and users.<br>Where the federal government owns the mineral estate in Greater Sage-Grouse habitat and the surface is in non-federal ownership, apply to BLM authorizations regulating the federal lessee the same stipulations, COAs, and/or conservation measures and RDFs applied if the mineral estate is developed on BLM-administered surface lands in that management area, to the maximum extent permissible under existing authorities, and in coordination with the landowner.<br>Where the federal government owns the surface and the mineral estate is in non-federal ownership in Greater Sage-Grouse habitat, apply appropriate surface use COAs, stipulations, and mineral RDFs through ROW grants or other surface management instruments, to the maximum extent permissible under existing authorities, in coordination with the mineral estate owner/lessee. | Continue to require lessees to conduct operations in a manner that minimizes adverse impacts to other resources and other land uses and users.<br>Where the federal government owns the mineral estate in Greater Sage-Grouse habitat and the surface is in non-federal ownership, apply to BLM authorizations regulating the federal lessee the same stipulations, COAs, and/or conservation measures and RDFs applied if the mineral estate is developed on BLM-administered surface lands in that management area, to the maximum extent permissible under existing authorities, and in coordination with the landowner.<br>Where the federal government owns the surface and the mineral estate is in non-federal ownership in Greater Sage-Grouse habitat, apply appropriate surface use COAs, stipulations, and mineral RDFs through ROW grants or other surface management instruments, to the maximum extent permissible under existing authorities, in coordination with the mineral estate owner/lessee (see also MD SS WL-4024 and MD SS WL-4036). | Potential change under Alternative 3. |
| **MD O&G-2006: Areas that are open to oil and gas leasing are open to geophysical exploration subject to appropriate mitigation developed through use of the mitigation guidelines described in Appendix F (p. 397). Areas closed to oil and gas leasing are closed to geophysical exploration.<br>Geophysical exploration is subject to motorized travel limitations and restrictions on surface-disturbing and disruptive activities.<br>Geophysical exploration projects that are designed to minimize habitat fragmentation within PHMA would be allowed, except where prohibited or restricted by LUP decisions, and in conformance with timing and distances Management Decisions (see SS WL-4024). | Areas that are open to oil and gas leasing are open to geophysical exploration subject to appropriate mitigation developed through use of the mitigation guidelines described in Appendix F (p. 397). Areas closed to oil and gas leasing are closed to geophysical exploration.<br>Geophysical exploration is subject to motorized travel limitations and restrictions on surface-disturbing and disruptive activities. Geophysical exploration projects that are designed to minimize habitat fragmentation within PHMA would be allowed, except where prohibited or restricted by LUP decisions, and in conformance with timing and distances Management Decisions (see also MD SS WL-4024 and MD SS WL-4036). | No change proposed. |
| MG MR:4: Manage leasable minerals other than oil, gas, coal, and geothermal energy based on demand, while avoiding or mitigating impacts to other resource values. | No changes made. | No change proposed. |

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| MO MR:4.1: Make opportunities available for exploration and development of leasable minerals other than oil, gas, coal, and geothermal energy, while avoiding or mitigating impacts of these activities on other resource values. | No changes made. | No change proposed. |
| MD OL-2001: All lands in the planning area are available to exploration and development of other leasable minerals unless closed to mineral leasing.<br>All non-energy leasable mineral activities would be considered in PHMA, provided that the activities can be completed in compliance with all Greater Sage-Grouse occupancy, timing, density and disturbance restrictions (see SS WL-4024). | All lands in the planning area are available to exploration and development of other leasable minerals unless closed to mineral leasing.<br>All non-energy leasable mineral activities would be considered in PHMA, provided that the activities can be completed in compliance with all Greater Sage-Grouse occupancy, timing, density and disturbance restrictions (see also MD SS WL-4024 and MD SS WL-4036). | Potential change under Alternatives 3 and 6. |
| MO MR:5.1: Provide opportunities for exploration and development of salable minerals while avoiding or mitigating effects to other resource values. | No changes made. | No change proposed. |
| MG FM:1: Life, property, and resource values are protected. The protection of human life is the single, overriding priority. Setting priorities among protecting human communities and community infrastructure, other property and improvements, and natural and cultural resources will be done based on the values to be protected, human health and safety, and the costs of protection. | No changes made. | No change proposed. |
| MO FM:1.1: Respond to unplanned wildfires based on: (1) ecological, (2) social, and (3) legal consequences while supporting other resource values. | No changes made. | No change proposed. |
| MO FM:1.5: Implement appropriate emergency stabilization and rehabilitation actions following wildland fire. | No changes made. | No change proposed. |
| MG FM:2: Plant community and hazardous fuel objectives are achieved. | No changes made. | No change proposed. |
| MO FM:2.1: Improve fire regime condition class and maintain or improve conditions of fire-adapted landscapes by managing fire, planned and unplanned, to accomplish beneficial resource objectives. | No changes made. | No change proposed. |
| MD Fire-3001: A Fire Management Plan for the Wyoming High Plains District will be maintained that more specifically outlines management response and implementation actions for wildland fire response of public lands. | No changes made. | No change proposed. |

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| MD Fire-3002: A resource advisor appropriate to the potentially affected resource will be consulted, or assigned, to all wildland fires that involve or threaten BLM-administered lands. | No changes made. | No change proposed. |
| MD Fire-3006: Implement the BLM Emergency Stabilization and Burned Area Rehabilitation standards located in the DOI Interagency Burned Area Emergency Response Guidebook (DOI 2004) and BLM Burned Area Emergency Stabilization and Rehabilitation Handbook (BLM 2007a) as needed. Appendix P (p. 625) provides additional information regarding the BLM's approach to emergency stabilization and rehabilitation. | No changes made. | No change proposed. |
| MD Fire-3007: Use the District Fire Management Plan to implement the objectives of this RMP; to address fire management on a landscape scale, to maintain or improve conditions in fire-adapted landscapes, and to accomplish resource management objectives. | No changes made. | No change proposed. |

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| MD Fire-3008: Ensure all prescribed burning activities comply with Wyoming DEQ air quality standards and smoke management rules.<br>For fuels management, the BLM would consider multiple tools for fuels reduction and would analyze in NEPA compliance documentation before electing to implement prescribed fire in PHMAs. If prescribed fire is used in Greater Sage-Grouse habitat, the NEPA analysis for the Burn Plan will address:<br>• why alternative techniques were not selected as a viable options;<br>• how Greater Sage-Grouse goals and objectives would be met by its use;<br>• how the Conservation Objectives Team Report objectives would be addressed and met;<br>• a risk assessment to address how potential threats to Greater Sage-Grouse habitat would be minimized.<br>Prescribed fire as a vegetation or fuels treatment shall only be considered after the NEPA analysis for the Burn Plan has addressed the four bullets outlined above. Prescribed fire could be used to meet specific fuels objectives that would protect Greater Sage-Grouse habitat (e.g., creation of fuel breaks that would disrupt the fuel continuity across the landscape in stands where annual invasive grasses are a minor component in the understory, burning slash piles from conifer reduction treatments, used as a component with other treatment methods to combat annual grasses and restore native plant communities).<br>Prescribed fire in known Greater Sage-Grouse winter range shall only be considered after the NEPA analysis for the Burn Plan has addressed the four bullets outlined above. Any prescribed fire in winter habitat would need to be designed to strategically reduce wildfire risk around and/or in the winter range and designed to protect winter range habitat quality. | No changes made. | No change proposed. |
| MD Fire-3011: Response to wildfire varies from full protection in areas where fire is undesirable to monitoring fire behavior in areas where fire can be managed to accomplish other resource objectives. The entire planning area is available to manage wildfire for multiple objectives. | No changes made. | No change proposed. |

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| MD Fire-3012: Prohibit heavy equipment use within the following areas, except when human safety is at risk or if the expected fire effects would cause more resource damage than the use of heavy equipment:<br>• Areas of cultural resource sensitivity<br>• Riparian/wetland habitats<br>• Identified Greater Sage-Grouse important habitats: Core Population Areas, nesting, brood-rearing, Core Population Connectivity Corridors, or winter habitat<br>• Areas of highly erosive soils<br>• Lands with wilderness characteristics<br>Limit heavy equipment usage to existing roads and trails, or immediately adjacent to them, in areas not identified as full protection. | No changes made. | No change proposed. |
| MD Fire-3013: Use protection strategies in the following areas:<br>• WUI<br>• Wildland Industrial Interface<br>• Developed recreation<br>• Developed electronic/communication sites of all types<br>• Where sensitive or high value resources would be adversely affected by fire (i.e., Greater Sage-Grouse Core Population Area and Connectivity Corridor) | No changes made. | No change proposed. |

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| MD Fire-3014: Evaluate all fires and rehabilitate fire-damaged lands as needed to meet resource objectives. Repair suppression damages as necessary.<br>Post ES&R and BAER management would be designed to ensure long-term persistence of seeded or pre-burn native plants. This may require temporary or long-term changes in livestock grazing, wild horse, and travel management, etc., to achieve and maintain the desired condition of ES&R and BAER projects to benefit Greater Sage-Grouse (Eiswerth and Shonkwiler 2006).<br>The BLM could bring in BAR and BAER teams who would work collaboratively with partners at the federal, state, and local level to rehabilitate and restore Greater Sage-Grouse habitats in a manner consistent with the core habitat population area strategy for conservation. DDCT reviews would be conducted in coordination with the WGFD Habitat Protection Program located in Cheyenne, Wyoming at the WGFD headquarters. Areas within PHMAs would be high priority for restoration of Greater Sage-Grouse habitat beyond immediate response. | No changes made. | No change proposed. |
| MD Fire-3015: Use wildland fire and other vegetation treatments to meet desired management objectives. | No changes made. | No change proposed. |
| MG BR:1: Vegetation resources sustained in desired ecological conditions. | No changes made. | No change proposed. |
| MO BR:1.1: Manage communities for a diversity of native species, habitats, seral stages, and distribution. | No changes made. | No change proposed. |
| MO BR:1.2: Manage for healthy vegetation communities to ensure their capability to provide sufficient plant composition, cover, and litter accumulation to protect soils from wind and water erosion and enhance nutrient cycling and productivity. | No changes made. | No change proposed. |
| MO BR:1.3: Reclaim areas affected by surface-disturbing activities to promote healthy functioning native plant communities. | No changes made. | No change proposed. |
| MO BR:1.4: Manage habitat to facilitate the conservation, recovery, and maintenance of populations of native, desirable non-native, and special status plant species consistent with appropriate local, state, and federal conservation requirements and management plans. | No changes made. | No change proposed. |
| MO BR:1.5: Manage for healthy native plant communities by reducing and managing invasive, non-native noxious species. | No changes made. | No change proposed. |

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| MD Forest-4006: Actively manage woodlands to prevent expansion into other communities consistent with multiple resource values, on a project-specific basis. | No changes made. | No change proposed. |
| MG BR:3: A diverse landscape of native grasslands and shrublands sustained in desired ecological conditions. | No changes made. | No change proposed. |
| MO BR:3.1: Manage for a full range of sagebrush, shrub, and grassland communities with diverse native species and subspecies, composition, canopies, densities, and age classes across the landscape. | No changes made. | No change proposed. |
| MD GS-4001: Manage vegetative communities in accordance with Wyoming Standards for Healthy Rangelands and Guidelines for Livestock Grazing Management for the Public Lands Administered by the BLM in the State of Wyoming. | No changes made. | No change proposed. |
| MD GS-4003: Use an integrated management approach (e.g., mechanical, chemical, biological treatments, prescribed fire, and grazing management techniques) to maintain, restore, and enhance the health and diversity of plant communities to achieve resource or multi-resource objectives. | No changes made. | No change proposed. |
| MD GS-4005: Manage grasslands and shrublands to protect, preserve, or enhance plant communities. | No changes made. | No change proposed. |
| MD GS-4006: Manage the siting of facilities and related infrastructure (utility corridors, roads) to reduce impacts to vegetation resources. | No changes made. | No change proposed. |
| MD GS-4007: Manage the planning and development of travel routes, recreational uses, mineral exploration and development sites, and ROW to reduce impacts to the vegetation resource. | No changes made. | No change proposed. |
| MD GS-4008: Develop a contingency plan addressing catastrophic natural events such as drought, wildfires, and large-scale pest infestations, incorporating strategies that best protect vegetation resources. | No changes made. | No change proposed. |
| MD GS-4009: Work with landowners on split estate lands to reestablish disturbed sites to healthy plant communities in accordance with the ecological site potential | No changes made. | No change proposed. |
| MG BR:4: Health and functional capabilities in riparian/wetland systems. | No changes made. | No change proposed. |
| MO BR:4.1: Manage lotic and lentic wetland/riparian systems at a minimum to achieve and/or maintain PFC. | No changes made. | No change proposed. |

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| MO BR:4.2: Improve riparian systems and wetlands in systems operating at less than PFC. | No changes made. | No change proposed. |
| MO BR:4.3: Manage contributing watersheds to sustain riparian health and water quality. | No changes made. | No change proposed. |
| MO BR:4.4: Manage and enhance riparian and wetland systems for plant, insect, fish and wildlife species that depend on these systems for their health and well being. | No changes made. | No change proposed. |
| MO BR:4.5: CBNG created riparian and wetland systems will be evaluated, retained, or reclaimed to support vegetation and other resource values. | No changes made. | No change proposed. |
| MD Riparian-4002: Prioritize, and develop activity and implementation plans to manage riparian systems to be at or above, or continue to be improving toward, PFC while achieving the Standards for Healthy Rangelands and Guidelines for Livestock Grazing Management for the Public Lands Administered by the BLM in the State of Wyoming. | No changes made. | No change proposed. |
| MD Riparian-4003: Manage riparian and wetland systems to enhance forage conditions and improve water quality. Manage all riparian systems with sensitive species concerns to a succession stage appropriate for that system, including vertical as well as horizontal vegetative structure and composition. | No changes made. | No change proposed. |
| MD Riparian-4004: Expand and enhance riparian/wetland systems and habitat in cooperation with stakeholders. | No changes made. | No change proposed. |
| MD Riparian-4005: Prevent degradation, loss, or destruction of riparian/wetland habitat. | No changes made. | No change proposed. |
| MD Riparian-4008: Allow surface-disturbing activities within 500 feet of riparian/wetlands systems with an approved site-specific plan that ensures construction, stabilization, and reclamation methods are meeting resource objectives, including, but not limited to soil, vegetation and wildlife habitat. | No changes made. | No change proposed. |
| MD Riparian-4010: Identify and manage systems capable of achieving DFC. | No changes made. | No change proposed. |
| MD Riparian-4011: Restore vegetation in CBNG supported wetland and riparian systems on BLM surface and/or lease in accordance with the ecological site potential. | No changes made. | No change proposed. |
| MG BR:5: Healthy native communities with manageable levels of pathogens, undesirable, invasive, non-native, or noxious species. | No changes made. | No change proposed. |

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| MO BR:5.1: Develop and maintain baseline information regarding the extent, location, and potential impact(s) of pest species. From this baseline information develop and implement an Integrated Pest Management Plan. Integrated management would be used to control, suppress, and eradicate, where possible, noxious and invasive species per BLM Handbook H-1740-2. Manage noxious or invasive species treatments to maintain or improve Greater Sage-Grouse habitat. Apply Required Design Features as Conditions of Approval, such as those in Appendix C (p. 285). Encourage the use of voluntary BMPs. | Develop and maintain baseline information regarding the extent, location, and potential impact(s) of pest species. From this baseline information develop and implement an Integrated Pest Management Plan. Integrated management would be used to control, suppress, and eradicate, where possible, noxious and invasive species per BLM Handbook H-1740-2. Manage noxious or invasive species treatments to maintain or improve Greater Sage-Grouse habitat. Apply Required Design Features as Conditions of Approval, such as those in the 2019 Wyoming GrSG ARPMA Appendix B. Encourage the use of voluntary BMPs. | No change proposed. |
| MO BR5.2: Facilitate support for an integrated approach for the detection, management, or eradication of new and minor infestations. | No changes made. | No change proposed. |
| MO BR:5.3: Develop, implement, and maintain a management program for annual bromes and other invasive or undesirable species not listed as noxious, utilizing the best available science and BMPs. | No changes made. | No change proposed. |
| MO BR:5.4: Coordinate with APHIS to facilitate pest and predator management. | No changes made. | No change proposed. |
| MD Pest-4002: Manage designated pests on public surface lands using an Integrated Pest Management Approach consistent with DOI Manual 517 (BLM 2007b). | No changes made. | No change proposed. |
| MD Pest-4003: Limit surface disturbance to the minimum needed for safe project completion to limit the spread of noxious weeds. | No changes made. | No change proposed. |
| MD Pest-4004: Use certified noxious weed seed-free products on all BLM-administered projects and lands. | No changes made. | No change proposed. |
| MD Pest-4005: Implement and maintain cooperative integrated pest management programs with county weed and pest districts, state agencies, private industry, grazing lessees, and other stakeholders in conjunction with BLM weed and pest control work on public lands adjoining deeded and state lands. | No changes made. | No change proposed. |
| MD Pest-4006: Require surface or vegetation disturbance areas, including areas formerly receiving or holding water, be treated for invasive species and revegetated. | No changes made. | No change proposed. |

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| MD Pest-4009: Treat those plants on the State of Wyoming Designated list, the appropriate county lists, and other species of concern as determined by BLM resource specialists.<br>Note: Priority treatments are those areas where infestations on private land are threatening public lands. Treat areas that contain annual bromes and/or other invasive species to minimize competition and favor establishment of desired species | No changes made. | No change proposed. |
| MD Pest-4010: Designate and prioritize areas for the treatment of annual brome species. | No changes made. | No change proposed. |
| MG BR:6: Distribution and abundance of all native and desirable non-native species are optimized. | No changes made. | No change proposed. |
| MO BR:6.1: BLM actions prevent and/or reduce impacts to desirable species. | No changes made. | No change proposed. |
| MO BR:6.2: In coordination with cooperating agencies, develop and implement an achievable Wildlife Monitoring and Protection Plan. | No changes made. | No change proposed. |
| MO BR:6.3: Maintain, restore, or improve the continuity and productivity of fish and wildlife habitats to support WGFD population objectives. | No changes made. | No change proposed. |
| MO BR:6.4: Develop and implement an adaptive conservation and management strategy. | No changes made. | No change proposed. |
| MG BR:7: Sufficient functional habitat for native and desirable non-native species. | No changes made. | No change proposed. |
| MO BR:7.1: Evaluate, update, and revise as necessary existing Wildlife Habitat Management Plans. | No changes made. | No change proposed. |
| MO BR:7.2: Develop Wildlife Habitat Management Plans for areas with important habitats. | No changes made. | No change proposed. |
| MO BR:7.3: Manage habitat consistent with local, state, and federal management plans, as applicable. | No changes made. | No change proposed. |
| MO BR:7.4: Continue to gather habitat and population data while concurrently monitoring human and natural disturbance dynamics to improve habitat management. | No changes made. | No change proposed. |
| MO BR:7.5: Provide security habitat, sufficient in amount and distribution, to support WGFD population objectives for fish and wildlife to escape from disruptive activities. | No changes made. | No change proposed. |
| MO BR:7.6: Maintain and provide functioning sagebrush habitat to sustain sagebrush obligates and other sagebrush dependent species. | No changes made. | No change proposed. |

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| MG BR:8: Fish and wildlife are able to move between areas of functionally intact habitat. | No changes made. | No change proposed. |
| MO BR:8.1: Develop Travel Management Plans for areas important for fish and wildlife while supporting other resource values. | No changes made. | No change proposed. |
| MO BR:8.2: Develop a ROW Management Plan for utility corridors to manage impacts to areas of habitat important to fish and wildlife consistent with other resource values. | No changes made. | No change proposed. |
| MO BR:8.3: Land acquisitions should support desirable fish and wildlife populations or habitat. | No changes made. | No change proposed. |
| MO BR:8.4: Restore functionality to areas of degraded habitat important to fish and wildlife populations consistent with other resource values. | No changes made. | No change proposed. |
| MD Fish-4008: Maintain or enhance streams and riparian areas associated with Class I and II streams (WGFD classifications), Powder River, Tongue River, and other appropriate areas for desired fisheries potential. | No changes made. | No change proposed. |
| MD Fish-4012: Allow surface-disturbing activities within 0.25 mile of naturally occurring water bodies containing native and desirable non-native fish species where fish resource objectives can be met. | No changes made. | No change proposed. |
| MD WL-4001: Develop appropriate mitigation for surface-disturbing and disruptive activities associated with wildlife habitat management through use of the mitigation guidelines described in Appendix F (p. 397). | No changes made. | No change proposed. |
| MD WL-4002: Maintain or improve important wildlife habitats through vegetative manipulations, habitat improvement projects, livestock grazing strategies and the application of The Wyoming Guidelines for Managing Sagebrush Communities with Emphasis on Fire Management (Wyoming Interagency Vegetation Committee 2002) and Appendix F (p. 397), WGFD Strategic Habitat Plan (WGFD 2001), State Wildlife Action Plan (WGFD 2010), and similar guidance updated over time. | No changes made. | No change proposed. |

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| MD WL-4003: Continue to use existing Habitat Management Plans and update as necessary to include management objectives and prescriptions for wildlife: South Big Horns Habitat Management Plan (BLM 1986b), including a portion or all of the Gardner Mountain and North Fork WSAs; Wetlands Habitat Management Plan (BLM 1986a); and Middle Fork Powder River Habitat Management Plan (BLM 1980). | No changes made. | No change proposed. |
| MD WL-4005: Consult with the WGFD and USFWS, in accordance with MOUs, when applying mitigation for wildlife and before waiving, allowing exceptions to, or modifying wildlife-related land use restrictions and mitigation. | No changes made. | No change proposed. |
| MD WL-4006: Provide, to the extent possible, suitable habitat and forage to support wildlife population objectives as defined by WGFD.<br>BLM will cooperatively consider proposals by the WGFD to change population objective levels based on habitat capability and availability. | No changes made. | No change proposed. |
| MD WL-4007: Manage access to protect crucial habitats in cooperation with WGFD and other stakeholders. | No changes made. | No change proposed. |
| MD WL-4008: Utilize current research, management and conservation plans, and similar related documents to guide wildlife habitat management. | No changes made. | No change proposed. |
| MD WL-4009: Construct new fences to avoid adverse impacts to wildlife and in accordance with BLM Fencing Handbook 1741-1 (BLM 1989) and WO Instruction Memorandum 2010-022: Managing Structures for the Safety of Sage-grouse, Sharp-tailed grouse, and Lesser prairie chicken (BLM 2009b). | No changes made. | No change proposed. |
| MD WL-4012: Inventory, record, and report existing type, condition, and location of BLM fences. Prioritize fence projects and annually implement modifications in accordance with appropriate wildlife needs and the BLM Fencing Handbook 1741-1. | No changes made. | No change proposed. |
| MD WL-4013: Allow surface-disturbing and disruptive activities to occur throughout the entire life of projects during seasons important for wildlife when wildlife resource objectives can be met | No changes made. | No change proposed. |

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| MD WL-4014: Powerlines (distribution and transmission) will be designed to minimize wildlife related impacts and constructed to the latest APLIC guidance.<br>Prohibit above ground distribution powerlines unless identified in an approved distribution plan. | No changes made. | No change proposed. |
| MD Cultural-5007: Prohibit surface disturbance within the following sites:<br>• Pumpkin Buttes<br>• Cantonment Reno<br>• Dull Knife Battle<br>• Crazy Woman Battle<br>• Contributing and Unevaluated Segments of the Bozeman Trail<br>• All Rock Art Sites<br>• All Rock Shelter Sites<br>• All Native American Burials<br>Allow surface disturbance and infrastructure within 3.0 miles of the following sites where development is either not visible, or will result in a weak contrast to the setting:<br>• Pumpkin Buttes<br>• Cantonment Reno<br>• Dull Knife Battle<br>• Crazy Woman Battle<br>• Contributing and Unevaluated Segments of the Bozeman Trail<br>• All Rock Art Sites<br>• All Native American Burials | No changes made. | No change proposed. |
| MD Paleo-5001: Retain public lands with significant paleontological values. | No changes made. | No change proposed. |
| MD Paleo-5006: Avoid areas containing paleontological resources of high quality or importance when developing locatable minerals. | No changes made. | No change proposed. |
| MD Paleo-5007: Apply an NSO stipulation to mineral leases in areas containing paleontological resources of high quality or importance. | No changes made. | No change proposed. |
| MD Paleo-5008: Avoid areas containing paleontological resources of high quality or importance when developing salable minerals. | No changes made. | No change proposed. |
| MD VRM-5002: Incorporate BMPs for visual resources into project planning for federal actions. | No changes made. | No change proposed. |
| MG LR:2: Manage land tenure adjustments and land use authorizations to meet the needs of the customers while protecting other resource values. | No changes made. | No change proposed. |

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| MO LR:2.1: Develop and maintain a land-ownership pattern that improves access for public use, and improves management and protection of BLM-administered lands by:<br>1. Acquiring legal easements to BLM-administered lands for recreational opportunities and administrative use.<br>2. Responding to requests for land authorizations for access needs.<br>3. Responding to requests for land transfers.<br>4. Giving priority to land exchanges and/or sales on custodial grazing allotments while supporting other resource values. | No changes made. | No change proposed. |
| MO LR:2.3: Effects of infrastructure projects, including siting, will be minimized using the best available science, updated as monitoring information on current infrastructure projects becomes available. | No changes made. | No change proposed. |
| MD L&R-6002: Consider land use authorizations (permits, leases, etc.) on a project-specific basis consistent with other resource objectives. | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |
| MD L&R-6003: Consider withdrawals for surface and/or minerals on a project-specific basis. | No changes made. | No change proposed. |
| MD L&R-6011: Acquire private or state land or interest in land from willing sellers consistent with other resource objectives, on a project-specific basis. | No changes made. | No change proposed. |

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| **MD L&R-6012: Acquire and dispose of land based on all resource values, including but not limited to agricultural potential and water. Do not classify, open, or make available any BLM-administered public lands within the planning area for agricultural leasing or agricultural entry under either Desert Land Entry or Indian Allotment for one or more of the following reasons: rugged topography, presence of sensitive resources, lack of water or access, small parcel size, and/or unsuitable soils.<br>Lands classified as PHMA and GHMA for Greater Sage-Grouse will be retained in federal management unless: (1) the agency can demonstrate that disposal of the lands, including land exchanges, will provide a net conservation gain to the Greater Sage-Grouse or (2) the agency can demonstrate that the disposal, including land exchanges, of the lands will have no direct or indirect adverse impact on conservation of the Greater Sage-Grouse.<br>Exceptions would be considered where there is mixed ownership and land exchanges would allow for additional or more contiguous federal ownership patterns within PHMA. For PHMA with minority federal ownership, an additional, effective mitigation agreement would be included for any disposal of federal land. As a final preservation measure, consideration should be given to pursuing a permanent conservation<br>easement.<br>For lands in GHMA that are identified for disposal, the BLM will only dispose of such lands consistent with the goals and objectives of this plan, including, but not limited to, the land use plan goal to conserve, recover, and enhance Greater Sage-Grouse habitat on a landscape scale. | No changes made. | No change proposed. |
| MD L&R-6014: Prioritize acquiring land or interests in lands in areas adjacent to large blocks of BLM-administered land or other lands having significant resource or other values before other areas. | No changes made. | No change proposed. |
| MG LR:4: Primary infrastructure corridors and subsidiary routes consistent with other resource values. | No changes made. | No change proposed. |
| MO LR:4.1: Manage public lands to meet the needs of ROW customers while supporting other resource values. | No changes made. | No change proposed. |

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| MO LR:4.3: Identify infrastructure corridors consistent with other resource values. | No changes made. | No change proposed. |
| MO LR:4.4: Make opportunities available for exploration and development of CO2 sequestration research and activities, while avoiding or mitigating impacts of these activities on other resource values. | No changes made. | No change proposed. |
| MO LR:4.5: Effects of infrastructure projects, including siting, will be minimized using the best available science, updated as monitoring information on current infrastructure projects becomes available. | No changes made. | No change proposed. |
| MD ROW-6001: Designate corridors for major ROW to minimize surface disturbance and impacts to other resources. | No changes made. | No change proposed. |
| MD ROW-6004: The preferred location for new ROW will be in or adjacent to existing disturbed areas associated with existing ROW, constructed roads, or highways. | No changes made. | No change proposed. |
| MD ROW-6005: Maintain a transportation management system in cooperation with appropriate state and local agencies to meet public and resource management needs. | No changes made. | No change proposed. |
| MD ROW-6006: Make lands available for ROW in accordance with management identified within the Approved RMP to conserve other resources. This results in:<br>• 79,777 acres excluded from ROW.<br>• 321,149 acres identified for ROW avoidance.<br>PHMA would be managed as ROW avoidance areas for new ROW or SUA permits. Within PHMA where new ROWs/SUAs are necessary, new ROWs/SUAs would be located within designated RMP corridors or adjacent to existing ROWs/SUAs where technically feasible. Subject to valid existing rights including non-federal land inholdings, required new ROWs/SUAs would be located adjacent to existing ROWs/SUAs or where it best minimizes Greater Sage-Grouse impacts.<br>Greater Sage-Grouse priority habitat (Core Population Areas and Core Population Connectivity Corridors) are designated as avoidance areas for ROWs.<br>• 381,176 acres are open for ROW development. | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |

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| MD ROW-6009: Designate the following corridors for major ROW transportation and utility use, in cooperation with the State of Wyoming:<br>• Echeta Road<br>• Sheridan to Gillette, largely following US 14/16<br>• Highway 59 north of Gillette<br>• Interstate 25<br>• Interstate 90, Gillette to Montana State Line<br>• Powder River<br>• Powder River Breaks (Buffalo to Gillette)<br>Corridor use is required. No above ground lines will be authorized in the Powder River or Powder River Breaks corridors. Corridor requirements within Greater Sage-Grouse habitat are identified in SS WL-4022. | No changes made. | No change proposed. |
| MD ROW-6010: Authorize and place above ground facilities (i.e., compressors, electric distribution powerlines) within ROW and other disturbance areas when resource objectives can be met. | No changes made. | No change proposed. |
| MD ROW-6012: Evaluate CO2 sequestration proposals where in accordance with management identified within the Approved RMP. | No changes made. | No change proposed. |
| MG LR:5: A safe transportation network that supports other resource values. | No changes made. | No change proposed. |
| MO LR:5.1: Utilize a comprehensive travel management approach to sustain and enhance access, recreational experiences, and support other resource values. | No changes made. | No change proposed. |
| MO LR:5.3: Designate all BLM-administered lands as Open, Limited, or Closed to OHV use, in consideration of other resource values. | No changes made. | No change proposed. |
| MO LR:5.4: Provide for acceptable modes of legal public access that supports other resources, reduces conflicts, and provides for diverse recreation opportunities. | No changes made. | No change proposed. |
| MD Trans-6002: Evaluate roads constructed under other initiatives (e.g., oil and gas exploration) for inclusion in the BLM transportation system. Roads that are no longer needed for their original purposes are assessed for addition to the BLM transportation system prior to reclamation. | No changes made. | No change proposed. |

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| MD Trans-6004: Design, construct, and maintain roads or trails based on the specific objectives for that trail or road in consideration of other resources. Design, construct, and maintain roads to minimize surface disturbance, changes to surface water runoff, and erosion. | No changes made. | No change proposed. |
| MD Trans-6006: Base road or trail closures and abandonments on resource protection, demand for new roads, and accommodation of authorized uses. | No changes made. | No change proposed. |
| MD Trans-6007: Maintain transportation system roads under BLM jurisdiction in accordance with assigned maintenance levels and in consideration of other resource values. Maintain administrative roads on an as needed basis, dependent on time, funding, and access priorities. | No changes made. | No change proposed. |
| MD Trans-6008: Within 5 years of the ROD, inventory all routes on public land and develop a travel management plan to classify and designate routes for continued use or decommissioning and reclamation. Include maintenance standards for routes to be retained for public use, as well as specific measures to accomplish road closure in the travel management plan. Inventory, designate, number, and sign all routes as appropriate. Posted signs will include allowed uses and activities. Restrictions to existing roads and trails remains in effect until travel management planning is completed and designated routes are identified. Appendix S (p. 667) provides additional information regarding the travel management planning process. | No changes made. | No change proposed. |

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| MD Trans-6013: Allow temporary closures to motorized vehicle use in areas that pose public health and safety risks, and/or where resource damage is imminent.<br>In Greater Sage-Grouse priority habitat (Core Population Areas and Core Population Connectivity Corridors) and general habitat, temporary closures will be considered in accordance with 43 CFR subpart 8364 (Closures and Restrictions); 43 CFR subpart 8351 (Designated National Area); 43 CFR subpart 6302 (Use of Wilderness Areas, Prohibited Acts, and Penalties); 43 CFR subpart 8341 (Conditions of Use).<br>Temporary closure or restriction orders under these authorities are enacted at the discretion of the authorized officer to resolve management conflicts and protect persons, property, and public lands and resources. Where an authorized officer determines that OHVs are causing or will cause considerable adverse effects upon soil, vegetation, wildlife, wildlife habitat, cultural resources, historical resources, threatened or endangered species, wilderness suitability, other authorized uses, or other resources, the affected areas shall be immediately closed to the type(s) of vehicle causing the adverse effect until the adverse effects are eliminated and measures implemented to prevent recurrence (43 CFR 8341.2). A closure or restriction order should be considered only after other management strategies and alternatives have been explored. The duration of temporary closure or restriction orders should be limited to 24 months or less; however, certain situations may require longer closures and/or iterative temporary closures. This may include closure of routes or areas. | No changes made. | No change proposed. |
| MD Trans-6014: Limit OHV use to designated routes unless compelling reasons exist to classify parcels as Open or Closed, and is consistent with other resource values. Until individual routes are designated, areas subject to route designation will be classified as Limited to existing routes. Once route designation is completed, areas will no longer be classified as Limited to existing routes. | No changes made. | No change proposed. |

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| MD Trans-6019: Limit motorized vehicle use to designated routes within habitat of special status species consistent with travel management designations for that area. Routes will be designated to avoid occupied habitat during travel management planning. | No changes made. | No change proposed. |
| MD Trans-6020: Evaluate existing routes in the vicinity of any new system roads for closure and reclamation consistent with other resource values. | No changes made. | No change proposed. |
| MO LR:7.2: Manage recreation to protect resources, maintain public health and safety, and to provide a diverse array of benefits to the public. | No changes made. | No change proposed. |
| MG LR:8: Recreation facilities balance public demand with other resource values. | No changes made. | No change proposed. |
| MO LR:8.1: Design and maintain recreation sites to meet acceptable health and safety standards while supporting other resource values. | No changes made. | No change proposed. |
| MD Rec-6003: Open the planning area to dispersed recreation where consistent with other resource values. | No changes made. | No change proposed. |
| MD Rec-6010: Avoid riparian habitat or develop and manage recreational sites, recreation facilities, and recreational access in a manner that minimizes impacts to riparian habitats. | No changes made. | No change proposed. |
| MD Rec-6011: Prohibit dispersed camping and commercial camps within 200 feet of perennial surface water. | No changes made. | No change proposed. |
| **MD Rec-6015: Allow additional recreation facilities in areas where they are supported by recreational use and are consistent with other resource values.<br>Construction of recreation facilities within Greater Sage-Grouse PHMA (Core Population Areas and Core Population Connectivity Corridors) must conform with the avoidance and minimization measures of this plan. If it is determined that these conservation measures are inadequate for the conservation of Greater Sage-Grouse, the BLM will require and ensure compensatory mitigation that provides a net conservation gain to the species. | Allow additional recreation facilities in areas where they are supported by recreational use and are consistent with other resource values.<br>Construction of recreation facilities within Greater Sage-Grouse PHMA (Core Population Areas and Core Population Connectivity Corridors) must conform to the avoidance and minimization measures of this plan. If it is determined that these conservation measures are inadequate for the conservation of Greater Sage-Grouse, the BLM will consider mitigation consistent with the applicable State Management Strategy (currently Governor's Executive Order 2015-4) (see also MD SS WL-4036). | No change proposed. |

| 2014/2015 Approved RMPs | 2019 Approved RMPs | Potential Change in 2023 Plan |
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| MD Rec-6018: Designate the following areas as SRMAs and delineate discrete recreation management zone boundaries:<br>• Burnt Hollow (17,280 acres)<br>• Dry Creek Petrified Tree (2,567 acres)<br>• Hole-in-the-Wall (11,952 acres)<br>• Middle Fork Powder River (10,083 acres)<br>• Mosier Gulch (1,026 acres)<br>• Welch Ranch (1,748 acres)<br>• Weston Hills (9,504 acres)<br>Strategically emphasize a variety of recreation opportunities along with the protection of natural and cultural resources. R&VS management will be recognized as the predominant land use focus in SRMAs. Manage SRMAs under site-specific management plans. Site-specific management plans will be consistent with and implement the provisions specified for SRMAs in Appendix T (p. 679). | No changes made. | No change proposed. |
| MD Rec-6019: Do not lease minerals within the boundary of the following SRMAs:<br>• Burnt Hollow (17,280 acres)<br>• Dry Creek Petrified Tree (2,567 acres)<br>• Hole-in-the-Wall (11,952 acres)<br>• Middle Fork Powder River (10,083 acres)<br>• Mosier Gulch (1,026 acres)<br>• Welch Ranch (1,748 acres)<br>Lease fluid minerals with a CSU stipulation to be consistent with SRMA management in the following SRMA:<br>• Weston Hills (9,504 acres) | No changes made. | No change proposed. |
| MD Rec-6021: Allow surface disturbance within designated SRMAs for administrative use only, where consistent with other resource values. | No changes made. | No change proposed. |
| MD Rec-6022: Recommend withdrawals from mineral entry under the mining laws in designated SRMAs. | No changes made. | No change proposed. |
| MD Rec-6023: Allow salable mineral development within designated SRMAs for administrative use only. | No changes made. | No change proposed. |
| MG LR:11: Public rangelands provide for a sustainable level of livestock grazing consistent with other resource values and sustained yield. | No changes made. | Potential change under Alternative 3. |

| 2014/2015 Approved RMPs | 2019 Approved RMPs | Potential Change in 2023 Plan |
|---|---|---|
| MO LR:11.2: Manage forage to maintain or improve ecological states and achieve and/or maintain Standards for Healthy Rangelands and Guidelines for Livestock Grazing Management for the Public Lands Administered by the BLM in the State of Wyoming. | No changes made. | Potential change under Alternative 3. |
| MO LR:11.3: Monitor and evaluate rangeland health and condition in coordination with cooperators, and lessees to determine if, and what additional management is needed to achieve desired ecological state. | No changes made. | Potential change under Alternative 3. |
| MD Grazing-6001: Develop and implement appropriate livestock grazing management actions to achieve the Standards for Healthy Rangelands and Guidelines for Livestock Grazing Management for the Public Lands Administered by the BLM in the State of Wyoming, to provide watershed protection, to improve forage for livestock, forage and habitat for wildlife, and enhance rangeland health. | No changes made. | Potential change under Alternative 3. |
| MD Grazing-6004: Continue implementation of existing AMPs. Develop and implement new AMPs with grazing lessees and other stakeholders to achieve desired resource goals and objectives. | No changes made. | Potential change under Alternative 3. |
| MD Grazing-6005: Manage livestock grazing to sustain riparian, wetland, mountain mahogany, specials status species or other special habitats. | No changes made. | Potential change under Alternative 3. |
| MD Grazing-6009: Implement strategies that best protect rangeland resources during periods of drought. Cooperate with stakeholders for voluntary adjustments in livestock use and/or livestock management. | No changes made. | Potential change under Alternative 3. |
| MD Grazing-6015: Develop range improvements in accordance with resource needs and livestock management. | No changes made. | Potential change under Alternative 3. |
| MD Grazing-6016: Conduct baseline inventories. Develop, implement, and monitor AMPs. Base AMP goals/objectives in Category I and M allotments on resource protection and watershed health. | No changes made. | Potential change under Alternative 3. |

| 2014/2015 Approved RMPs | 2019 Approved RMPs | Potential Change in 2023 Plan |
|---|---|---|
| *MD Grazing- 6017: Allow livestock grazing on all public lands in the planning area except where an evaluation has determined it to be incompatible with other resource uses or values (campgrounds, entrances of caves, sites of cultural significance).<br>• The BLM will prioritize (1) the review of grazing permits/leases, in particular to determine if modification is necessary prior to renewal, and (2) the processing of grazing permits/leases in Greater Sage-Grouse priority habitat (Core Population Areas and Core Population Connectivity Corridors) followed by general habitat. In setting workload priorities, precedence will be given to existing permits/leases in these areas not meeting Land Health Standards, with focus on those containing riparian areas, including wet meadows. The BLM may use other criteria for prioritization to respond to urgent natural resource concerns (e.g., fire) and legal obligations.<br>• The BLM will collaborate with appropriate federal agencies and the State of Wyoming, as contemplated under the Wyoming Governor's Executive Order 2013-3, to: (1) develop appropriate conservation objectives; (2) define a framework for evaluating situations where Greater Sage-Grouse conservation objectives are not being achieved on federal land, to determine if a significant causal relationship exists between improper grazing (by wildlife or wild horses or livestock) and Greater Sage-Grouse conservation objectives; and (3) identify appropriate site-based actions to achieve<br>Greater Sage-Grouse conservation objectives within the framework. Absent substantial and compelling information that adjustments are necessary to the core population area strategy, these core population areas, connectivity areas, identified and mapped winter concentration areas, and protective stipulations shall not be altered for a minimum of 7 years. Any changes shall involve a transparent process that provides an opportunity for public input and proper consideration of any proposal consistent with the provisions contemplated | Allow livestock grazing on all public lands in the planning area except where an evaluation has determined it to be incompatible with other resource uses or values (campgrounds, entrances of caves, sites of cultural significance).<br>• The BLM will prioritize (1) the review of grazing permits/leases, in particular to determine if modification is necessary prior to renewal, and (2) the processing of grazing permits/leases in Greater Sage-Grouse priority habitat (Core Population Areas and Core Population Connectivity Corridors) followed by general habitat. In setting workload priorities, precedence will be given to existing permits/leases in these areas not meeting Land Health Standards, with focus on those containing riparian areas, including wet meadows. The BLM may use other criteria for prioritization to respond to urgent natural resource concerns (e.g., fire) and legal obligations.<br>• Within PHMA, if monitoring data show the wildlife/special status species standard has not been met nor progress being made toward meeting that standard, there would be an evaluation and a determination made as to the cause. If it is determined that the current authorized livestock use is a significant causal factor in failing to achieve the wildlife/special status species standards, the BLM would address the achievement or progress toward achieving the LHSs (43 CFR 4180.2) and, if needed, Greater Sage-Grouse habitat maintenance or improvement.<br>• The BLM will collaborate with appropriate federal agencies and the State of Wyoming, as contemplated under the Wyoming Governor's Executive Order 2013-3, to: (1) develop appropriate conservation objectives; (2) define a framework for evaluating situations where Greater Sage-Grouse conservation objectives are not being achieved on federal land, to determine if a significant causal relationship exists between improper grazing (by wildlife or wild horses or livestock) and Greater Sage-Grouse conservation objectives; and (3) identify appropriate site-based actions to | Potential change under Alternatives 3, 4, 5, and 6. |

| 2014/2015 Approved RMPs | 2019 Approved RMPs | Potential Change in 2023 Plan |
|---|---|---|
| under Wyoming's core population area strategy.<br>• The NEPA analysis for renewals and modifications of livestock grazing permits/leases that include lands within PHMAs will include specific management thresholds based on Greater Sage-Grouse Habitat Objectives Table and Land Health Standards (43 CFR 4180.2) and one or more defined responses that will allow the authorizing officer to make adjustments to livestock grazing that have already been subjected to NEPA analysis.<br>• Allotments within priority habitat (Core Population Areas and Core Population Connectivity Corridors), and focusing on those containing riparian areas, including wet meadows, will be prioritized for field checks to help ensure compliance with the terms and conditions of the grazing permits. Field checks could include monitoring for actual use, utilization, and use supervision.<br>• At the time a permittee or lessee voluntarily relinquishes a permit or lease, the BLM will consider whether the public lands where that permitted use was authorized should remain available for livestock grazing or be used for other resource management objectives, such as reserve common allotments or fuel breaks. This does not apply to or impact grazing preference transfers, which are addressed in 43 CFR 4110.2-3. 9,992 acres are incompatible with and 772,110 acres are available for livestock grazing. This does not apply to or impact grazing preference transfers, which are addressed in 43 CFR 4110.2-3. | achieve Greater Sage-Grouse conservation objectives within the framework. Absent substantial and compelling information that adjustments are necessary to the core population area strategy, these core population areas, connectivity areas, identified and mapped winter concentration areas, and protective stipulations shall not be altered for a minimum of 7 years. Any changes shall involve a transparent process that provides an opportunity for public input and proper consideration of any proposal consistent with the provisions contemplated under Wyoming's core population area strategy.<br>• When NEPA analysis is required for a specific implementation action, one alternative would include mechanisms to make adjustments to meet or make progress toward meeting the wildlife/special status species standard. The analysis should also identify the BLM-approved data collection methodologies used for monitoring conditions and determining when adjustments are necessary. If current grazing management meets land health standards and provides for Greater Sage-Grouse habitat, there would be no need to analyze an alternative for Greater Sage-Grouse. Within PHMA, seasonal habitat objectives for Greater Sage-Grouse apply only to those habitats delineated within an allotment during the specific season (e.g., breeding season objectives during breeding season). Data needed to inform the relationship between the authorized use and habitat condition would come from sample locations that appropriately reflect the impact of the authorized use on habitat conditions. Data points should fall within Greater Sage-Grouse seasonal habitat areas and be collected on ecological sites that have the potential to produce Greater Sage-Grouse habitat.<br>• Allotments within priority habitat (Core Population Areas and Core Population Connectivity Corridors), and focusing on those containing riparian areas, including wet meadows, will be prioritized for field checks to help ensure compliance with the terms and conditions of the grazing | *(See above.)* |

| 2014/2015 Approved RMPs | 2019 Approved RMPs | Potential Change in 2023 Plan |
|---|---|---|
| *(See above.)* | permits. Field checks could include monitoring for actual use, utilization, and use supervision.<br>• Authorized uses in PHMA that incorporate habitat objectives for Greater Sage-Grouse must develop desired conditions based on Greater Sage-Grouse habitats present in the allotment and the ecological potential of sites that supports these habitats. Metrics used to monitor for objectives must be developed and inform the wildlife/SSS portion of the Standards for Healthy Rangelands.<br>• At the time a permittee or lessee voluntarily relinquishes a permit or lease, the BLM will consider whether the public lands where that permitted use was authorized should remain available for livestock grazing or be used for other resource management objectives, such as reserve common allotments or fuel breaks. This does not apply to or impact grazing preference transfers, which are addressed in 43 CFR 4110.2-3. 9,992 acres are incompatible with and 772,110 acres are available for livestock grazing. This does not apply to or impact grazing preference transfers, which are addressed in 43 CFR 4110.2-3. | *(See above.)* |
| MD Grazing-6019: Locate livestock salt or mineral supplements a minimum of 500 feet away from water sources, riparian areas, and aspen stands. | No changes made. | Potential change under Alternative 3. |
| MD Grazing-6021: Provide rest/deferment from livestock grazing following wildfire, prescribed burns, and other vegetative treatments until resource objectives are met. | No changes made. | Potential change under Alternative 3. |

### 2.17.2 Relevant Appendices

The following table shows which appendices from the 2015 and 2019 plans have management direction that may change through this RMP amendment. If 2019 is not listed in the year, then no change was made to the appendix between the 2015 and 2019 plans. The 2015 appendices can be found on the Buffalo RMP ePlanning website. The 2019 appendices can be found on the Wyoming GRSG ePlanning website.

| ARMPA Appendix Name | Year | Potential for Change in 2023 Plan |
|---|---|---|
| A: Maps | 2015 | Yes |
| A: Approved RMP Amendment with Management Goals, Objectives, and Decisions | 2019 | Yes |
| B: Fluid Mineral Lease Notices; Lease Stipulations; and the Process for Exceptions, Modifications, and Waivers | 2015 | Yes |
| C: Best Management Practices and Required Design Features | 2015 | Yes |
| B: Required Design Features | 2019 | Yes |
| D: Greater Sage-Grouse Habitat Management Strategy | 2015 | Yes |
| C: Greater Sage-Grouse Habitat Management Strategy | 2019 | Yes |
| E: Legislation and Policy Pertaining to Specific Resources | 2015 | No |
| F: Mitigation Guidelines for Surface-Disturbing and Disruptive Activities, Wyoming Bureau of Land Management | 2015 | No |
| G: Federal Oil and Gas Operations on Split Estate Lands | 2015 | No |
| H: Proposed Resource Management Plan and Approved Resource Management Plan Crosswalk Tables | 2015 | No |
| I: Wyoming Standards for Healthy Rangelands | 2015 | No |
| J: Surface Disturbance and Reasonable Foreseeable Actions | 2015 | No |
| K: Biological Opinion | 2015 | No |
| L: Buffalo Air Resources Management Plan | 2015 | No |
| M: Reclamation Policy for the Buffalo Field Office | 2015 | No |
| N: Buffalo Water Resources Management Plan | 2015 | No |
| O: Oil and Gas Operations | 2015 | No |
| P: Fire and Fuels Management | 2015 | No |
| Q: Biological Resources Support Document | 2015 | No |
| R: Lands Identified for Disposal Through Exchange or Sale | 2015 | No |
| S: Travel and Transportation Management | 2015 | No |
| T: Recreation Management Activities | 2015 | No |
| U: Livestock Grazing Allotments | 2015 | No |
| V: Areas of Critical Environmental Concern | 2015 | No |
| W: Public Involvement, Consultation, and Coordination | 2015 | No |
| X: Implementation, Monitoring, and Evaluation | 2015 | No |

# Appendix 2.18
# Cody, Wyoming RMP Revisions

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## 2.18 CODY, WYOMING RMP REVISIONS

This appendix presents the approved RMP revision language from the record of decision for the Cody RMP that relate to GRSG management. The table below notes which goals, objectives, appendices, and management decisions/actions have a potential to change as a result of the current planning effort and if so, under which alternatives changes are being considered. Note that any references to tables and appendices are to those applicable RMP appendices that are listed in **Section 2.18.2** of this appendix.

### 2.18.1 Existing GRSG RMP Management – Cody RMP

**Table 1. Summary of Goals, Objectives, and Management Actions to the Cody RMP**

| 2014/2015 Approved RMPs | 2019 Approved RMPs | Potential Change in 2023 Plan |
|---|---|---|
| **Land Use Plan Revisions/Amendments to the Cody RMP** | | |
| MO MR:2.3: Priority will be given to leasing and development of fluid mineral resources, including geothermal, outside of PHMA and GHMA. When analyzing leasing and authorizing development of fluid mineral resources, including geothermal, in PHMA and GHMA, and subject to applicable stipulations for the conservation of Greater Sage-Grouse, priority will be given to development in non-habitat areas first and then in the least suitable habitat for Greater Sage-Grouse. The implementation of these priorities will be subject to valid existing rights and any applicable law or regulation, including, but not limited to, 30 U.S.C. 226(p) and 43 CFR 3162.3-1(h). | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |
| *MO MR:2.4: Where a proposed fluid mineral development project on an existing lease could adversely affect Greater Sage-Grouse populations or habitat, the BLM will work with the lessees, operators, or other project proponents to avoid, reduce, and mitigate adverse impacts to the extent compatible with lessees' rights to drill and produce fluid mineral resources.<br>The BLM will work with the lessee, operator, or project proponent in developing an APD for the lease to avoid and minimize impacts to Greater Sage-Grouse or its habitat and will ensure that the best information about the Greater Sage-Grouse and its habitat informs and helps to guide development of such federal leases. | Where a proposed fluid mineral development project on an existing lease could adversely affect Greater Sage-Grouse populations or habitat, the BLM will work with the lessees, operators, or other project proponents to avoid, reduce, and mitigate adverse impacts to the extent compatible with lessees' rights to drill and produce fluid mineral resources.<br>The BLM will work with the lessee, operator, or project proponent in developing an APD for the lease to avoid and minimize impacts to Greater Sage-Grouse or its habitat and will ensure that the best information about the Greater Sage-Grouse and its habitat informs and helps to guide development of such federal leases (see MDs 4107, 4108, 4109, 4111, and 4157). | No change proposed. |

| 2014/2015 Approved RMPs | 2019 Approved RMPs | Potential Change in 2023 Plan |
|---|---|---|
| **MD 2006 MR:3.1: Consider interest in exploration for, or leasing of, federal coal (Map 3-5), if any on a case-by-case basis. Allow coal exploration licenses subject to the regulations of 43 CFR 3410, and subject to guidance mitigating for surface-disturbing activities in the Wyoming BLM Standard Oil and Gas- Lease Stipulations (Appendix B, Oil and Gas Lease Notices and Lease Stipulations, including Exception, Modification, and Waiver Criteria (p. 211)). Before issuing a coal exploration license, require the authorized officer to prepare an environmental assessment or environmental impact statement, if necessary, of the potential effects of the proposed exploration on the natural and socioeconomic environment of the affected area. If an application for a federal coal lease is received, conduct an appropriate land use and environmental analysis, including the coal screening process, to determine whether the area(s) proposed for leasing is (are) acceptable for coal development and leasing (as per 43 CFR 3425). If public lands are determined to be acceptable for further consideration for coal leasing, amend the land use plan as necessary. Only accept federal coal lease applications on those federal coal lands with development potential identified as suitable for further leasing consideration, after application of the coal screens and unsuitability criteria. At the time an application for a new coal lease or lease modification is submitted to the BLM, the BLM will determine whether the lease application area is "unsuitable" for all or certain coal mining methods pursuant to 43 CFR 3461.5. PHMA is essential habitat for maintaining Greater Sage-Grouse for purposes of the suitability criteria set forth at 43 CFR 3461.5(o)(1). The BLM will also consider that USFWS has found "the core area strategy…if implemented by all landowners via regulatory mechanisms, would provide adequate protection for sage-grouse and their habitats in the state" when considering leasing coal in PHMA under the criteria set for at 43 CFR 3461.5(o)(1) (USFWS 2010). | Consider interest in exploration for, or leasing of, federal coal (Map 3-5), if any on a case-by-case basis. Allow coal exploration licenses subject to the regulations of 43 CFR 3410, and subject to guidance mitigating for surface-disturbing activities in the Wyoming BLM Standard Oil and Gas Lease Stipulations (2015 Cody RMP Appendix B, Oil and Gas Lease Notices and Lease Stipulations, including Exception, Modification, and Waiver Criteria (p. 211)). Before issuing a coal exploration license, require the authorized officer to prepare an environmental assessment or environmental impact statement, if necessary, of the potential effects of the proposed exploration on the natural and socioeconomic environment of the affected area.<br>If an application for a federal coal lease is received, conduct an appropriate land use and environmental analysis, including the coal screening process, to determine whether the area(s) proposed for leasing is (are) acceptable for coal development and leasing (as per 43 CFR 3425). If public lands are determined to be acceptable for further consideration for coal leasing, amend the land use plan as necessary. Only accept federal coal lease applications on those federal coal lands with development potential identified as suitable for further leasing consideration, after application of the coal screens and unsuitability criteria. At the time an application for a new coal lease or lease modification is submitted to the BLM, the BLM will determine whether the lease application area is "unsuitable" for all or certain coal mining methods pursuant to 43 CFR 3461.5. PHMA is essential habitat for maintaining Greater Sage-Grouse for purposes of the suitability criteria set forth at 43 CFR 3461.5(o)(1). The BLM will also consider that USFWS has found "the core area strategy…if implemented by all landowners via regulatory mechanisms, would provide adequate protection for sage-grouse and their habitats in the state" when considering leasing coal in PHMA under the criteria set for at 43 CFR 3461.5(o)(1) (USFWS 2010) (see also MDs 4107, 4108, 4109, 4111, and 4157). | Potential change under Alternative 3. |

| 2014/2015 Approved RMPs | 2019 Approved RMPs | Potential Change in 2023 Plan |
|---|---|---|
| **MD 2013: Process oil and gas lease applications on a case-by-case basis. Ensure that leasing activities in PHMAs comply with Greater Sage-Grouse RMP decisions and remain in compliance with laws, regulations, and policy. | Process oil and gas lease applications on a case-by-case basis. Ensure that leasing activities in PHMAs comply with Greater Sage-Grouse RMP decisions and remain in compliance with laws, regulations, and policy (see also MDs 4107, 4108, 4109, 4111, and 4157). | Potential change under Alternative 3. |

| 2014/2015 Approved RMPs | 2019 Approved RMPs | Potential Change in 2023 Plan |
|---|---|---|
| **MD 2023: Delineate **Oil and Gas Management Areas** (Map 3-9) (108,174 acres of federal mineral estate) around existing intensively-developed fields, applying a 2-mile buffer from the outer boundary of the existing field (Map 3-10); adding enhanced oil recovery areas identified by the Governor's Office Enhanced Oil Recovery Institute and excluding Greater Sage-Grouse PHMAs. Manage these areas primarily for oil and gas exploration and development. Oil and gas development, including enhanced oil recovery operations, within Oil and Gas Management Areas is allowed to take place at the same level and density as the existing development in the field, except in the Oregon Basin Oil Field, where new development must result in no net gain of surface disturbance. Levels and densities beyond the existing field development may require additional reclamation or compensatory offsite mitigation.<br>As oil and gas fields expand or exploration reaches beyond the Oil and Gas Management Areas depicted on Map 3-9, Oil and Gas Management Areas may be enlarged as appropriate. To enlarge Oil and Gas Management Areas, the expansion area would:<br>i) have to be adjacent to the field and under valid oil and gas lease(s) with stipulations allowing surface occupancy and development; ii) have to have a surface density of, on average, at least four well pads per 640 acres; a determination that additional well density is required to efficiently and adequately produce the oil or gas resource; iii) have a project-specific environmental analysis prepared to analyze the impacts and determine operating methods, mitigation, and BMPs to be used in the efficient and comprehensive development of the field; iv) need surface resources to be satisfactorily mitigated; and v) need commitment to accelerate reclamation as required by the authorized officer. | No changes made. | Potential change under Alternative 3. |

| 2014/2015 Approved RMPs | 2019 Approved RMPs | Potential Change in 2023 Plan |
|---|---|---|
| MO FM:1.5: Following wildland fires, conduct appropriate emergency stabilization and rehabilitation when and where needed. In priority Greater Sage-Grouse habitat areas, prioritize suppression immediately after life and property to conserve the habitat. In general Greater Sage-Grouse habitat, prioritize suppression where wildfires threaten priority Greater Sage-Grouse habitat. | No changes made. | No change proposed. |
| MO FM:2.1: Consult and cooperate with adjacent landowners, state and local governments, and other stakeholders to plan and implement prescribed fire and other vegetation treatments across the landscape. In areas of general Greater Sage-Grouse habitat, design and implement fuels treatments with an emphasis on protecting existing sagebrush ecosystems. | No changes made. | No change proposed. |

| 2014/2015 Approved RMPs | 2019 Approved RMPs | Potential Change in 2023 Plan |
|---|---|---|
| MD 3008: Suppress fires threatening Greater Sage-Grouse habitats and crucial winter wildlife habitat within Wyoming big sagebrush communities. Where fire would be utilized to meet resource objectives, work closely with resource specialists to protect and improve Greater Sage-Grouse habitat. For fuels management, the BLM would consider multiple tools for fuels reduction and would analyze in NEPA compliance documentation before electing to implement prescribed fire in PHMAs.<br>If prescribed fire is used in Greater Sage-Grouse habitat, the NEPA analysis for the Burn Plan will address:<br>• why alternative techniques were not selected as a viable options;<br>• how Greater Sage-Grouse goals and objectives would be met by its use;<br>• how the COT Report objectives would be addressed and met; and<br>• a risk assessment to address how potential threats to Greater Sage-Grouse habitat would be minimized.<br>Prescribed fire as a vegetation or fuels treatment in Greater Sage-Grouse habitat shall only be considered after the NEPA analysis for the Burn Plan has addressed the four bullets outlined above. Prescribed fire could be used to meet specific fuels objectives that would protect Greater Sage-Grouse habitat in PHMAs (e.g., creation of fuel breaks that would disrupt the fuel continuity across the landscape in stands where annual invasive grasses are a minor component in the understory, burning slash piles from conifer reduction treatments, used as a component with other treatment methods to combat annual grasses and restore native plant communities).<br>Prescribed fire in known crucial winter wildlife habitat shall only be considered after the NEPA analysis for the Burn Plan has addressed the four bullets outlined above. Any prescribed fire in and/or around crucial winter wildlife habitat must be strategically-designed to reduce wildfire risk and protect winter range habitat quality. | No changes made. | No change proposed. |

| 2014/2015 Approved RMPs | 2019 Approved RMPs | Potential Change in 2023 Plan |
|---|---|---|
| MO BR:2.6: In PHMAs, the desired condition is to maintain all lands ecologically capable of producing sagebrush (but no less than 70 percent) with a minimum of 15 percent sagebrush cover or as consistent with specific ecological site conditions. The attributes necessary to sustain these habitats are described in Interpreting Indicators of Rangeland Health (BLM Technical Reference 1734-6 [BLM 2005c]). | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |
| MG BR:9: GREATER SAGE-GROUSE – Sustain the integrity of the sagebrush biome to provide the amount, continuity, and quality of habitat that is necessary to maintain sustainable populations of Greater Sage-Grouse and other species by achieving the objectives below. | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |
| MO BR:9.1: Maintain large patches of high quality sagebrush habitats, with emphasis on patches occupied by Greater Sage-Grouse. | No changes made. | No change proposed. |
| MO BR:9.2: Maintain connections between sagebrush habitats, with emphasis on connections between habitats occupied by Greater Sage-Grouse. | No changes made. | No change proposed. |
| MO BR:10.1: Reconnect large patches of sagebrush habitat with emphasis on reconnecting patches occupied by stronghold and isolated populations of Greater Sage-Grouse. | No changes made. | No change proposed. |
| **MD 4059: Maintain or improve important wildlife habitats through vegetative manipulations, habitat improvement projects, livestock grazing strategies and the application of The Wyoming Guidelines for Managing Sagebrush Communities with Emphasis on Fire Management (Wyoming Interagency Vegetation Committee 2002) and the Wyoming BLM Standard Mitigation Guidelines for Surface-Disturbing and Disruptive Activities (Appendix F, Wyoming Bureau of Land Management Mitigation Guidelines for Surface-Disturbing and Disruptive Activities (p. 351)), BMPs (Appendix C, Required Design Features and Best Management Practices (p. 251)), and similar guidance updated over time. | Maintain or improve important wildlife habitats through vegetative manipulations, habitat improvement projects, livestock grazing strategies and the application of The Wyoming Guidelines for Managing Sagebrush Communities with Emphasis on Fire Management (Wyoming Interagency Vegetation Committee 2002) and the Wyoming BLM Standard Mitigation Guidelines for Surface-Disturbing and Disruptive Activities (Appendix F, Wyoming Bureau of Land Management Mitigation Guidelines for Surface-Disturbing and Disruptive Activities (p. 351)), BMPs (2019 Wyoming GrSG ARMPA Appendix B, Required Design Features and Best Management Practices), and similar guidance updated over time. | Potential change under Alternatives 3, 4, 5, and 6. |
| MD 4071: Conduct habitat enhancement vegetation treatments within sagebrush communities as opportunities and funding allow, consistent with EO 2015-4 (Wyoming Office of the Governor 2015). | No changes made. | No change proposed. |

| 2014/2015 Approved RMPs | 2019 Approved RMPs | Potential Change in 2023 Plan |
|---|---|---|
| MD 4072: Modify identified hazard fences, and analyze and construct new fences in accordance with wildlife needs, the BLM Fencing Handbook 1741-1, and WO IM 2010-022, Managing Structures for the Safety of Sage-grouse, Sharp-tailed grouse, and Lesser Prairie-chicken, and similar guidance and policy as updated over time. | No changes made. | No change proposed. |
| MD 4077: Allow water development projects in crucial elk winter range and in Greater Sage-Grouse nesting habitat with 10 inches or less annual precipitation only when adverse effects can be avoided, minimized and/or compensated based on site-specific analysis. Allow existing uses pending site-specific analysis on a priority basis. | No changes made. | No change proposed. |
| MD 4081: Avoid wind energy projects in big game crucial winter range and raptor concentration areas.<br>Wind-energy development would be avoided in Greater Sage-Grouse PHMAs (Map 3-17), and not allowed unless it can be sufficiently demonstrated that the development activity would not result in declines of Greater Sage-Grouse PHMA populations. Sufficient demonstration of "no declines" should be coordinated with the WGFD and USFWS. | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |
| MD 4088: Discourage the use of broad-spectrum insecticides where insect control is required. Target pest control toward key problem areas and schedule applications to be effective in minimum doses in Greater Sage-Grouse brood-rearing areas. Field Offices may implement treatments within Greater Sage-Grouse habitat utilizing RAATS protocols | No changes made. | No change proposed. |
| MD 4089: Avoid aerial pesticide spraying in favor of ground applications to minimize drift into non-target areas in Greater Sage-Grouse habitat unless benefits of treatments are likely to outweigh impacts. | No changes made. | No change proposed. |
| MD 4090: Avoid applying pesticides to Greater Sage-Grouse breeding habitat during the nesting and early brood-rearing season (March 15 through June 30) to reduce the loss of food supply to chicks and avoid the chance of secondary poisoning unless benefits of treatments are likely to outweigh impacts. | No changes made. | No change proposed. |

| 2014/2015 Approved RMPs | 2019 Approved RMPs | Potential Change in 2023 Plan |
|---|---|---|
| MD 4091: Maintain seeps, springs, wet meadows, and riparian vegetation in a functional and diverse condition for young Greater Sage-Grouse and other species that depend on forbs and insects associated with these areas.<br>Consider management actions if desirable green vegetation associated with these wet areas is not available, accessible, or cannot be maintained with current livestock, wildlife, or wild horse use, and the impacts are outweighed by the improved habitat quality. | No changes made. | No change proposed. |
| MD 4092: Restore Greater Sage-Grouse brood-rearing habitats in riparian/wetland areas. | No changes made. | No change proposed. |
| MD 4093: Restore lost riparian functioning systems by repairing abnormally incised drainages to raise water tables and increase water storage and brood-rearing habitats within Greater Sage-Grouse habitat. | No changes made. | No change proposed. |

| 2014/2015 Approved RMPs | 2019 Approved RMPs | Potential Change in 2023 Plan |
|---|---|---|
| MD 4094: Manage vegetation composition diversity and structure, as determined by ESD, or other methods that reference site potential, and WGFD protocols to achieve Greater Sage-Grouse habitat management objectives, in cooperation with stakeholders.<br>Evaluate the role of existing seedings that are currently composed of primarily introduced perennial grasses in and adjacent to Greater Sage-Grouse habitat to determine if they should be restored to sagebrush or habitat of higher quality for Greater Sage-Grouse. If these seedings provide value in conserving or enhancing Greater Sage-Grouse habitats, then no restoration would be necessary. Assess the compatibility of these seedings for Greater Sage-Grouse habitat during the land health assessments.<br>Burned areas within PHMAs would be restored to suitable habitat with consideration given to ESDs, reference sites, site potential and local variability.<br>The BLM could bring in burned area rehabilitation and Burned Area Emergency Response teams who would work cooperatively with partners at the federal, state, and local levels to rehabilitate and restore Greater Sage-Grouse habitats in a manner consistent with the core habitat populations area strategy for conservation.<br>DDCT reviews would be conducted in coordination with the WGFD Habitat Protection Program located in Cheyenne, Wyoming at the WGFD headquarters. Areas within PHMAs would be prioritized for restoration of Greater Sage-Grouse habitat beyond immediate response. | No changes made. | No change proposed. |
| MD 4095: Maintain sagebrush and understory diversity (relative to ecological site description) in crucial seasonal Greater Sage-Grouse habitats unless such removal is necessary to achieve Greater Sage-Grouse habitat management objectives. For example, thinning small patches of dense sagebrush may increase desirable forbs in early brood-rearing habitat. | No changes made. | No change proposed. |

| 2014/2015 Approved RMPs | 2019 Approved RMPs | Potential Change in 2023 Plan |
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| MD 4096: Increase the composition and canopy cover of Wyoming big sagebrush, within existing nonnative grass seedings with less than 5 percent sagebrush canopy cover, to greater than or equal to neighboring sagebrush communities or historical levels. (See Shrubland-Salt Desert/Salt Bottom on Map 3-14; deeper soiled, and gentler sloped portions of the Shrubland-Salt Desert/Salt Bottom, colored in pink, would be those areas where sagebrush restoration efforts could be conducted.) | No changes made. | No change proposed. |
| MD 4097: Investigate opportunities to increase sagebrush in lower precipitation zones. | No changes made. | No change proposed. |
| MD 4098: Plan and construct mining and mineral development activities, to the degree possible given state water rights, to minimize disturbances that would result in alterations to springs and riparian Greater Sage-Grouse habitat. Alternative water sources may be developed to replace natural sources that have been affected or destroyed during these development activities. | No changes made. | Potential change under Alternative 3. |
| MD 4099: Treat constructed or non-natural water storage impoundments to control mosquito breeding (and the associated spread of West Nile virus), to prevent disease spread to Greater Sage-Grouse as necessary. | No changes made. | No change proposed. |
| MD 4100: In cooperation with stakeholders, manage to promote the growth and persistence of native shrubs, grasses, and forbs needed by Greater Sage-Grouse for seasonal food and concealment | No changes made. | No change proposed. |
| MD 4101: In cooperation with stakeholders, design and locate fences so as not to disturb PHMAs. Increase the visibility of fences in these areas which have been identified as hazardous to flying Greater Sage-Grouse. | No changes made. | No change proposed. |

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| MD 4102: Conduct fire management activities to minimize overall wildfire size and frequency in sagebrush plant communities where Greater Sage-Grouse habitat objectives are at risk.<br>General priorities for habitat protection:<br>Priority # 1 – Protection of Greater Sage-Grouse PHMAs.<br>Priority # 2 – Wyoming big sagebrush communities outside Greater Sage-Grouse PHMAs and habitats recovering from disturbance within or adjacent to Greater Sage-Grouse PHMAs. | No changes made. | No change proposed. |
| MD 4103: Annually maintain FMPs to incorporate updated sagebrush habitat information as well as fire suppression priorities in sagebrush habitats. Incorporate fire management objectives for the management of sagebrush ecosystems into FMPs. Provide fire management objectives for sagebrush ecosystems to initial attack personnel at the beginning of each fire season. | No changes made. | No change proposed. |
| MD 4104: Establish fuels treatment projects at strategic locations to minimize size of wildfires and limit loss of Greater Sage-Grouse habitat. | No changes made. | No change proposed. |
| MD 4105: Reintroduce appropriate fire regimes to limit conifer encroachment into the sagebrush plant communities. Take into account invasive herbaceous species and Fire Regime Group and FRCC (measure of departure from historic fire regime) with treatments. Where possible, achieve a balance between treating areas that have significantly departed from the historic fire regime (Condition Class 3) and areas that are functioning within an appropriate fire regime (Condition Class 1). | No changes made. | No change proposed. |
| MD 4106: Remove conifers encroaching into sagebrush habitats in a manner that considers tribal and cultural values. Prioritize treatments closest to occupied Greater Sage-Grouse habitats and near occupied leks, and where juniper encroachment is phase 1 or phase 2 as defined in Miller et al. (2005). Refine the location of specific priority areas to be treated by utilizing site-specific analysis and principles like those included in the FIAT report (Chambers et. al. [2014]) and other ongoing modeling efforts to address conifer encroachment. | No changes made. | No change proposed. |

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| **MD 4107: **Inside PHMAs**<br>Prohibit surface occupancy and surface-disturbing activities on or within a 0.6-mile radius of the perimeter of occupied Greater Sage-Grouse leks. The authorized officer may grant an exception if an environmental record of review determines that the action, as proposed or conditioned, would not impair the function or utility of the site for the current or subsequent seasonal habitat, life-history, or behavioral needs of Greater Sage-Grouse (Map 3-17).<br>**Outside PHMAs**<br>Prohibit surface-disturbing and disruptive activities and apply a NSO restriction within a ¼-mile radius of the perimeter of occupied Greater Sage-Grouse leks (Map 3-17).<br>Outside Greater Sage-Grouse PHMAs, the BLM's goal is to sustain important habitats that support core populations and to maintain lek persistence over the long term in sufficient proportions of the Greater Sage-Grouse population to facilitate movement and genetic transfer between core populations, including those found in adjacent states. | **Inside PHMAs**<br>Prohibit surface occupancy and surface-disturbing activities on or within a 0.6-mile radius of the perimeter of occupied Greater Sage-Grouse leks (or lek center if no perimeter is yet mapped).<br>**Outside PHMAs**<br>Prohibit surface-disturbing and disruptive activities and apply a NSO restriction within a ¼-mile radius of the perimeter of occupied Greater Sage-Grouse leks (or lek center if no perimeter is yet mapped) (Map 3-17).<br>Outside Greater Sage-Grouse PHMAs, the BLM's goal is to sustain important habitats that support core populations and to maintain lek persistence over the long term in sufficient proportions of the Greater Sage-Grouse population to facilitate movement and genetic transfer between core populations, including those found in adjacent states.<br>The authorized officer may grant an exception on a case-by-case basis subject to appropriate site-specific analysis, mitigation requirements, and consultation with the State of Wyoming and consistent with the applicable State management strategy (currently Governor of Wyoming's Executive Order 2015-4) (see MD 4157). | Potential change under Alternatives 3, 4, 5, and 6. |

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| **MD 4108: **Inside PHMAs**<br>Prohibit disruptive activities on or within a 0.6-mile radius of the perimeter of occupied Greater Sage-Grouse leks from March 15 to June 30 (40,039 acres).<br>**Outside PHMAs**<br>Prohibit disruptive activities on or within a ¼-mile radius of the perimeter of occupied Greater Sage-Grouse leks from March 15 to June 30 (1,116 acres).<br>**Inside PHMAs**<br>Prohibit surface-disturbing and/or disruptive activities from March 15 to June 30 to protect Greater Sage-Grouse breeding, nesting, and early brood-rearing habitat (437,045 acres). Apply this timing limitation throughout the PHMAs. Activities in unsuitable habitats would be evaluated under the exception and modification criteria and could be allowed on a case-by-case basis.<br>**Outside PHMAs**<br>Prohibit surface-disturbing and/or disruptive activities in Greater Sage-Grouse nesting and early brood-rearing habitat within a 2-mile radius of the perimeter of occupied Greater Sage-Grouse leks from March 15 to June 30.<br>Note: Where credible data support different timeframes for these seasonal restrictions, dates may be expanded by up to 14 days prior to or subsequent to the above dates. | **Inside PHMAs**<br>Prohibit disruptive activities on or within a 0.6-mile radius of the perimeter of occupied Greater Sage-Grouse leks (or lek center if no perimeter is yet mapped) from March 15 to June 30 (40,039 acres).<br>**Outside PHMAs**<br>Prohibit disruptive activities on or within a ¼-mile radius of the perimeter of occupied Greater Sage-Grouse leks (or lek center if no perimeter is yet mapped) from March 15 to June 30 (1,116 acres).<br>**Inside PHMAs**<br>Prohibit surface-disturbing and/or disruptive activities from March 15 to June 30 to protect Greater Sage-Grouse breeding, nesting, and early brood-rearing habitat (437,045 acres). Apply this timing limitation throughout the PHMAs.<br>**Outside PHMAs**<br>Prohibit surface-disturbing and/or disruptive activities in Greater Sage-Grouse nesting and early brood-rearing habitat within a 2-mile radius of the perimeter of occupied Greater Sage-Grouse leks (or lek center if no perimeter is yet mapped) from March 15 to June 30.<br>Note: Where credible data support different timeframes for these seasonal restrictions, dates may be expanded by up to 14 days prior to or subsequent to the above dates. The authorized officer may grant an exception on a case-by-case basis subject to appropriate site-specific analysis, mitigation requirements, and consultation with the State of Wyoming and consistent with the applicable State management strategy (currently Governor of Wyoming's Executive Order 2015-4) (see MD 4157). | Potential change under Alternatives 3, 4, 5, and 6. |

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| **MD 4109: **Greater Sage-Grouse winter concentration areas:**<br>Surface-disturbing and/or disruptive activities in sage-grouse winter concentration areas would be prohibited from December 1–March 14. Activities in unsuitable habitats within PHMAs would be evaluated under the exception and modification criteria and could be allowed on a case-by-case basis.<br>Protection of additional mapped winter concentration areas in GHMAs would be implemented only where winter concentration areas are identified as supporting biologically significant numbers of sage-grouse nesting in PHMAs and/or attending leks within PHMAs. Appropriate seasonal timing restrictions and habitat protection measures would be considered and evaluated in consultation with the WGFD in all identified winter concentration areas.<br>Evaluate and allow activities in unsuitable habitats within PHMAs in accordance with exception and modification criteria on a case-by-case basis.<br>Protection of additional mapped winter concentration areas in GHMAs would be implemented only where winter concentration areas are identified as supporting biologically significant numbers of Greater Sage-Grouse nesting in PHMAs and/or attending leks within PHMAs. Appropriate seasonal timing restrictions and habitat protection measures would be considered and evaluated in consultation with the WGFD in all identified winter concentration areas. | **Greater Sage-Grouse winter concentration areas:** Surface-disturbing and/or disruptive actives in Greater Sage-Grouse winter concentration areas would be prohibited from December 1—March 14. The authorized officer may grant an exception on a case-by-case basis subject to appropriate site-specific analysis, mitigation requirements, and consultation with the State of Wyoming and consistent with the applicable State management strategy (currently Governor of Wyoming's Executive Order 2015-4) (see MD 4157).<br>Protection of additional mapped winter concentration areas in GHMA would be implemented where winter concentration areas are mapped and designated by the State of Wyoming. Appropriate seasonal timing restrictions and habitat protection measures would be considered and evaluated on consultation with the WGFD in all identified winter concentration areas. | Potential change under Alternatives 3, 4, 5, and 6. |
| **MD 4110: Density of Disturbances:<br>In Greater Sage-Grouse PHMAs, the density of disturbance of energy or mining facilities would be limited to an average of one site per square mile (640 acres) within the DDCT, subject to valid existing rights (Appendix D, Greater Sage-Grouse Habitat Management Strategy (p. 273)). The one location and cumulative value of existing disturbances would not exceed 5 percent of habitat of the DDCT area. Inside PHMA, all suitable habitat disturbed (any program area) will not exceed 5 percent within the DDCT area using the DDCT process. | Density of Disturbances:<br>In Greater Sage-Grouse PHMAs, the density of disturbance of energy or mining facilities would be limited to an average of one site per square mile (640 acres) within the DDCT, subject to valid existing rights (2019 Wyoming GrSG ARMPA Appendix C, Greater Sage-Grouse Habitat Management Strategy). The one location and cumulative value of existing disturbances would not exceed 5 percent of habitat of the DDCT area. Inside PHMA, all suitable habitat disturbed (any program area) will not exceed 5 percent within the DDCT area using the DDCT process. | Potential change under Alternatives 3, 4, 5, and 6. |

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| Consolidate anthropogenic features from development and transmission on the landscape. Allow on a case-by-case basis high profile structures within Greater Sage-Grouse nesting habitat.<br>Sagebrush Treatment: For vegetation treatments in sagebrush within PHMAs, refer to WGFD Protocols for Treating Sagebrush to Benefit Sage-Grouse (WGFD 2011, as updated) and BLM WO IM 2013-128 (Sage-grouse Conservation Related to Wildland Fire and Fuels Management). These recommended protocols, subject to seasonal conditions of approval, would be used in determining whether proposed treatment constitutes a "disturbance" that would contribute toward the 5 percent threshold for habitat maintenance.<br>Additionally, these protocols would be used to determine whether the proposed treatment configuration would be expected to have neutral or beneficial impacts for PHMA populations or if they represent additional habitat loss or fragmentation.<br>Treatments to enhance sagebrush/grasslands habitat for Greater Sage-Grouse would be evaluated based upon habitat quality and the functionality/use of treated habitats post-treatment.<br>The BLM would work collaboratively with partners at the state and local level to maintain and enhance Greater Sage-Grouse habitats. Seasonal restrictions would be applied, as needed, for implementing fuels management treatments according to the type of seasonal habitat present.<br>Wildfire burns will be treated as disturbed if sagebrush is reduced below 5 percent unless there is an implementation plan outlining restoration efforts and 3 years of data showing a trend back to suitable habitat. | Consolidate anthropogenic features from development and transmission on the landscape. Allow on a case-by-case basis high profile structures within Greater Sage-Grouse nesting habitat.<br>Sagebrush Treatment: For vegetation treatments in sagebrush within PHMAs, refer to WGFD Protocols for Treating Sagebrush to Benefit Sage-Grouse (WGFD 2015, as updated) and BLM WO IM 2013-128 (Sage-grouse Conservation Related to Wildland Fire and Fuels Management). These recommended protocols, subject to seasonal conditions of approval, would be used in determining whether proposed treatment constitutes a "disturbance" that would contribute toward the 5 percent threshold for habitat maintenance.<br>Additionally, these protocols would be used to determine whether the proposed treatment configuration would be expected to have neutral or beneficial impacts for PHMA populations or if they represent additional habitat loss or fragmentation.<br>Treatments to enhance sagebrush/grasslands habitat for Greater Sage-Grouse would be evaluated based upon habitat quality and the functionality/use of treated habitats post-treatment.<br>The BLM would work collaboratively with partners at the state and local level to maintain and enhance Greater Sage-Grouse habitats. Seasonal restrictions would be applied, as needed, for implementing fuels management treatments according to the type of seasonal habitat present.<br>Wildfire burns will be treated as disturbed if sagebrush is reduced below 5 percent unless there is an implementation plan outlining restoration efforts and 3 years of data showing a trend back to suitable habitat. | *(See above.)* |

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| *MD 4111: New project noise levels, either individual or cumulative, should not exceed 10 dBA (as measured by L50) above baseline noise at the perimeter of the lek from 6:00 pm to 6:00 am during the breeding season (March 1 to May 15). Specific noise protocols for measurement and implementation will be developed as additional research and information emerges. | Within PHMA (core only), new project noise levels, either individual or cumulative, should not exceed 10 dBA (as measured by L50) above baseline noise at the perimeter of the lek (or lek center if no perimeter is yet mapped) from 6:00 pm to 8:00 am during the breeding season (March 1–May 15). The authorized officer may grant an exception on a case-by-case basis subject to appropriate site-specific analysis, mitigation requirements, and consultation with the State of Wyoming and consistent with the applicable State management strategy (currently Governor of Wyoming's Executive Order 2015-4) (see MD 4157). In coordination with the State of Wyoming, specific noise protocols for measurement and implementation will be developed as additional research and information emerges. These measures would be considered at the site-specific project level where and when appropriate. | No change proposed. |
| MD 4112: Allow motorized vehicle use in Greater Sage-Grouse PHMAs consistent with other resource objectives.<br>Manage new road construction in and adjacent to Greater Sage-Grouse habitat consistent with applicable restrictions on surface-disturbing and disruptive activities.<br>Avoid construction of new or local collector roads (as defined in BLM Manual 9113 [BLM 2011d]) within 1.9 miles of the perimeter of occupied Greater Sage-Grouse leks within PHMAs.<br>Prohibit all new roads within 0.6 miles of the perimeter of occupied Greater Sage-Grouse leks within PHMAs.<br>Construct roads to minimum design standards needed for production activities. | Allow motorized vehicle use in Greater Sage-Grouse PHMAs consistent with other resource objectives.<br>Manage new road construction in and adjacent to Greater Sage-Grouse habitat consistent with applicable restrictions on surface-disturbing and disruptive activities.<br>Avoid construction of new or local collector roads (as defined in BLM Manual 9113 [BLM 2011d]) within 1.9 miles of the perimeter of occupied Greater Sage-Grouse leks (or lek center if no perimeter is yet mapped) within PHMAs.<br>Prohibit all new roads within 0.6 miles of the perimeter of occupied Greater Sage-Grouse leks (or lek center if no perimeter is yet mapped) within PHMAs.<br>Construct roads to minimum design standards needed for production activities. | No change proposed. |

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| MD 4113: In PHMAs, implement mitigation and minimization guidelines and required design features, including specific measures for Greater Sage-Grouse (refer to Appendix C, Required Design Features and Best Management Practices (p. 251)), as applicable and consistent with EO 2015-4 (Wyoming Office of the Governor 2015).<br>Incorporate Greater Sage-Grouse specific measures into project proposals as required design features or mitigation for any authorized federal action, regardless of surface ownership. | In PHMAs, implement mitigation and minimization guidelines and required design features, including specific measures for Greater Sage- Grouse (refer to 2019 Wyoming GrSG ARMPA Appendix B, Required Design Features and Best Management Practices), as applicable and consistent with EO 2015-4 (Wyoming Office of the Governor 2015).<br>Incorporate Greater Sage-Grouse specific measures into project proposals as required design features or mitigation for any authorized federal action, regardless of surface ownership. | — |
| MD 4114: In PHMAs, require the development of a wildlife resource monitoring and mitigation plan to address potential impacts from mineral development on wildlife populations and/or habitat on a case-by-case basis. | No changes made. | No change proposed. |
| MD 4115: Use the following travel management criteria in PHMAs:<br>• During subsequent travel management planning, all routes within PHMAs would undergo a route evaluation to determine its purpose and need and the potential resource and/or user conflicts from motorized travel. Where resource and/or user conflicts outweigh the purpose and need for the route, the route would be considered for closure or considered for relocation outside of sensitive Greater Sage-Grouse habitat.<br>• During implementation-level travel planning, threats to Greater Sage-Grouse and their habitat would be considered when evaluating route designations and/or closures.<br>• During subsequent travel management planning, routes within PHMAs that do not have a purpose or need would be considered for closure.<br>• During subsequent travel management planning, routes within PHMAs that are duplicative parallel, or redundant would be considered for closure.<br>• During subsequent travel management planning, OHV timing limitations would be considered in important seasonal habitats where OHV use is a threat. | No changes made. | No change proposed. |

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| • During subsequent travel management planning, consider limiting snow machine travel to designated routes or consider seasonal closures in Greater Sage-Grouse wintering areas from November 1 through March 31.<br>• During subsequent travel management planning, routes in PHMAs not required for public access or recreation with a current administrative/agency purpose or need would be evaluated for administrative access only.<br>• During subsequent travel management planning, prioritize restoration of routes not designated in a Travel Management Plan within PHMAs.<br>• During subsequent travel management planning, consider using seed mixes or transplant techniques that will maintain or enhance Greater Sage-Grouse habitat when rehabilitating linear disturbances.<br>• During subsequent travel management planning, consider scheduling road maintenance to avoid disturbance during sensitive periods and times to the extent practicable. Use time of day limits (after 10:00 AM to 7:00 PM) to reduce impacts on Greater Sage-Grouse during breeding and nesting periods. | *(See above.)* | *(See above.)* |
| *MD 4116: The Greater Sage-Grouse adaptive management plan provides regulatory assurance that unintended negative impacts to Greater Sage-Grouse habitat will be addressed before consequences become severe or irreversible.<br>Adaptive management triggers are essential for identifying when potential management changes are needed in order to continue meeting Greater Sage-Grouse conservation objectives. With respect to Greater Sage-Grouse, all regulatory entities in Wyoming, including the BLM, use soft and hard triggers. Soft and hard triggers are focused on three metrics: 1) number of active leks, 2) acres of available habitat, and 3) population trends based on annual lek counts. See Appendix D, Greater Sage-Grouse Habitat Management Strategy (p. 273) for more information on soft and hard triggers. | The Greater Sage-Grouse adaptive management plan provides regulatory assurance that unintended negative impacts to Greater Sage-Grouse habitat will be addressed before consequences become severe or irreversible.<br>Adaptive management triggers are essential for identifying when potential management changes are needed in order to continue meeting Greater Sage-Grouse conservation objectives. With respect to Greater Sage-Grouse, all regulatory entities in Wyoming, including the BLM, use soft and hard triggers. Soft and hard triggers are focused on three metrics: 1) number of active leks, 2) acres of available habitat, and 3) population trends based on annual lek counts. See 2019 Wyoming GrSG ARMPA Appendix C, Greater Sage-Grouse Habitat Management Strategy for more information on soft and hard triggers. | Potential change under Alternatives 3, 4, 5, and 6. |

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| Soft Triggers Response:<br>Soft triggers are indicators that management or specific activities may not be achieving the intended results of conservation action or that unanticipated changes to populations or habitats have occurred that have the potential to place habitats or populations at risk. The soft trigger is any deviation from normal trends in habitat or population in any given year. Metrics include, but are not limited to, annual lek counts, wing counts, aerial surveys, habitat monitoring, and DDCT evaluations.<br>For population metrics, normal population trends are calculated as the 5-year running mean of annual population counts. BLM field offices, with the assistance of their respective land and RMP implementation groups, local WGFD offices, and local sage-grouse working groups will evaluate the metrics with the Adaptive Management Working Group on an annual basis. The purpose of these strategies is to address localized greater sage-grouse population and habitat changes by providing the framework in which management will change if monitoring identifies negative population and habitat anomalies in order to avoid crossing a hard trigger threshold.<br>Soft triggers require immediate monitoring and surveillance to determine causal factors and may require curtailment of activities in the short or long term, as allowed by law. The project level adaptive management strategies will identify appropriate responses where the project's activities are identified as the causal factor. The management agency (BLM) and the Adaptive Management Work Group will implement an appropriate response strategy to address causal factors not attributable to a specific project or to make adjustments at a larger regional or statewide level.<br>Hard Trigger Response:<br>Hard triggers are indicators that management is not achieving desired conservation results. Hard triggers would be considered a catastrophic indicator that the species is not responding to conservation actions, or that a larger-scale impact or set of impacts is having a negative effect. | Soft Triggers Response:<br>Soft triggers are indicators that management or specific activities may not be achieving the intended results of conservation action or that unanticipated changes to populations or habitats have occurred that have the potential to place habitats or populations at risk. The soft trigger is any deviation from normal trends in habitat or population in any given year. Metrics include, but are not limited to, annual lek counts, wing counts, aerial surveys, habitat monitoring, and DDCT evaluations. For population metrics, normal population trends are calculated as the 5-year running mean of annual population counts. BLM field offices, with the assistance of their respective land and RMP implementation groups, local WGFD offices, and local sage-grouse working groups will evaluate the metrics with the Adaptive Management Working Group on an annual basis. The purpose of these strategies is to address localized Greater Sage-Grouse population and habitat changes by providing the framework in which management will change if monitoring identifies negative population and habitat anomalies in order to avoid crossing a hard trigger threshold.<br>Soft triggers require immediate monitoring and surveillance to determine causal factors and may require curtailment of activities in the short or long term, as allowed by law. The project level adaptive management strategies will identify appropriate responses where the project's activities are identified as the causal factor. The management agency (BLM) and the Adaptive Management Work Group will implement an appropriate response strategy to address causal factors not attributable to a specific project or to make adjustments at a larger regional or statewide level.<br>Hard Trigger Response:<br>Hard triggers are indicators that management is not achieving desired conservation results. Hard triggers would be considered a catastrophic indicator that the species is not responding to conservation actions, or that a larger-scale impact or set of impacts is having a negative effect.<br>Within the range of normal population variables (5-year running mean of annual | *(See above.)* |

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| Within the range of normal population variables (5-year running mean of annual population counts), hard triggers shall be determined to take effect when two of the three metrics exceeds 60 percent of normal variability for the area under management in a single year, or when any of the three metrics exceeds 40 percent of normal variability for a 3 year time period within a 5-year range of analysis. A minimum of 3 consecutive years in a 5-year period is used to determine trends (i.e., years 1-2-3, years 2-3-4, years 3-4-5).<br>Upon determination that a hard trigger has been tripped, the BLM will immediately defer issuance of discretionary authorizations for new actions within the Biologically Significant Unit for a period of 90 days. In addition, within 14 days of a determination that a hard trigger has been tripped, the Adaptive Management Work Group will convene to develop an interim response strategy and initiate an assessment to determine the causal factor or factors (hereafter called the causal factor assessment).<br>In making amendments to this plan, the BLM will coordinate with the USFWS as BLM continues to meet its objective of protecting, restoring, and enhancing Greater Sage-Grouse habitat by reducing, minimizing or eliminating threats to that habitat. The hard and soft trigger data will be analyzed as soon as it becomes available after the signing of the ROD and then at a minimum, analyzed annually thereafter. | population counts), hard triggers shall be determined to take effect when two of the three metrics exceeds 60 percent of normal variability for the area under management in a single year, or when any of the three metrics exceeds 40 percent of normal variability for a 3 year time period within a 5-year range of analysis. A minimum of 3 consecutive years in a 5-year period is used to determine trends (i.e., years 1-2-3, years 2-3-4, years 3-4-5).<br>Upon determination that a hard trigger has been tripped, the BLM will immediately defer issuance of discretionary authorizations for new actions within the Biologically Significant Unit for a period of 90 days. In addition, within 14 days of a determination that a hard trigger has been tripped, the Adaptive Management Work Group will convene to develop an interim response strategy and initiate an assessment to determine the causal factor or factors (hereafter called the causal factor assessment). The Adaptive Management Working Group would define a process to review and reverse adaptive management actions once the identified causal factor is resolved (e.g., returning to previous management once objectives of interim management strategy have been met).<br>In making amendments to this plan, the BLM will coordinate with the USFWS as BLM continues to meet its objective of protecting, restoring, and enhancing Greater Sage-Grouse habitat by reducing, minimizing or eliminating threats to that habitat. The hard and soft trigger data will be analyzed as soon as it becomes available after the signing of the ROD and then at a minimum, analyzed annually thereafter. | *(See above.)* |
| MD 4145: Base future adjustments to the appropriate management level on monitoring information and multiple use considerations through development of and/or revisions to HMA Plans. Update HMA plans to include Greater Sage-Grouse objectives. | No changes made. | Potential change under Alternative 3. |

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| *MD 4156: No similar action. | The BLM will update its Greater Sage-Grouse habitat management areas, including biologically significant units (BSUs), in conjunction with the State of Wyoming's core areas, upon issuance of any Wyoming Governor's Executive Order revising or amending the core area boundaries and upon completion of appropriate NEPA analysis and process. The BLM will complete the appropriate NEPA documentation (including appropriate public comment) prior to adopting any revised core area boundaries (e.g., maintenance action or plan amendment, environmental assessment, etc.). | Potential change under Alternatives 3, 4, 5, and 6. |
| No similar action. | *MD 4157: Specific to management for Greater Sage-Grouse, all RMPs are amended as follows:<br>Adopt the State of Wyoming's Greater Sage-Grouse Compensatory Mitigation Framework to the extent consistent with federal law, regulations, and policy.<br>In all Greater Sage-Grouse habitat, when authorizing third-party actions in designated Greater Sage-Grouse habitat, the BLM will seek to achieve the planning-level Greater Sage-Grouse management goals and objectives through implementation of mitigation and management actions, consistent with valid existing rights and applicable law. Under this Plan Amendment, management would be consistent with the Greater Sage-Grouse goals and objectives, and in conformance with BLM Manual 6840, Special Status Species Management. In accordance with BLM Manual 6840, the BLM will undertake planning decisions, actions and authorizations "to minimize or eliminate threats affecting the status of [Greater Sage-Grouse] or to improve the condition of [Greater Sage-Grouse] habitat" across the planning area.<br>Accordingly, before authorizing third-party actions that result in habitat loss and degradation, the BLM will complete the following steps, in alignment with the Governor of Wyoming's Executive Order 2015-4 (July 29, 2015):<br>1. Work jointly with the WGFD to evaluate projects and recommend mitigation in the form of avoidance and minimization.<br>2. The WGFD will determine if the State requires or recommends any additional | Potential change under Alternatives 3, 4, 5, and 6. |

| 2014/2015 Approved RMPs | 2019 Approved RMPs | Potential Change in 2023 Plan |
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| *(See above.)* | mitigation – including compensatory mitigation – under State regulations, policies, or programs related to the conservation of Greater Sage-Grouse.<br>3. Incorporate state required or recommended mitigation into the BLM's NEPA decision-making process, if the WGFD determines that compensatory mitigation is required to address impacts to GRSG habitat as a part of State policy or authorization, or if a proponent voluntarily offers mitigation.<br>4. Analyze whether the compensatory mitigation (deferring to the appropriate State authority to quantify habitat offsets, durability, and other aspects used to determine the recommended compensatory mitigation action):<br>• achieves measurable outcomes for Greater Sage-Grouse habitat function on a landscape scale as determined by WGFD that are at least equal to the lost or degraded values in accordance with the Governor of Wyoming's Executive Order 2015-4.<br>• provides benefits that are in place for at least the duration of the impacts.<br>• accounts for a level of risk that the mitigation action may fail or not persist for the full duration of the impact<br>5. Ensure mitigation outcomes are consistent with the State of Wyoming's mitigation strategy and principles outlined in 2018 Approved RMPA Appendix C, The Greater Sage-Grouse Habitat Management Strategy.<br>The BLM has determined that compensatory mitigation must be voluntary unless required by other applicable law and in recognition that State authorities may also require compensatory mitigation (IM 2019-018, *Compensatory Mitigation*, December 6, 2018). Therefore, consistent with valid existing rights and applicable law, when authorizing third-party actions that result in habitat loss and degradation, the BLM will consider voluntary compensatory mitigation actions only as a component of compliance with a State mitigation plan, program, or authority, or when offered voluntarily by a project proponent. | *(See above.)* |

| 2014/2015 Approved RMPs | 2019 Approved RMPs | Potential Change in 2023 Plan |
|---|---|---|
| *(See above.)* | Project-specific analysis will be necessary to determine how a compensatory mitigation proposal addresses impacts from a proposed action. The BLM will cooperate with the State to determine appropriate project design and alignment with State policies and requirements, including those regarding compensatory mitigation. When the BLM is considering compensatory mitigation as a component of the project proponent's submission or based on a mitigation requirement from the State, the BLM's NEPA analysis would evaluate the need to avoid or minimize impacts of the proposed project and achieve the goals and objectives of this RMPA. The BLM will defer to the appropriate State authority to quantify habitat offsets, durability, and other aspects used to determine the recommended compensatory mitigation action. | *(See above.)* |
| MO LR:1.5: Effects of infrastructure projects, including siting, will be minimized using the best available science, updated as monitoring information on current infrastructure projects becomes available. | No changes made. | No change proposed. |

| 2014/2015 Approved RMPs | 2019 Approved RMPs | Potential Change in 2023 Plan |
|---|---|---|
| **MD 6016: Retain approximately 1,072,653 acres of BLM-administered land. 14,283 acres of BLM-administered land are available for disposal by sale, exchange or other means (Map 3-21) (Appendix I, Land Disposal and Acquisition (p. 381)).<br>Disposal can include none, some, or all of the mineral estate as allowed by 43 CFR 2720 and FLPMA Section 209(b)(1). A mineral potential report would determine if a surface estate disposal includes none, some, or all of the mineral estate.<br>Lands classified as PHMAs and GHMAs for Greater Sage-Grouse will be retained in federal management unless: (1) the agency can demonstrate that disposal of the lands, including land exchanges, will provide a net conservation gain to the Greater Sage-Grouse or (2) the agency can demonstrate that the disposal of the lands, including land exchanges, will have no direct or indirect adverse impact on conservation of the Greater Sage-Grouse. Consider exceptions where there is mixed ownership. Allow land exchanges for additional or more contiguous federal ownership patterns within PHMAs. For PHMAs with minority federal ownership, include an additional, effective mitigation agreement for any disposal of federal land. Consider pursuing a permanent conservation easement as a final preservation measure. For lands in GHMAs that are identified for disposal, the BLM will only dispose of such lands consistent with the goals and objectives of this plan, including, but not limited to, the land use plan objective to maintain or increase Greater Sage-Grouse abundance and distribution.<br>Note: All land actions to acquire or dispose of lands would require a site specific analysis under NEPA. | No changes made. | No change proposed. |

| 2014/2015 Approved RMPs | 2019 Approved RMPs | Potential Change in 2023 Plan |
|---|---|---|
| **MD 6032: Designate ROW corridors as shown on Map 3-24. PHMAs are designated as avoidance areas for high voltage transmission line and pipeline ROWs. All authorizations in these areas must comply with the conservation measures outlined in this Approved RMP, including the RDFs and avoidance criteria presented in Appendix C, Required Design Features and Best Management Practices (p. 251).<br>Within PHMAs, specific to management for Greater Sage-Grouse, all RMPs are amended as follows:<br>**New Transmission Lines (greater than 115 kV):**<br>New transmission lines greater than 115 kV in PHMA would be allowed only (1) when located within 0.5 miles or less of 115 kV or greater transmission lines constructed prior to 2008; or (2) in designated RMP corridors authorized for aboveground transmission lines. Transmission lines routed using one or more of the two criteria listed above will not be counted against the DDCT 5 percent disturbance cap.<br>New transmission lines greater than 115 kV proposed outside of these areas would be considered where it can be demonstrated that declines in Greater Sage-Grouse populations could be avoided through project design and/or mitigation. These projects will be subject to the density and disturbance restrictions for PHMA.<br>Review of transmission line proposals would incorporate the Framework for Sage-grouse Impact Analysis for Interstate Transmission Lines (BLM 2012b) and other appropriate documents consistent with the three routing criteria described above. New projects within PHMAs that may require future utility lines, including distribution and transmission lines or pipelines, would include the proposed utility lines in their DDCT as part of the proposed disturbance. Lines permitted, but not located in the above mentioned routes or a designated corridor will be counted toward the 5 percent disturbance calculation (line distance is equal to the anticipated construction footprint or construction ROW width multiplied by length and includes all access roads, staging area, and other surface disturbance | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |

| 2014/2015 Approved RMPs | 2019 Approved RMPs | Potential Change in 2023 Plan |
|---|---|---|
| associated with construction outside of the construction ROW).<br>**New Electric Distribution Lines (less than 115 kV):**<br>Require burial of new electric distribution lines where economically feasible. If not economically feasible, distribution lines may be authorized when effectively designed/mitigated to protect Greater Sage-Grouse and when the authorized officer determines that overhead installation is the action alternative with the fewest adverse impacts while still meeting the project need. Consider agricultural and residential distribution lines to be adequately mitigated for Greater Sage-Grouse if constructed at least 0.6 mile from the lek perimeter with appropriate timing constraints and constructed to the latest APLIC standards. These ROW authorizations will be subject to approval by the State Director.<br>**Pipelines:**<br>Allow new pipelines through PHMAs:<br>(1) within an RMP corridor currently authorized for that use or designated through future RMP amendments; or<br>(2) constructed in or adjacent to existing utilities (buried and aboveground) or roads. Pipelines constructed in RMP corridors or adjacent to existing utilities or roads will require completion of a DDCT analysis for baseline data collection, but the project is not required to meet the threshold of 5 percent. However, within 6 months of the completion of construction, the project proponent will provide the authorized officer with as-built drawings so that the total disturbance within PHMAs can be calculated annually. | *(See above.)* | *(See above.)* |

| 2014/2015 Approved RMPs | 2019 Approved RMPs | Potential Change in 2023 Plan |
|---|---|---|
| MD 6033: Manage 637,154 acres as ROW avoidance areas (Map 3-24).<br>Manage PHMAs as ROW avoidance areas for new ROW or SUA permits (317,307 acres).<br>Within PHMAs where new ROWs/SUAs are necessary, locate new ROWs/SUAs within designated RMP corridors or adjacent to existing ROWs/SUAs where technically feasible. Subject to valid existing rights, including non-federal land inholdings, locate new, required ROWs/SUAs adjacent to existing ROWs/SUAs or where impacts to Greater Sage-Grouse are minimized.<br>Work with proponents to design ROW applications to protect Greater Sage-Grouse. | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |

| 2014/2015 Approved RMPs | 2019 Approved RMPs | Potential Change in 2023 Plan |
|---|---|---|
| MD 6046: Allow temporary closures to motorized vehicle use in areas that pose public health and safety risks, and/or where resource damage is imminent. In PHMAs and GHMAs, temporary closures will be considered in accordance with 43 CFR subpart 8364 (Closures and Restrictions); 43 CFR subpart 8351 (Designated National Area); 43 CFR subpart 6302 (Use of Wilderness Areas, Prohibited Acts, and Penalties); 43 CFR subpart 8341 (Conditions of Use).<br>Temporary closure or restriction orders under these authorities are enacted at the discretion of the authorized officer to resolve management conflicts and protect persons, property, and public lands and resources. Where an authorized officer determines that off-highway vehicles are causing or will cause considerable adverse effects upon soil, vegetation, wildlife, wildlife habitat, cultural resources, historical resources, threatened or endangered species, wilderness suitability, other authorized uses, or other resources, the affected areas shall be immediately closed to the type(s) of vehicle causing the adverse effect until the adverse effects are eliminated and measures implemented to prevent recurrence. (43 CFR 8341.2) A closure or restriction order should be considered only after other management strategies and alternatives have been explored. The duration of temporary closure or restriction orders should be limited to 24 months or less; however, certain situations may require longer closures and/or iterative temporary closures. This may include closure of routes or areas. | No changes made. | No change proposed. |

| 2014/2015 Approved RMPs | 2019 Approved RMPs | Potential Change in 2023 Plan |
|---|---|---|
| *MD 6059: Design recreational sites, recreation facility development, and recreational access to avoid riparian habitat areas or develop and manage them in a manner that minimizes effects on riparian habitats. Construction of recreation facilities within PHMA must conform with the avoidance and minimization measures of this plan. If it is determined that these conservation measures are inadequate for the conservation of Greater sage-grouse, the BLM will require and ensure compensatory mitigation that provides a net conservation gain to the species. | Design recreational sites, recreation facility development, and recreational access to avoid riparian habitat areas or develop and manage them in a manner that minimizes effects on riparian habitats. Construction of recreation facilities within PHMA must conform to the avoidance and minimization measures of this plan. If it is determined that these conservation measures are inadequate for the conservation of Greater Sage-Grouse, the BLM will consider mitigation is consistent with the applicable State management strategy (currently Governor of Wyoming's Executive Order 2015-4 (see also MD 4157). | No change proposed. |

| 2014/2015 Approved RMPs | 2019 Approved RMPs | Potential Change in 2023 Plan |
|---|---|---|
| **MD 6126: In cooperation, consultation, and coordination with permittees/lessees, cooperators, and interested public, develop and implement appropriate livestock grazing management actions to enhance land health, improve forage for livestock, and meet other multiple use objectives by using the *Wyoming Guidelines for Livestock Grazing Management*, other appropriate BMPs (see Appendix C, *Required Design Features and Best Management Practices* (p. 251)), and development of appropriate range improvements. The BLM will prioritize (1) the review of grazing permits/leases, in particular to determine if modification is necessary prior to renewal, and (2) the processing of grazing permits/leases in PHMAs. In setting workload priorities, precedence will be given to existing permits/leases in areas not meeting Land Health Standards, with focus on allotments containing riparian areas or wet meadows. The BLM may use other criteria for prioritization to respond to urgent natural resource concerns (e.g., wildfire) and legal obligations.<br>The BLM will collaborate with appropriate federal agencies, and the State of Wyoming as contemplated under EO 2013–3 (Wyoming Office of the Governor 2013), to 1) develop appropriate conservation objectives; (2) defined a framework for evaluating situations where Greater Sage-Grouse conservation objectives are not being achieved on federal land, to determine if a causal relationship exists between improper grazing (by wildlife or wild horses or livestock) and Greater Sage-Grouse conservation objectives; and 3) identify appropriate site-specific actions to achieve Greater Sage-Grouse conservation objectives within the framework. | In cooperation, consultation, and coordination with permittees/lessees, cooperators, and interested public, develop and implement appropriate livestock grazing management actions to enhance land health, improve forage for livestock, and meet other multiple use objectives by using the Wyoming Guidelines for Livestock Grazing Management, other appropriate BMPs (see 2019 Wyoming GrSG ARMPA Appendix B, Required Design Features and Best Management Practices ), and development of appropriate range improvements. The BLM will prioritize (1) the review of grazing permits/leases, in particular to determine if modification is necessary prior to renewal, and (2) the processing of grazing permits/leases in PHMAs. In setting workload priorities, precedence will be given to existing permits/leases in areas not meeting Land Health Standards, with focus on allotments containing riparian areas or wet meadows. The BLM may use other criteria for prioritization to respond to urgent natural resource concerns (e.g., wildfire) and legal obligations.<br>The BLM will collaborate with appropriate federal agencies, and the State of Wyoming as contemplated under EO 2013–3 (Wyoming Office of the Governor 2013), to 1) develop appropriate conservation objectives; (2) defined a framework for evaluating situations where Greater Sage-Grouse conservation objectives are not being achieved on federal land, to determine if a causal relationship exists between improper grazing (by wildlife or wild horses or livestock) and Greater Sage-Grouse conservation objectives; and 3) identify appropriate site-specific actions to achieve Greater Sage-Grouse conservation objectives within the framework. | Potential change under Alternative 3. |
| *MD 6130: Utilize a rangeland health assessment, resource monitoring, or analysis to determine if livestock grazing adjustments in amounts, kinds, or season are necessary. The NEPA analysis for renewals and modifications of livestock grazing permits/leases that include lands within PHMAs will include specific management thresholds based on Greater Sage-Grouse | Utilize a rangeland health assessment, resource monitoring, or analysis to determine if livestock grazing adjustments in amounts, kinds, or season are necessary. Within PHMA, if monitoring data show the wildlife/special status species standard has not been met nor progress being made toward meeting that standard, there would be an evaluation and a determination made | Potential change under Alternative 3. |

| 2014/2015 Approved RMPs | 2019 Approved RMPs | Potential Change in 2023 Plan |
|---|---|---|
| Habitat Objectives Table (Table 2.7, "Greater Sage-Grouse Seasonal Habitat Objectives" (p. 21)) and Land Health Standards (43 CFR 4180.2) and one or more defined responses that will allow the authorizing officer to make adjustments to livestock grazing that have already been subjected to NEPA analysis. Greater Sage-Grouse Habitat Objectives Habitat Objectives Table (Table 2.7, "Greater Sage-Grouse Seasonal Habitat Objectives" (p. 21)), Land Health Standards (43 CFR 4180.2) and ecological site potential, and one or more defined responses that will allow the authorizing officer to make adjustments to livestock grazing that have already been subjected to NEPA analysis. | as to the cause. If it is determined that the current authorized livestock use is a significant causal factor in failing to achieve the wildlife/special status species standards~~,~~ the BLM would address the achievement or progress toward achieving the LHSs (43 CFR 4180.2) and, if needed, Greater Sage-Grouse habitat maintenance or improvement.<br>When NEPA analysis is required for a specific implementation action, one alternative would include mechanisms to make adjustments to meet or make progress toward meeting the wildlife/special status species standard. The analysis should also identify the BLM-approved data collection methodologies used for monitoring conditions and determining when adjustments are necessary. If current grazing management meets land health standards and provides for Greater Sage-Grouse habitat, there would be no need to analyze an alternative for Greater Sage-Grouse.<br>Authorized uses in PHMA that incorporate habitat objectives for Greater Sage-Grouse must develop desired conditions based on Greater Sage-Grouse habitats present in the allotment and the ecological potential of sites that supports these habitats. Metrics used to monitor for objectives must be developed and inform the wildlife/SSS portion of the Standards for Healthy Rangelands.<br>Within PHMA, seasonal habitat objectives for Greater Sage-Grouse apply only to those habitats delineated within an allotment during the specific season (e.g., breeding season objectives during breeding season).<br>Data needed to inform the relationship between the authorized use and habitat condition would come from sample locations that appropriately reflect the impact of the authorized use on habitat conditions.<br>Data points should fall within Greater Sage-Grouse seasonal habitat areas and be collected on ecological sites that have the potential to produce Greater Sage-Grouse habitat. | *(See above.)* |

| 2014/2015 Approved RMPs | 2019 Approved RMPs | Potential Change in 2023 Plan |
|---|---|---|
| MD 6142: Allotments within PHMAs, focusing on those containing riparian areas, including wet meadows, will be prioritized for field checks to help ensure compliance with the terms and conditions of the grazing permits. Field checks could include monitoring for actual use, utilization, and use supervision. | No changes made. | Potential change under Alternative 3. |

### 2.18.2 Relevant Appendices

The following table shows which appendices from the 2015 and 2019 plans have management direction that may change through this RMP amendment. If 2019 is not listed in the year, then no change was made to the appendix between the 2015 and 2019 plans. The 2015 Appendices can be found on the Bighorn Basin RMP ePlanning website. The 2019 Appendices can be found on the Wyoming GRSG ePlanning website.

| ARMPA Appendix Name | Year | Potential for Change in 2023 Plan |
|---|---|---|
| A: Maps | 2015 | Yes |
| A: Approved RMP Amendment with Management Goals, Objectives, and Decisions | 2019 | Yes |
| B: Oil and Gas Lease Notices and Lease Stipulations; including Exception, Modification, and Waiver Criteria | 2015 | Yes |
| C: Required Design Features and Best Management Practices | 2015 | Yes |
| B: Required Design Features | 2019 | Yes |
| D: Greater Sage-Grouse Habitat Management Strategy | 2015 | Yes |
| C: Greater Sage-Grouse Habitat Management Strategy | 2019 | Yes |
| E: Laws, Regulations, Policies, and Guidance | 2015 | No |
| F: Wyoming Bureau of Land Management Mitigation Guidelines for Surface-Disturbing and Disruptive Activities | 2015 | No |
| G: Federal Oil and Gas Operations on Split-Estate Lands | 2015 | No |
| H: Monitoring and Evaluation | 2015 | No |
| I: Land Disposal and Acquisition | 2015 | No |
| J: Recreation Management | 2015 | No |
| K: Biological Opinion | 2015 | No |
| L: Implementation | 2015 | No |
| M: Bighorn Basin Air Resource Management Plan | 2015 | No |
| N: Seasonal Raptor Stipulations for All Surface-Disturbing and Disruptive Activities | 2015 | No |
| O: Livestock Grazing | 2015 | No |
| P: Final Environmental Impact Statement and Record of Decision Crosswalk Tables | 2015 | No |

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# Appendix 2.19
# Lander, Wyoming RMP Revisions

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## 2.19 LANDER, WYOMING RMP REVISIONS

This appendix presents the approved RMP revision language from the record of decision for the Lander RMP that relate to GRSG management. The table below notes which goals, objectives, appendices, and management decisions/actions have a potential to change as a result of the current planning effort and if so, under which alternatives changes are being considered. Note that any references to tables and appendices are to those applicable RMP appendices that are listed in **Section 2.19.2** of this appendix.

### 2.19.1 Existing GRSG RMP Management – Lander RMP Revisions

**Table 1. Summary of Goals, Objectives, and Management Actions to the Lander RMP**

| 2014/2015 Approved RMPs | 2019 Approved RMPs | Potential Change in 2023 Plan |
|---|---|---|
| **Land Use Plan Revisions/Amendments to the Lander RMP** | | |
| **MD 1015: Implement BLM National and Wyoming Reclamation Policies requiring the development of reclamation plans for all federal actions authorized, conducted, or funded by the BLM that disturb vegetation and/or the mineral/soil resources. Require that site-specific interim and final reclamation practices be developed and implemented that will meet the reclamation standards as identified in Appendix B (p. 185). The type and detail of the reclamation plan will be commensurate with the extent and duration of soil disturbance. For extensive disturbance such as a full-field oil and gas development, a detailed, multi-phase plan such as the Continental Divide Creston oil and gas project reclamation plan (attached as Appendix G to the Proposed RMP and Final EIS as an example) will be required. | No changes made. | No change proposed. |
| **MD 1016: Require a full reclamation bond specific to the site for all new disturbances in accordance with 43 CFR 3104.2, 3104.3, and 3104.5 or current policy. Ensure bonds are sufficient for costs relative to reclamation (Connelly et al. 2000; Hagen et al. 2007) that would result in restoration of disturbed lands in accordance with the final reclamation standards and objectives identified in Appendix B (p. 185). Base the reclamation costs on the assumption that contractors for the BLM will perform the work. | No changes made. | Potential change under Alternative 3. |
| MD 1017: Require that surface-disturbing activities minimize the surface disturbance footprint to the maximum extent possible to limit the areas requiring reclamation. Limit disturbance of desirable vegetative communities established during interim reclamation when implementing final reclamation. | No changes made. | No change proposed. |

| 2014/2015 Approved RMPs | 2019 Approved RMPs | Potential Change in 2023 Plan |
|---|---|---|
| MD 1018: Require that all reclamation plans identify the desired plant community for final reclamation. | No changes made. | No change proposed. |
| MD 1019: Consider wildlife habitat objectives in all final reclamation objectives. In Core Area, final reclamation objectives will be to restore greater sage-grouse habitat. Include metrics to ensure that restoration goals are met. | No changes made. | No change proposed. |
| MD 1020: Require site stabilization and sediment control in compliance with Wyoming Stormwater Discharge requirements and BLM reclamation policies. | No changes made. | No change proposed. |
| **MD 1021: Require that during and following reclamation activities, the land user is responsible for monitoring to help ensure interim and final reclamation success as defined in reclamation policies and with the standards identified in Appendix B (p. 185) is achieved. Require follow-up seeding and/or other corrective or remedial erosion-control measures on areas of surface disturbance, as appropriate and, if necessary, protecting the reclaimed landscape until reclamation standards have been achieved. Monitoring and follow-up reclamation practices will continue on interim and final reclaimed areas until the standards identified in Appendix B (p. 185) have been successfully achieved. | No changes made. | No change proposed. |
| MD 1022: Identify areas with soil disturbance that were not successfully reclaimed. Priorities for reclamation of these areas are determined on a case-by-case basis with an emphasis on greater sage-grouse Core Area and other important wildlife habitat. Develop partnerships and funding sources to implement reclamation where no responsible party has the reclamation obligation. | No changes made. | No change proposed. |
| **MD 1023: Adapt reclamation methods to specific requirements based on plant communities within ecological sites and site-specific objectives. Incorporate reclamation objectives and require reclamation plans, including reclamation standards as identified in Appendix B (p. 185) on a site-specific basis. | No changes made. | No change proposed. |
| MD 1024: Utilize management practices, including phased development and BMPs, to achieve reclamation success. Require Reclamation Objectives and Standards as identified in all reclamation plans. | No changes made. | No change proposed. |

| 2014/2015 Approved RMPs | 2019 Approved RMPs | Potential Change in 2023 Plan |
|---|---|---|
| **MD 1025: Reclamation management practices will select native plant species based on site characteristics and ecological site descriptions. Reclamation success will be determined based on the criteria and standards identified in Appendix B (p. 185). | No changes made. | No change proposed. |
| MD 2001: Do not lease coal or oil shale-tar sands. | No changes made. | No change proposed. |
| MD 2002: Incorporate proponent committed or BLM Required Design Features or mitigation such as BMPs as Conditions of Approval for any authorized mineral activity for federal minerals, regardless of surface ownership. | No changes made. | No change proposed. |
| 2003 (MR: 1.3): In project-level EISs and EAs, require, on a case-by-case basis, the development of a wildlife resource monitoring and mitigation plan to address potential impacts from mineral development on wildlife populations and/or habitat. | Action was removed in 2019. | No change proposed. |
| MD 2004: Recommend for withdrawal from locatable mineral entry (Map 9) approximately 467,065 acres. (In addition, approximately 8,634 acres are withdrawn in pre-FLPMA actions that do not expire.) See decisions under resource programs such as wildlife, cultural, and recreation for specific details of acres recommended for withdrawals. A total of approximately 2,333,402 acres are open to locatable mineral entry (Map 9). | No changes made. | Potential change under Alternative 3. |
| 2005 (MR:1.3): 1,411,095 acres of federal mineral estate are open to geothermal leasing with moderate constraints (Map 10). 603,633 acres of federal mineral estate are open to geothermal leasing with major constraints (Map 10). 714,545 acres of federal mineral estate are closed to geothermal leasing (Map 10). | Action was removed in 2019. | Potential change under Alternatives 3 and 6. |
| 2006 (MR:1.3): Constraints applied for oil and gas leasing also apply to geothermal leasing. | Action was removed in 2019. | Potential change under Alternatives 3 and 6. |

| 2014/2015 Approved RMPs | 2019 Approved RMPs | Potential Change in 2023 Plan |
|---|---|---|
| MD 2008: Approximately 67,511 acres of federal mineral estate are open to oil and gas leasing subject only to standard lease stipulations (Map 11).<br>Approximately 1,423,264 acres of federal mineral estate are open to oil and gas leasing subject to controlled surface use and/or timing limitation stipulations (Map 11 and Appendix 1 (p. 255)).<br>Approximately 1,146,630 acres of federal mineral estate are open to oil and gas leasing subject to NSO stipulations (Map 11 and Appendix 1 (p. 255)).<br>Approximately 172,071 acres of federal mineral estate are closed to oil and gas leasing (Map 11). | Approximately 80,198 acres of federal mineral estate are open to oil and gas leasing subject only to standard lease stipulations (Map 11).<br>Approximately 1,419,568 acres of federal mineral estate are open to oil and gas leasing subject to controlled surface use and/or timing limitation stipulations (Map 11 and Appendix 1 (p. 255)).<br>Approximately 1,137,666 acres of federal mineral estate are open to oil and gas leasing subject to NSO stipulations (Map 11 and Appendix 1 (p. 255)).<br>Approximately 171,669 acres of federal mineral estate are closed to oil and gas leasing (Map 11). | Potential change under Alternatives 3 and 6. |
| MD 2009: All oil and gas and other mineral leases are subject to standard lease stipulations. Additional stipulations may apply as otherwise specified in this RMP. In areas that are closed to mineral leasing, do not re-offer existing leases when they expire. If drainage occurs in an area closed to oil and gas leasing, authorize leasing on a case-by-case basis with an NSO stipulation. | No changes made. | Potential change under Alternatives 3 and 6. |
| MD 2010: For proposed actions in greater sage-grouse Core Area, determine whether a categorical exclusion is applicable and if so, closely examine the extraordinary circumstances, if applicable, to determine whether one or more exists that would require preparation of a NEPA analysis. If a categorical exclusion applies, and no extraordinary circumstances exist, determine whether preparing a NEPA analysis would help inform decision making. | No changes made. | No change proposed. |
| MD 2011: Require unitization when deemed necessary for proper development and operation of an area or to facilitate more orderly (e.g., phased and/or clustered) development as a means of minimizing adverse impacts to resources, including greater sage-grouse, so long as the unitization plan adequately protects the rights of all parties, including the United States. | No changes made. | Potential change under Alternative 3. |

| 2014/2015 Approved RMPs | 2019 Approved RMPs | Potential Change in 2023 Plan |
|---|---|---|
| MD 2012: Disposal of produced water is authorized in accordance with Onshore Oil and Gas Order #7, Disposal of Produced Water, and in compliance with state regulations. If there is Wyoming Pollutant Discharge Elimination System permitted discharge, consider soil erosion, degradation of soil quality, sedimentation, and other factors in coordination with the State of Wyoming. | No changes made. | Potential change under Alternative 3. |
| MD 2013: The planning area is open to geophysical exploration except for lands identified as closed to mineral leasing or NSO to oil and gas leasing or as otherwise provided in other decisions. Geophysical exploration is subject to motorized travel limitations and restrictions on surface-disturbing and disruptive activities. | No changes made. | Potential change under Alternatives 3 and 6. |
| MD 2017: Approximately 1,955,798 acres are open for mineral material disposal on a demand basis (Map 12) subject to resource protections. 853,303 acres are closed to mineral material disposal (Map 12). | Action was removed in 2019. | Potential change under Alternatives 3 and 6. |
| MD 2018: Identify areas disturbed by expired mineral material sales, including free-use permits and community use pits. Prioritize reclamation of these sites, starting with those in greater sage-grouse Core Area where restoration as long-term greater sage-grouse habitat is possible. Next in priority are those in riparian-wetland areas, ACECs, the National Trails Management Corridor, VRM Class II areas, non-Core Area greater sage-grouse habitat, and wildlife migration corridors. Seek partnerships with others to complete restoration, including applicants seeking suitable offsite mitigation opportunities. | Action was removed in 2019. | Potential change under Alternatives 3 and 6. |
| FM: 2: Manage fire and fuels to restore or maintain natural ecosystem functions, restore fire-adapted ecosystems, reduce losses from landscape-level wildland fire, and protect multiple-use values. | Action was removed in 2019. | No change proposed. |
| FM 2.6: Utilize fuels and vegetation treatments to maintain and enhance greater sage-grouse habitat where applicable. | Action was removed in 2019. | No change proposed. |
| MD 3004: In greater sage-grouse Core Area, prioritize suppression to conserve the habitat. Where applicable and technically feasible, apply greater sage-grouse BMPs such as those identified in Appendix E (p. 215). | No changes made. | No change proposed. |

| 2014/2015 Approved RMPs | 2019 Approved RMPs | Potential Change in 2023 Plan |
|---|---|---|
| MD 3007: Use chemical, biological, and mechanical treatments to reduce the risk of landscape-level wildfire within priority areas. Alter fuel loading and improve ecological condition of vegetation communities. Consider the presence and potential for noxious and nonnative plant species when designing wildland fire response and fuels treatments. | No changes made. | No change proposed. |
| MD 3008: Use personal use and commercial vegetation sale permits, where not otherwise constrained or prohibited (as identified in Records 4012, 6139, and 7045), for removal of firewood, post and pole, Christmas trees, sawlogs, and wildlings, for hazardous fuels management. | Use personal use and commercial vegetation sale permits, where not otherwise constrained or prohibited, for removal of firewood, post and pole, Christmas trees, sawlogs, and wildlings, for hazardous fuels management. | No change proposed. |
| MD 3009: Monitor fuels treatment and wildfire burn areas for sufficient time after treatment or fire event in order to determine short-term and long-term project success, detect weed infestations and accelerated soil erosion, and assess overall vegetation recovery. Utilize all available rehabilitation tools to control weed infestation and accelerated soil erosion. Implement post-treatment rest of treated areas from livestock grazing for two full growing seasons on all prescribed or wildland fire burn areas unless vegetation recovery dictates otherwise. | No changes made. | No change proposed. |
| MD 3010: Partner with the University of Wyoming and other research entities to develop a greater understanding of the ecology and disturbance regime of sagebrush steppe, woodland, and forested vegetation communities found within the planning area. Use this information to develop a regionally specific scientific foundation for vegetation management activities. | No changes made. | No change proposed. |
| MD 3011: Inventory the Fire Regime Condition Class (Map 14) of the vegetative communities found within the fire management units (Map 15). In coordination with stakeholders and in consideration of greater sage-grouse Core Area objectives, prioritize areas requiring treatment and utilize appropriate vegetation treatment techniques to improve the condition class across a landscape. Prioritize those projects in areas with the greatest benefits to wildlife and the highest likelihood of landscape-level wildfire. | No changes made. | No change proposed. |

| 2014/2015 Approved RMPs | 2019 Approved RMPs | Potential Change in 2023 Plan |
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| MD 3012: Allow vegetation treatments in greater sage-grouse Core Area that conserve, enhance, or restore greater sage-grouse habitat excluding the use of prescribed fire unless specifically for the purpose of greater sage-grouse habitat improvement (this includes treatments that benefit livestock as part of an allotment management plan/conservation plan to improve greater sage-grouse habitat).<br>In suitable habitat within greater sage-grouse Core Area, incorporate specific greater sage-grouse habitat objectives and apply appropriate seasonal restrictions for implementing vegetation management treatments.<br>In identified greater sage-grouse winter concentration areas, vegetation treatments should emphasize strategically reducing wildfire risk around or in the winter concentration areas and maintaining winter concentration habitat quality. Prioritize restoration treatments in areas that are thought to limit greater sage-grouse distribution and/or abundance. Focus vegetation treatments outward from existing, intact greater sage-grouse habitat. Utilize BMPs, such as those in Appendix E (p. 215) and other current habitat management guidelines, when designing and implementing the project. | No changes made. | No change proposed. |
| MD 3013: In suitable greater sage-grouse Core Area, do not reduce sagebrush canopy cover to less than 15 percent within a defined treatment polygon unless a vegetation management objective requires additional reduction in sagebrush cover to protect or to conserve habitat quality for greater sage-grouse or other sagebrush steppe obligate species. Maintain sagebrush and understory diversity (relative to ecological site description) unless such removal is necessary to achieve greater sage-grouse habitat management objectives. Remove conifers or reduce the density of conifers that have encroached into sagebrush plant communities. | No changes made. | No change proposed. |
| MD 3014: Outside of greater sage-grouse Core Area, emphasize the reintroduction of fire into its natural role in the ecosystem in consideration of Decision Record 3016. Where possible, use wildland fire and prescribed fire to achieve management objectives, including reducing hazardous fuel loading, restoring vegetation communities, improving and/or protecting wildlife habitat, enhancing forage production, and addressing forest and woodland health issues such as pine beetle outbreaks. | Action was removed in 2019. | No change proposed. |

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| MD 3015: Cooperate with stakeholders to conduct landscape level treatments resulting in enhanced fuels management and/or restoration of fire-adapted ecosystems. In cooperation with stakeholders, manage to promote the growth and persistence of native shrubs, grasses, and forbs. | No changes made. | No change proposed. |
| MD 3016: Limit the use of fire to treat areas receiving less than 12 inches of annual precipitation. Prescribed fire to reduce hazardous fuels or enhance land health in areas receiving less than 12 inches of annual precipitation could be utilized after exploring other potential treatment methods and in areas where the relative resistance and relative recovery rate of the site allows for the successful post-fire reestablishment of desired native vegetation. | No changes made. | No change proposed. |
| MD 3017: Utilizing Required Design Features and BMPs applied as Conditions of Approval, establish fuels treatment projects at strategic locations to minimize the size of wildfires. Restore native or desirable plants and create landscape patterns to benefit wildlife. Power wash all fire vehicles including engines, water tenders, personnel vehicles, and OHVs after they have been in the field to help prevent the establishment or spread of invasive weeds. | No changes made. | No change proposed. |
| MD 4015: Identify unique plant communities and manage to protect, preserve, or enhance these communities. | No changes made. | No change proposed. |
| MD 4016: Manage vegetation communities for vegetative attributes described in NRCS Ecological Site Guides and to meet identified vegetative goals. When existing Ecological Site Descriptions have not been developed, are too general, or are not correct to serve adequately as benchmarks, identify and document local areas of similar potential within each specific ecological site that exemplify achievement of appropriate habitat objectives, and use these sites for the development of new reference sheets to be used as the benchmark reference. | No changes made. | No change proposed. |
| MD 4017: Use vegetation treatments to change plant community composition in a manner that achieves wildlife objectives, rangeland health objectives, and facilitates grazing management. Ensure that projects conform to resource objectives for the site. | No changes made. | No change proposed. |

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| MG BR:3: Manage for healthy native plant communities by reducing, preventing expansion of, or eliminating the occurrence of invasive nonnative species, undesirable vegetation, or noxious weeds, and predatory plant pests or disease by implementing decisions consistent with goals included in Partners Against Weeds and consistent with state and local weed management plans. | No changes made. | No change proposed. |
| MO BR:3.1: Maintain adequate baseline information, and inventory and monitoring data, regarding the extent and control of invasive species. Evaluate effectiveness of decisions, and assess progress toward goals to improve invasive species management. Develop a prevention and early detection program. | No changes made. | No change proposed. |
| MO BR:3.2: Coordinate with adjoining jurisdictions in management and control of invasive nonnative species across jurisdictional and political boundaries. | No changes made. | No change proposed. |
| MO BR:3.3: Include provisions for invasive nonnative species management in all BLM-funded or authorized actions. | No changes made. | No change proposed. |
| MG BR:4: Support internal and external education and awareness of noxious weeds. | No changes made. | No change proposed. |
| MO BR:4.1: Develop and deploy educational and public awareness programs and materials in cooperation with other agencies and organizations. | No changes made. | No change proposed. |
| MG BR:5: In all parts of the planning area, manage for the reduction, prevention, and halting the expansion of cheatgrass. Emphasize the prevention of invasive annual grass and woody plants in greater sage-grouse Core Area. | No changes made. | No change proposed. |
| MD 4020: Manage weed treatments to maintain and improve greater sage-grouse habitat. Apply Required Design Features and BMPs as Conditions of Approval, such as those in Appendix E (p. 215). | No changes made. | No change proposed. |
| MD 4021: Require the use of certified noxious-weed free forage, mulch, and other land-applied products for BLM-authorized activities on BLM-administered lands. | No changes made. | No change proposed. |

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| MD 4022: Should invasive nonnative species become established in a location, develop and implement site-specific plans to eradicate/control invasive weeds for all surface-disturbing activities in the immediate vicinity. Priority for control will be: (1) Wyoming Declared Weed and Pest Species, (2) those weeds on the Western States Combined Declared Noxious Weed List, (3) those annual/biennial invasive weeds interfering with reclamation efforts, and (4) those invasive nonnative species interfering with a management objective. | No changes made. | No change proposed. |
| MD 4023: Require that equipment and vehicles used for BLM-authorized activities be cleaned for seeds of noxious weeds and invasive nonnative species before moving onto BLM-administered lands. Prohibit project vehicles accessing BLM-administered lands via cross-county travel from driving through infestations during access to the site. If the area on which BLM-authorized activities take place is identified as being a high risk for invasive and/or noxious weeds, require that vehicles be cleaned before leaving the worksite and include prescriptions for the disposal of wash water. | No changes made. | No change proposed. |
| MD 4024: Develop a plan to manage cheatgrass in coordination with other agencies and individuals, with the local County Weed & Pest Control Districts acting as the point of contact among all parties. | No changes made. | No change proposed. |
| MD 4025: If the Authorized Officer determines that BLM-authorized activities are contributing to the spread of noxious or invasive species, adjust the terms of the authorized activity to aid in the control of the species. | No changes made. | No change proposed. |
| MD 4026: If the Authorized Officer determines that livestock are likely carrying ingested seeds of invasive nonnative species, the Authorized Officer may require that livestock be flushed for weeds for a period of 72 hours before allowing livestock to move onto BLM-administered lands. | No changes made. | Potential change under Alternative 3. |
| MD 4027: Develop and implement a program promoting public awareness of Wyoming Declared Noxious Weeds and Pests as well as invasive nonnative species. | No changes made. | No change proposed. |

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| MD 4028: Identify riparian-wetland management actions to promote biodiversity and develop an implementation plan to incorporate actions into BLM-authorized activities. Manage riparian-wetland areas and wet meadows to achieve or maintain diverse species richness that includes a component of perennial forbs in conjunction with desirable riparian sedges, rushes, bulrushes, and grasses, as appropriate. | No changes made. | No change proposed. |
| MD 4029: Implement management actions to have riparian-wetland areas meet or exceed proper functioning conditions and Standard 2 of the Wyoming Standards for Healthy Rangelands. | No changes made. | No change proposed. |
| MD 4035: Use an integrated management approach (mechanical, chemical, or biological treatments, prescribed fire, and grazing management techniques) to manipulate vegetative communities to achieve fish, wildlife, and watershed objectives. See the *Special Status Species* section for limitations on the use of prescribed fire in greater sage-grouse habitat. | Action was removed in 2019. | No change proposed. |
| MD 4041: The Dubois, Red Canyon, Lander Slope, and Green Mountain ACECs, greater sage-grouse Core Area, and the Sweetwater River watershed are priorities for management of fish and wildlife and their habitat. See the *Areas of Critical Environmental Concern* section for ACEC decisions. See the *Special Status Species – Wildlife* section for greater sage-grouse management. | Action was removed in 2019. | No change proposed. |
| MD 4051: Avoid the movement of water from one 4th level hydrologic unit code drainage to another 4th level hydrologic unit code drainage to prevent aquatic invasive species and disease transfer. | No changes made. | No change proposed. |
| **MD 4056: Outside of DDAs, wildlife seasonal protections for surface-disturbing and disruptive activities apply to maintenance and operations actions when the activity is determined to be detrimental to wildlife (see Appendix F (p. 229)). Reclamation of surface disturbance will be in accordance with Appendix B (p. 185) for non-DDAs. | No changes made. | No change proposed. |
| MD 4059: On a case-by-case basis, close and reclaim redundant roads to reduce road density and habitat fragmentation in coordination with adjacent landowners and/or state and county governments. | No changes made. | No change proposed. |

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| MD 4060: Manage wind-energy development on a case-by-case basis and in consideration of the resource values in big game crucial winter range, migration corridors, and parturition areas, raptor concentration areas, and other areas with wildlife values. Wind-energy management in greater sage-grouse Core Area is found in the *Special Status Species – Wildlife* section. | Action was removed in 2019. | Potential change under Alternatives 3, 4, 5, and 6. |
| MD 4067: On a case-by-case basis, manage vegetation in identified crucial winter range and parturition areas to benefit the identified species (Maps 18-22). | No changes made. | No change proposed. |
| MD 4069: Avoid authorizing road development in big game crucial winter range and parturition areas. | No changes made. | No change proposed. |
| MG BR:13: Maintain and/or increase greater sage-grouse abundance and distribution by conserving, enhancing, or restoring the sagebrush ecosystem upon which populations depend, in cooperation with other conservation partners. Sustain the integrity of the sagebrush biome to provide the amount, continuity, and quality of habitat that is necessary to maintain sustainable populations of greater sage-grouse and other species by achieving the objectives below. | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |
| MO BR:13.1: Maintain large patches of high-quality sagebrush habitats with emphasis on patches occupied by greater sage-grouse. | No changes made. | No change proposed. |
| MO BR:13.2: Maintain connections between sagebrush habitats, with emphasis on connections between habitats occupied by greater sage-grouse. | No changes made. | No change proposed. |
| MD 4072: Develop and implement protective measures for federally listed species in coordination with the USFWS. For proposed actions in greater sage-grouse Core Areas, determine whether a categorical exclusion is applicable and if so, closely examine the extraordinary circumstances, if applicable, to determine whether one or more exists that would require preparation of a NEPA analysis. If a categorical exclusion applies, and no extraordinary circumstances exist, determine whether preparing a NEPA analysis would help inform decision making.<br>Continue to take action in cooperation with the USFWS to facilitate the recovery of threatened and endangered plant species that occur on BLM-administered land. | Action was removed in 2019. | No change proposed. |

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| MD 4074: Coordinate with agencies, including state and local governments, in the restoration, reintroduction, augmentation, or reestablishment of threatened, endangered, and other special status species populations and/or habitats. | No changes made. | No change proposed. |
| MD 4076: Develop site-specific measures for BLM-authorized activities to protect threatened, endangered, and sensitive species. Reduce the footprint of development and facilities to the smallest practical to protect special status species and their habitat. Incorporate Required Design Features and BMPs such as those identified in Appendix E (p. 215) as Conditions of Approval as appropriate for authorized activities to address adverse impacts to special status species. | Develop site-specific measures for BLM-authorized activities to protect threatened, endangered, and sensitive species. Reduce the footprint of development and facilities to the smallest practical to protect special status species and their habitat. Incorporate Required Design Features and BMPs such as those identified in Appendix E (p. 215) as conditions of approval as appropriate for authorized activities to address adverse impacts to special status species. Conditions of approval are called stipulations or terms and conditions in some programs. | No change proposed. |
| MD 4079: On a case-by-case basis, require surveys for BLM sensitive species as part of authorizing actions. Require protective actions when appropriate. | No changes made. | No change proposed. |
| MD 4080: Establish limits of acceptable cumulative habitat loss, including habitat modification, fragmentation, and loss of function, for special status species on a case-by-case basis. Limits of habitat loss and fragmentation for greater sage-grouse in Core Area are addressed in Decision Record 4109. | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |
| MD 4096: Manage travel corridors for threatened and endangered species and BLM sensitive species on a case-by-case basis (Map 25). (Note: Only Canada lynx analysis units have been identified to date.) Manage permitted activities within travel corridors to avoid adverse impacts to sensitive species. | No changes made. | No change proposed. |
| MD 4097: To protect the concentration of special status species and their habitats, mineral and ROW actions in the Dubois area not within a WSA or an ACEC are managed as follows:<br>• Closed to oil and gas leasing<br>• Closed to geophysical exploration<br>• Closed to phosphate leasing<br>• Open to locatable minerals<br>• Closed to mineral material disposals unless entirely contained within the 120 acres located in T41N, R107W, Sec. 1 N½SE¼<br>• Excluded to major ROWs<br>• Avoided for minor ROWs | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |

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| **MD 4098: Maintain sagebrush and understory diversity (relative to ecological site description) in seasonal greater sage-grouse and other sagebrush-obligate species habitats unless plant removal is necessary to achieve habitat management objectives. Vegetation treatments for greater sage-grouse would follow the "Wyoming Game and Fish Department Protocols for Treating Sagebrush to be Consistent with Wyoming Executive Order 2011-5; Greater Sage-Grouse Core Area Protection" (WGFD 2011) or the most current version or science available. | Maintain sagebrush and understory diversity (relative to ecological site description) in seasonal Greater Sage-Grouse and other sagebrush-obligate species habitats unless plant removal is necessary to achieve habitat management objectives. Vegetation treatments for Greater Sage-Grouse would follow the "Wyoming Game and Fish Department Protocols for Treating Sagebrush to be Consistent with Wyoming Executive Order 2015-4; Greater Sage-Grouse Core Area Protection" (WGFD 2015) or the most current version or science available. | No change proposed. |
| MD 4099: To minimize adverse impacts to greater sage-grouse from allowable uses, utilize recommendations and guidance from the following sources:<br>• Grazing Influence, Management, and Objective Development in Wyoming's Greater Sage-Grouse Habitat-With Emphasis on Nesting and Early Brood Rearing<br>• Sage-Grouse Habitat Management Guidelines for Wyoming<br>• Studies in Avian Biology article "Ecology and Conservation of Greater Sage-Grouse: A Landscape Species and Its Habitats"<br>• Western Association of Fish and Wildlife Agencies Greater Sage-Grouse Conservation Strategy<br>• Conservation Objectives Team Report<br>• National Technical Team Report<br>Utilize additional information as it becomes available. | No changes made. | No change proposed. |
| MD 4100: Maintain seeps, springs, wet meadows, and riparian vegetation in a functional and diverse condition for young greater sage-grouse and other species that depend on forbs and insects associated with these areas. Restore non-functioning riparian systems by repairing abnormally incised drainages to raise water tables and increase water storage and brood-rearing habitats within greater sage-grouse habitat. | No changes made. | No change proposed. |
| MD 4101: Discourage the use of broad-spectrum insecticides where insect control is required. Target pest control toward key problem areas and schedule applications to be the smallest amount effective in greater sage-grouse brood-rearing areas. | No changes made. | No change proposed. |

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| MD 4102: Establish forage utilization levels in greater sage-grouse nesting habitat to ensure adequate cover remains. | No changes made. | No change proposed. |
| MD 4103: Except as otherwise provided in this RMP, greater sage-grouse Core Area is open to oil and gas and geothermal leasing, subject to standard stipulations for the protection of greater sage-grouse and other resources as described elsewhere in this RMP. | No changes made. | Potential change under Alternatives 3 and 6. |
| **MD 4104: Prohibit surface-disturbing or surface occupancy on or within a 0.6-mile radius of the perimeter of occupied greater sage-grouse leks in Core Area and on or within a 0.25-mile radius of the perimeter of occupied greater sage-grouse leks outside Core Area (Map 24).<br>In Core Area, keep any new roads or road upgrades 1.9 miles from the perimeter of the lek. | Prohibit surface-disturbing **activities** or surface occupancy on or within a 0.6-mile radius of the perimeter of occupied Greater Sage-Grouse leks (or lek center if no perimeter is yet mapped) in Core Area and on or within a 0.25-mile radius of the perimeter of occupied Greater Sage-Grouse leks (or lek center if no perimeter is yet mapped) outside Core Area (Map 24). In Core Area, keep any new roads or road upgrades 1.9 miles from the perimeter of the lek (or lek center if no perimeter is yet mapped). The authorized officer may grant an exception on a case-by-case basis subject to appropriate site-specific analysis, mitigation requirements, and consultation with the State of Wyoming and consistent with the applicable State management strategy (currently Governor of Wyoming's Executive Order 2015-4) (see also MD 4134). | Potential change under Alternatives 3, 4, 5, and 6. |
| **MD 4105: Prohibit surface-disturbing activities and/or disruptive activities from March 15 to June 30 in Core Area. Outside of Core Area, prohibit surface-disturbing and/or disruptive activities from March 15 to June 30 within 2 miles of the perimeter of occupied leks (Map 24). Where credible data support different timeframes for these seasonal restrictions, dates may be expanded 14 days prior to or subsequent to the above dates. | Prohibit surface-disturbing and/or disruptive activities from March 15 to June 30 in Core Area. Outside of Core Area, prohibit surface-disturbing and/or disruptive activities from March 15 to June 30 within 2 miles of the perimeter of occupied leks (or lek center if no perimeter is yet mapped) (Map 24). The authorized officer may grant an exception on a case-by-case basis subject to appropriate site- specific analysis, mitigation requirements, and consultation with the State of Wyoming and consistent with the applicable State management strategy (currently Governor of Wyoming's Executive Order 2015-4) (see also MD 4134). Where credible data support different timeframes for these seasonal restrictions, dates may be expanded 14 days prior to or subsequent to the above dates. | No change proposed. |

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| **MD 4106: Consistent with the BLM's regulatory authority over locatable mineral exploration and development, prohibit surface disturbance or disruptive activities from notice-level activity under 43 CFR 3809.320 in Core Area during the period March 15 to June 30. | Consistent with the BLM's regulatory authority over locatable mineral exploration and development, prohibit surface disturbance or disruptive activities from notice-level activity under 43 CFR 3809.320 in Core Area during the period March 15 to June 30. The authorized officer may grant an exception on a case-by-case basis subject to appropriate site-specific analysis, mitigation requirements, and consultation with the State of Wyoming and consistent with the applicable State management strategy (currently Governor of Wyoming's Executive Order 2015-4) (see also MD 4134). | Potential change under Alternative 3. |
| **MD 4107: Prohibit disruptive activities between 6 p.m. and 8 a.m. from March 1 to May 15 on or within a 0.6-mile radius of the perimeter of occupied greater sage-grouse leks in Core Area (Map 24). | Prohibit disruptive activities between 6 p.m. and 8 a.m. from March 1 to May 15 on or within a 0.6-mile radius of the perimeter of occupied Greater Sage-Grouse leks (or lek center if no perimeter is yet mapped) in Core Area (Map 24). The authorized officer may grant an exception on a case-by-case basis subject to appropriate site-specific analysis, mitigation requirements, and consultation with the State of Wyoming and consistent with the applicable State management strategy (currently Governor of Wyoming's Executive Order 2015-4) (see also MD 4134). | No change proposed. |
| **MD 4108: Prohibit surface-disturbing and disruptive activities in greater sage-grouse winter concentration areas, as they are identified, from December 1 to March 14 unless data indicate a date modification is necessary to better protect wintering greater sage-grouse. | Prohibit surface-disturbing and disruptive activities in Greater Sage-Grouse winter concentration areas, as they are identified, from December 1 to March 14 unless data indicate a date modification is necessary to better protect wintering Greater Sage-Grouse. The authorized officer may grant an exception on a case-by-case basis subject to appropriate site-specific analysis, mitigation requirements, and consultation with the State of Wyoming and consistent with the applicable State management strategy (currently Governor of Wyoming's Executive Order 2015-4) (see also MD 4134). Protection of additional mapped winter concentration areas in GHMA would be implemented where winter concentration areas are mapped and designated by the State of Wyoming. Appropriate seasonal timing restrictions and habitat protection measures would be considered and evaluated in consultation with the WGFD in all identified winter concentration areas. | No change proposed. |

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| MD 4109: In greater sage-grouse Core Area, limit the density of disturbance of an activity (oil and gas or mining) to an average of one site per square mile (640 acres) within the DDCT. The one location and cumulative value of existing disturbances will not exceed 5 percent of suitable habitat of the DDCT area. Utilize the most current greater sage-grouse density disturbance process or other state and/or federal agreed-upon process for compliance evaluations. | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |
| MD 4110: If in order to accommodate valid existing rights, the new disturbance for a ROW in greater sage-grouse Core Area coupled with existing disturbance would exceed 5 percent of suitable habitat within the DDCT area (see current guidance with respect to disturbance calculations), then additional effective mitigation is necessary to offset the resulting loss of greater sage-grouse habitat. Interim reclamation following construction of the ROW and final reclamation following the relinquishment of the ROW will ensure reestablishment of the predisturbance greater sage-grouse habitat, with the reclamation bond amount set in consideration of this reclamation obligation. These ROW authorizations will be subject to approval by the State Director. | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |
| MD 4111: In Core Area, major overhead powerlines will not be authorized unless co-located with an existing 115 kilovolt or greater powerline, as close as technically feasible, not to exceed 0.5 miles or within a designated corridor authorized for overhead powerlines. Distribution lines may be authorized when effectively mitigated to protect greater sage-grouse and the Authorized Officer determines that overhead installation is the action alternative with the fewest adverse impacts. Agricultural and residential lines will be considered to be adequately mitigated for greater sage-grouse if constructed at least 0.6 mile from the lek perimeter with appropriate timing constraints and installation of raptor deterrents. These ROW authorizations will be subject to approval by the State Director. | In Core Area, major overhead powerlines will not be authorized unless co-located with an existing 115 kilovolt or greater powerline, as close as technically feasible not to exceed 0.5 miles or within a designated corridor authorized for overhead powerlines. Distribution lines may be authorized when effectively mitigated to protect Greater Sage-Grouse and the Authorized Officer determines that overhead installation is the action alternative with the fewest adverse impacts. Agricultural and residential lines will be considered to be adequately mitigated for Greater Sage-Grouse if constructed at least 0.6 mile from the lek perimeter (or lek center if no perimeter is yet mapped) with appropriate timing constraints and installation of raptor deterrents. These ROW authorizations will be subject to approval by the State Director. | Potential change under Alternatives 3, 4, 5, and 6. |
| MD 4112: Until research on impacts of wind energy to greater sage-grouse is completed and adequate mitigation can be developed, exclude wind-energy development in Core Area. | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |

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| MD 4113: Allow livestock water development projects in greater sage-grouse nesting habitat. Consistent with the intent of greater sage-grouse Core Area management, such projects will only be allowed if they will contribute to improved greater sage-grouse habitat, developments can be designed to be compatible with greater sage-grouse, and they are part of a comprehensive grazing strategy. | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |
| MD 4114: The BLM will collaborate with appropriate federal agencies and the State of Wyoming, as contemplated under the Wyoming Governor's Executive Order 2013-3, to: 1) develop appropriate conservation objectives; 2) define a framework for evaluating situations where greater sage-grouse conservation objectives are not being achieved on federal land, to determine if a significant causal relationship exists between improper grazing (by wildlife or wild horses or livestock) and greater sage-grouse conservation objectives; and 3) identify appropriate site-based actions to achieve greater sage-grouse conservation objectives within the framework. | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |
| MD 4115: In cooperation with stakeholders, design and locate fences, so as not to disturb important greater sage-grouse habitat areas. When fences are authorized, require a design that has the fewest adverse impacts to greater sage-grouse, including features to reduce greater sage-grouse strikes and mortality. Require the installation of fence markers on wire fences constructed in greater sage-grouse habitat to increase fence visibility and reduce collision potential. Remove, modify, or mark fences with high-risk for collision. | No changes made. | No change proposed. |
| MD 4116: New permanent, high-profile structures within greater sage-grouse nesting habitat will be allowed on a case-by-case basis. Require the installation of anti-perching devices on appropriate structures to reduce predation opportunities. | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |

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| *MD 4117: Limit noise sources to 10 decibels above ambient noise measured at the perimeter of occupied greater sage-grouse leks from March 1 to May 15, unless scientific findings indicate a different noise level is appropriate. In addition, limit noise sources in other important greater sage-grouse habitats if research and/or policy indicate the need. | Within PHMA (core only), new project noise levels, either individual or cumulative, should not exceed 10 dBA (as measured by L50) above baseline noise at the perimeter of the lek (or lek center if no perimeter is yet mapped) from 6:00 pm to 8:00 am during the breeding season (March 1–May 15). The authorized officer may grant an exception on a case-by-case basis subject to appropriate site-specific analysis, mitigation requirements, and consultation with the State of Wyoming and consistent with the applicable State management strategy (currently Governor of Wyoming's Executive Order 2015-4) (see MD 4134). In coordination with the State of Wyoming, specific noise protocols for measurement and implementation will be developed as additional research and information emerges. These measures would be considered at the site-specific project level where and when appropriate. | No change proposed. |
| MD 4118: To minimize raptor use, require anti-perching devices on new overhead powerlines in greater sage-grouse Core Area. Require anti-perching devices on new overhead powerlines and wind energy meteorological towers in prairie dog, mountain plover, and pygmy rabbit habitats on a case-by-case basis. Work with ROW holders to install anti-perching devices on existing powerlines in these habitats. | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |
| MD 4119: Allow above ground low voltage utility lines or require burying lines in greater sage-grouse, prairie dog, mountain plover, and pygmy rabbit habitats on a case-by-case basis. Evaluate and take advantage of opportunities such as the renewal of existing ROWs to remove or modify existing powerlines, prioritizing greater sage-grouse Core Area. | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |
| MD 4120: In order to avoid surface-disturbing activities in Core Areas, priority will be given to development of oil and gas and other mineral resources outside of Core Areas, subject to applicable stipulations. When authorizing development of oil and gas and other mineral resources in core habitat, subject to applicable stipulations for the conservation of greater sage-grouse, priority will be given to development in non-habitat areas first and then in the least suitable habitat for greater sage-grouse. | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |

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| MD 4129: Update the Herd Area Management Plan as needed to meet herd health objectives, including Appropriate Management Levels, and to address impacts to other resources. Consider forage competition and evaluate overall utilization levels by all grazing animals, and incorporate greater sage-grouse habitat management objectives. | No changes made. | Potential change under Alternative 3. |
| No similar action. | *MD 4133: The BLM will update its Greater Sage-Grouse habitat management areas, including biologically significant units (BSUs), in conjunction with the State of Wyoming's core areas, upon issuance of any Wyoming Governor's Executive Order revising or amending the core area boundaries and upon completion of appropriate NEPA analysis and process. The BLM will complete the appropriate NEPA documentation (including appropriate public comment) prior to adopting any revised core area boundaries (e.g., maintenance action or plan amendment, environmental assessment, etc.). | Potential change under Alternatives 3, 4, 5, and 6. |
| No similar action. | *MD 4134: Specific to management for Greater Sage-Grouse, all RMPs are amended as follows:<br>Adopt the State of Wyoming's Greater Sage-Grouse Compensatory Mitigation Framework to the extent consistent with federal law, regulations, and policy.<br>In all Greater Sage-Grouse habitat, when authorizing third-party actions in designated Greater Sage-Grouse habitat, the BLM will seek to achieve the planning-level Greater Sage-Grouse management goals and objectives through implementation of mitigation and management actions, consistent with valid existing rights and applicable law. Under this Plan Amendment, management would be consistent with the Greater Sage-Grouse goals and objectives, and in conformance with BLM Manual 6840, Special Status Species Management. In accordance with BLM Manual 6840, the BLM will undertake planning decisions, actions and authorizations "to minimize or eliminate threats affecting the status of [Greater Sage-Grouse] or to improve the condition of [Greater Sage-Grouse] habitat" across the planning area.<br>Accordingly, before authorizing third-party actions that result in habitat loss and degradation, the BLM will complete the | Potential change under Alternatives 3, 4, 5, and 6. |

| 2014/2015 Approved RMPs | 2019 Approved RMPs | Potential Change in 2023 Plan |
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| *(See above.)* | following steps, in alignment with the Governor of Wyoming's Executive Order 2015-4 (July 29, 2015):<br>1. Work jointly with the WGFD to evaluate projects and recommend mitigation in the form of avoidance and minimization.<br>2. The WGFD will determine if the State requires or recommends any additional mitigation – including compensatory mitigation – under State regulations, policies, or programs related to the conservation of Greater Sage-Grouse.<br>3. Incorporate state required or recommended mitigation into the BLM's NEPA decision-making process, if the WGFD determines that compensatory mitigation is required to address impacts to GRSG habitat as a part of State policy or authorization, or if a proponent voluntarily offers mitigation.<br>4. Analyze whether the compensatory mitigation (deferring to the appropriate State authority to quantify habitat offsets, durability, and other aspects used to determine the recommended compensatory mitigation action):<br>• achieves measurable outcomes for Greater Sage-Grouse habitat function on a landscape scale as determined by WGFD that are at least equal to the lost or degraded values in accordance with the Governor of Wyoming's Executive Order 2015-4.<br>• provides benefits that are in place for at least the duration of the impacts.<br>• accounts for a level of risk that the mitigation action may fail or not persist for the full duration of the impact.<br>5. Ensure mitigation outcomes are consistent with the State of Wyoming's mitigation strategy and principles outlined in 2019 Wyoming GrSG ARMPA Appendix C, The Greater Sage-Grouse Habitat Management Strategy.<br>The BLM has determined that compensatory mitigation must be voluntary unless required by other applicable law and in recognition that State authorities may also require compensatory mitigation (IM 2019-018, *Compensatory Mitigation*, December 6, 2018). Therefore, consistent with valid existing rights and applicable law, when authorizing | *(See above.)* |

| 2014/2015 Approved RMPs | 2019 Approved RMPs | Potential Change in 2023 Plan |
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| *(See above.)* | third-party actions that result in habitat loss and degradation, the BLM will consider voluntary compensatory mitigation actions only as a component of compliance with a State mitigation plan, program, or authority, or when offered voluntarily by a project proponent.<br>Project-specific analysis will be necessary to determine how a compensatory mitigation proposal addresses impacts from a proposed action. The BLM will cooperate with the State to determine appropriate project design and alignment with State policies and requirements, including those regarding compensatory mitigation. When the BLM is considering compensatory mitigation as a component of the project proponent's submission or based on a mitigation requirement from the State, the BLM's NEPA analysis would evaluate the need to avoid or minimize impacts of the proposed project and achieve the goals and objectives of this RMPA. The BLM will defer to the appropriate State authority to quantify habitat offsets, durability, and other aspects used to determine the recommended compensatory mitigation action. | *(See above.)* |
| MD 6001: Respond to specific proposals for land use authorizations on a case-by-case basis. Do not classify, open, or make available any BLM-administered lands for agricultural leasing or agricultural entry under either Desert Land Entry or Indian Allotment for one or more of the following reasons: unsuitable topography, presence of sensitive resources or resource conflicts, lack of water or access, small parcel size, or unsuitable soils. | No changes made. | No change proposed. |

| 2014/2015 Approved RMPs | 2019 Approved RMPs | Potential Change in 2023 Plan |
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| MD 6002: Identify lands for acquisition through exchange and/or purchase with a priority on meeting special management objectives such as greater sage-grouse Core Area, ACECs, and National Landscape Conservation System lands. Prioritize lands for acquisition that do not have split-estate unless in Core Area where greater sage-grouse management objectives would benefit greater sage-grouse conservation. Lands and/or interests in lands acquired, and former withdrawn lands relinquished would be managed in a manner consistent with adjacent or nearby BLM-administered land including surface and mineral estate management and pursuing withdrawals as appropriate, unless otherwise addressed through further land use planning actions. Subject to further NEPA analysis. | Action was removed in 2019. | No change proposed. |
| MD 6003: Continue to administer lands leased under the Recreation and Public Purposes Act. Respond to requests for additional Recreation and Public Purposes Act leases. | No changes made. | No change proposed. |
| MD 6005: No parcels within a National Landscape Conservation System unit, including the National Trails Management Corridor or an ACEC, or in greater sage-grouse Core Area, are identified for disposal unless the disposal would benefit the goals and objectives of the area's priority values or other important resource values. Acquire lands in areas with mixed ownership and where land exchanges would result in additional or more contiguous federal ownership patterns or would improve management for the benefit of priority resources as identified in other decisions such as ACECs. | No changes made. | No change proposed. |
| MD 6011: Management prescriptions for wind-energy development in important wildlife habitat, areas managed as VRM Classes I and II, RMZs, areas with cultural resources, and special designations are found in those respective sections. | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |
| MD 6012: Implement the programmatic policies and BMPs for wind-energy development as identified in the ROD for Wind-Energy Development on Bureau of Land Management-Administered Land in the Western States (BLM 2005b) and Instruction Memorandum 2009-043 or subsequent guidance as part of any wind-energy authorization. | No changes made. | No change proposed. |

| 2014/2015 Approved RMPs | 2019 Approved RMPs | Potential Change in 2023 Plan |
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| MD 6015: Programmatic policies, BMPs, leasing procedures, and stipulations identified in the ROD for the Programmatic EIS for Geothermal Leasing in the Western United States (BLM and Forest Service 2008) are analyzed in the *Minerals* section. | No changes made. | No change proposed. |
| **MD 6016: Manage 1,279,633 acres as ROW avoidance areas (Map 33). See Appendix C (p. 191) for avoidance criteria. Manage 576,458 acres as ROW exclusion areas (Map 33). Manage 538,110 acres as open to ROW (Map 33). | Manage 1,282,773 acres as ROW avoidance areas (Map 33). See 2014 Lander RMP Appendix C (p. 191) for avoidance criteria. Manage 567,476 acres as ROW exclusion areas (Map 33). Manage 543,961 acres as open to ROW (Map 33). | Potential change under Alternatives 3, 4, 5, and 6. |
| MD 6017: The Beef Gap section of the Sweetwater Rocks Complex (the gap between the Split Rock and the Miller Springs WSAs [Map 44]) is closed to any new ROWs even if co-located with existing ROWs. | No changes made. | No change proposed. |
| MD 6018: Energy Corridor 79-216 is a designated corridor (Map 34). | No changes made. | No change proposed. |
| MD 6019: The following are designated corridors for major ROW development (Map 34) open for above and/or below ground ROWs as indicated. The location of the designated corridors as represented on the map is approximate and subject to verification based on existing disturbance, particularly in the Sand Draw to Casper corridor through the Gas Hills mining district and the Lost Creek corridor north and south of Jeffrey City. The corridor widths displayed on Map 34 are overstated to improve clarity. The specific location of the designated corridors is based on the existing ROW. The Lost Creek Corridor, for example, is the area adjacent to the Lost Creek pipeline. These locations are subject to on-the-ground verification which will be reflected on updated iterations of Map 34.<br>• Jim Bridger (containing the Spence-Mustang-Jim Bridger existing 230 kV powerline) from where it enters the Lander planning area in Township 25 North, Range 94 West to where it intersects with the Lost Creek pipeline: above and below ground<br>• Lost Creek: variously below ground only and above and below ground as follows:<br>  ○ Lost Creek 1: from where the pipeline enters the Lander planning area in the south in Township 25 North, Range 93 West to where the pipeline meets the existing 230 kV powerline in the Jim Bridger corridor: below ground only | No changes made. | No change proposed. |

| 2014/2015 Approved RMPs | 2019 Approved RMPs | Potential Change in 2023 Plan |
|---|---|---|
| ○ Lost Creek 2: from the Jim Bridger meeting point northward until the Lost Creek pipeline meets the Sand Draw to Casper designated corridor: above and below ground. The section of the corridor through the Jeffrey City area that is not within the National Trails Management Corridor is open to oil and gas leasing subject to CSU stipulations<br>○ Lost Creek 3: from the Sand Draw to Casper meeting point north to Highway 20/26: below ground only<br>○ Lost Creek 4: from north of Highway 20/26 to the Westwide Corridor: above and below ground<br>• Pathfinder: below ground only. (The Pathfinder corridor is only in the Lander planning area in Township 30 North, Range 85 West.)<br>• Sand Draw to Casper: above and below ground<br>• Highway 20/26: above and below ground<br>• Beaver Creek (formerly called Beaver Creek North and Lost Creek Spur): below ground only<br>• Shoshoni/Badwater: below ground<br>• Bairoil: below ground only<br>• Sand Draw: below ground only<br>• Bison Basin: below ground only<br>• Frontier going southwest from the Bairoil corridor to where it leaves the Lander planning area: below ground only<br>• Rattlesnake Hills (formerly called Frontier-Anadarko) north of Black Rock: below ground<br>• Black Rock (formerly called Pacificorp): above and below ground<br>• Pacificorp (going east-west in Township 35): above and below ground<br>Widths for these corridors are 0.5 mile unless there are resource conflicts, then the construction ROW width will be adjusted accordingly. Within these corridors, new facilities will be constructed adjacent to existing linear facilities and overlapping existing ROWs where feasible, recognizing the need for adequate separation for operating system integrity, safety (construction and operation), appropriate local, state, and federal policies, regulations and laws, and land-use constraints. Designated corridors are subject to the | *(See above.)* | *(See above.)* |

| 2014/2015 Approved RMPs | 2019 Approved RMPs | Potential Change in 2023 Plan |
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| prescriptions for resource protections except that they are open for ROWs even if the surrounding areas are excluded or avoided. Management prescriptions for ROWs are found in other resource areas such as Special Designations. | *(See above.)* | *(See above.)* |
| MD 6020: The preferred location for new ROWs and access route authorizations is in areas already disturbed by existing ROWs. See Appendix E (p. 215) for design constraints to limit surface disturbance associated with new ROWs. Identify opportunities to reclaim duplicative ROWs or those no longer in use. | No changes made. | No change proposed. |
| MD 6021: Utilize the most current greater sage-grouse density disturbance process or other state/federal agreed-upon process for compliance evaluations. | No changes made. | No change proposed. |
| MD 6022: Locate linear ROWs such as fiber optic and low-voltage powerline corridors along currently established road systems (for example, state highways and county roads). | No changes made. | No change proposed. |
| MD 6024: Lands that are available to oil and gas leasing are available to carbon dioxide sequestration and research subject to the same surface limitations as would be applied to oil and gas operations. Lands that are closed to oil and gas leasing are excluded for carbon dioxide sequestration and research. | No changes made. | No change proposed. |
| MD 6029: Grant administrative use authorizations on a case-by-case basis with approval from the Authorized Officer. All access agreements will specify the following: what type of use is allowed and for what purpose, times, dates or seasons of access, where the use will occur, and additional stipulations required to provide for adequate resource protection and to meet pertinent planning decisions. | No changes made. | No change proposed. |
| MD 6050: Livestock grazing in the planning area (Map 38) is managed as follows:<br>• 2,323,152 acres are open to grazing<br>• 7,665 acres are closed to grazing<br>• 63,393 acres are unavailable to grazing | No changes made. | Potential change under Alternative 3. |

| 2014/2015 Approved RMPs | 2019 Approved RMPs | Potential Change in 2023 Plan |
|---|---|---|
| MD 6052: In cooperation, consultation, and coordination with permittees/lessees, cooperators, and stakeholders including interested parties, develop and implement appropriate livestock grazing management actions to achieve the Wyoming Standards for Healthy Rangelands, improve forage for livestock, and enhance rangeland health. Within greater sage-grouse Core Area, incorporate greater sage-grouse habitat objectives and management considerations into all BLM grazing allotments containing greater sage-grouse habitat through Allotment Management Plans or permit renewals. Consider the application of BMPs for the protection of greater sage-grouse as terms and conditions of grazing permit/lease renewals. In areas where Wyoming Standards for Healthy Rangelands are not being met or are not making progress toward meeting standards, because of current livestock grazing, modify existing permits or condition the issuance of new permits on the implementation of new grazing strategies to meet standards in accordance with grazing regulations. Apply appropriate BMPs as terms and conditions of the permit. | Action was removed in 2019. | Potential change under Alternatives 3, 4, 5, and 6. |
| MD 6054: Conduct grazing program monitoring (see Glossary) of allotments by focusing on Category I allotments in order of priority starting with those allotments that have degraded riparian-wetland areas or are in whole or in part in greater sage-grouse Core Area. Modify BLM-authorized grazing use on an allotment-by-allotment basis to protect soil, water, vegetative resources, and wildlife. | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |
| MD 6055: When a permittee or lessee voluntarily takes non-use of their grazing preference in a specific grazing allotment, permit annual periods of non-use of grazing preference, without penalty, on a case-by-case basis when the advantage to greater sage-grouse habitat or other resource values warrant. | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |
| MD 6056: Include terms and conditions on grazing permits and leases that ensure plant growth requirements are met and that adequate forage remains available for greater sage-grouse hiding cover as necessary. Do not permit new range improvement projects within 500 feet of water and riparian-wetland areas except to benefit watershed health or vegetation. Develop project-specific BMPs that become terms and conditions of the grazing permit. | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |

| 2014/2015 Approved RMPs | 2019 Approved RMPs | Potential Change in 2023 Plan |
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| MD 6057: Locate supplements such as minerals and salt in a manner designed to conserve, enhance, or restore greater sage-grouse habitat. | No changes made. | Potential change under Alternatives 3, 4, 5, and 6.. |
| MD 6058: Prioritize completion of land health assessments and processing of grazing permits within greater sage-grouse Core Area and on allotments with riparian-wetland areas not achieving or making significant progress towards proper functioning condition. Emphasize allotments that have the best opportunities for riparian-wetland improvement or for conserving, enhancing, or restoring habitat for greater sage-grouse.<br>When conducting land health assessments, include indicators and measurements of structure, condition, and composition of vegetation specific to achieving greater sage-grouse habitat objectives. If local/state seasonal habitat objectives are not available, use greater sage-grouse habitat recommendations from Connelly et al. 2000 and Hagen et al. 2007 or updated research findings. | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |
| MD 6059: Work cooperatively with permittees, lessees, and other landowners to develop comprehensive grazing management strategies to develop site-specific objectives to conserve, enhance, or restore greater sage-grouse Core Area and general habitat areas. Develop a comprehensive grazing strategy to achieve these objectives. In Core Area, monitor measurable objectives in representative sites and evaluate grazing management to ensure that decisions are achieving greater sage-grouse habitat objectives. | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |
| MD 6060: Monitor precipitation and vegetative production trends on BLM-administered lands as a tool to understand impacts to soil, water, and vegetative resources. Monitor measurable objectives and evaluate grazing management to confirm that decisions are achieving greater sage-grouse habitat objectives. | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |
| MD 6061: Allotments are categorized as M, I, and C (see Appendix G (p. 231)). Re-categorize as appropriate during livestock grazing permit renewals. | No changes made. | No change proposed. |
| MD 6062: When livestock grazing permits and/or grazing preference are voluntarily relinquished in portions of or all of an allotment, analyze suitable livestock grazing management, including closure to livestock grazing where appropriate, based on benefits to resources and other uses. | No changes made. | No change proposed. |

| 2014/2015 Approved RMPs | 2019 Approved RMPs | Potential Change in 2023 Plan |
|---|---|---|
| MD 6063: Establish stocking rates in areas preferred by livestock that allow for appropriate utilization levels by livestock, adjusted for the anticipated intensity of use necessary to provide sufficient forage and cover to support and maintain healthy, diverse wildlife and wild horse populations and to achieve the Wyoming Standards for Healthy Rangelands. Utilization levels may vary based on the implementation of a comprehensive grazing strategy or as needed to achieve vegetation objectives. | No changes made. | No change proposed. |
| MD 6064: Prioritize the management of hot-season grazing on riparian-wetland and meadow complexes to promote recovery or maintenance of key vegetation species appropriate for the ecological site and water quality through the use of comprehensive grazing strategies (see Glossary) as identified in Appendix G (p. 231). In areas of continuous season-long grazing where rangeland health standards are not met, modify existing grazing permits to incorporate rest and/or deferment of grazing to facilitate rangeland health recovery and attainment of rangeland health standards. | No changes made. | No change proposed. |
| MD 6065: Continue implementation of existing allotment management plans. Develop and implement new comprehensive grazing strategies and Allotment Management Plans with grazing permittees/lessees and interested public to achieve desired resource goals. Grant administrative use authorizations on a case-by-case basis with approval from the Authorized Officer. All administrative use agreements will specify the following: what type of use is allowed and for what purpose; times, dates or seasons of access; where the use will occur; and additional stipulations required to provide for adequate resource protection and to meet planning decisions. | No changes made. | No change proposed. |

| 2014/2015 Approved RMPs | 2019 Approved RMPs | Potential Change in 2023 Plan |
|---|---|---|
| MD 6066: Utilizing Required Design Features and BMPs such as those in Appendix E (p. 215) applied as Conditions of Approval, develop and install range improvement projects necessary to implement comprehensive grazing strategies which will lead to improved rangeland health, or to enhance successful comprehensive grazing strategies already in place. Benefits associated with the projected improvement in rangeland health should exceed the adverse impacts associated with the project infrastructure. Avoid projects that would expand grazing on the landscape without a clear link to a comprehensive grazing strategy and consideration of other resources. | No changes made. | Potential change under Alternative 3. |
| MD 6067: Evaluate existing project infrastructure in the development of comprehensive grazing strategies. In consultation with the livestock grazing permittees authorized to use the allotment, identify projects that are no longer necessary, or that are contributing to adverse impacts to other resources, and modify or remove projects as appropriate to mitigate impacts. Evaluate whether the infrastructure contributes to the introduction or spread of invasive nonnative species, and develop mitigation (including removal of infrastructure) to reduce or eliminate weed infestation and spread. | No changes made. | No change proposed. |
| MD 6068: Remove or modify fences and cattleguards on a case-by-case basis to enhance other resource values and to facilitate livestock, wild horses, and wildlife movement and management. | No changes made. | No change proposed. |
| MD 6069: Establish and manage future forage reserves as opportunities arise within the planning area on a voluntary basis or as lands are acquired. | No changes made. | No change proposed. |
| MD 6070: Retain designated stock driveways. Permit other livestock trails on a case-by-case basis. | No changes made. | No change proposed. |
| MD 6071: Require that forage supplements have label information stating that the material is safe/compatible for sheep, wildlife, and wild horses in areas where their ranges overlap. Require that all forage supplement labels be submitted to the field office for approval by the Authorized Officer prior to use. | No changes made. | No change proposed. |

| 2014/2015 Approved RMPs | 2019 Approved RMPs | Potential Change in 2023 Plan |
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| MD 6072: Prohibit placement of salt and mineral supplements, such as low-moisture block supplements, in the following areas:<br>• Within 0.5 mile of water and riparian-wetland areas<br>• Within 0.6 mile of the perimeter of occupied greater sage-grouse leks<br>• Within 0.5 mile of areas being reclaimed from surface disturbance | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |
| MD 6073: Modify or implement livestock grazing management (Appendix G (p. 231)) to facilitate successful reclamation efforts. | No changes made. | No change proposed. |
| MD 6074: Determine livestock grazing management for acquired lands consistent with the management objectives for the acquisition or for the area in which the land is located, for example, an ACEC, WSA, or within the National Trails Management Corridor. | No changes made. | No change proposed. |
| MD 6077: In greater sage-grouse Core Area, authorize Special Recreation Permits that, through mitigation or design, will have neutral or beneficial impacts to greater sage-grouse. | Action was removed in 2019. | No change proposed. |
| MD 6090: Sustain or enhance the Johnny Behind the Rocks RMZ (4,828 acres) for nonmotorized recreationists to engage in horseback riding, hiking, trail running, wildlife viewing, and mountain biking so that participants in visitor assessments/surveys report a higher than average (mean average of 4.0 on a 5-point scale) realization of the following experience and benefit outcomes:<br>• **Experiences:** Enjoying the sensory experience of a natural landscape, enjoying exercise and physical fitness, developing skills and abilities, enjoying having access to close to home outdoor amenities, and feeling that this community is a special place to live.<br>• **Benefits:** Improved mental and physical health, greater connection to nature, improved opportunity to view wildlife close up, greater sense of place, improved outdoor recreation skills, heightened sense of satisfaction with our community, and reduced adverse human impacts such as litter, vegetative trampling, and unplanned trails. | No changes made. | No change proposed. |

| 2014/2015 Approved RMPs | 2019 Approved RMPs | Potential Change in 2023 Plan |
|---|---|---|
| MD 6091: Create and maintain the following desired future recreation setting qualities in the Johnny Behind the Rocks RMZ:<br>• **Physical Recreation Setting:** The natural setting may have subtle modifications that would be noticed but not draw the attention of the casual observer wandering through the area. Facility and trail development will focus on sufficient densities and developments to provide for a full day (6 to 8 hours or up to 40 miles of trail) of use. Non-trail facilities and structures will continue to be rare and co-located within close proximity to the highway/parking area.<br>• **Social Recreation Setting:** Usually 3-6 encounters per day off travel routes and 7-15 encounters per day on travel routes. Group size is usually small.<br>• **Operational Recreation Setting:** Excluding the adjacent highway, the Blue Ridge Road, and livestock permittee access to range improvements; the area will be managed for mountain bikes and other nonmotorized use(s). Mechanized/motorized trail building will be approved as needed to support the identified outcome objective. Onsite controls and services will be present, but harmonize with the natural environment. | No changes made. | No change proposed. |
| MD 6092: Mineral and ROW actions in the Johnny Behind the Rocks RMZ are managed with the following restrictions:<br>• Oil and gas leasing subject to NSO<br>• Closed to geophysical exploration<br>• Closed to phosphate exploration<br>• Recommend for withdrawal to locatable mineral entry<br>• Closed to mineral material sales<br>• Excluded from ROW actions | No changes made. | No change proposed. |

| 2014/2015 Approved RMPs | 2019 Approved RMPs | Potential Change in 2023 Plan |
|---|---|---|
| MD 6093: Initiate the following recreation decisions to support the identified outcome objective and desired future setting condition:<br>• Utilize monitoring and evaluation to adjust management techniques and implementation decisions as necessary to reach desired future setting conditions and provide identified recreation opportunities (activities, experiences, and benefits).<br>• New trails will be identified and authorized in a master trails plan and supported through implementation-level decision making.<br>• Pursue land exchanges and access agreements for parcels in and adjacent to this RMZ.<br>• Solicit partnerships and cooperative agreements to monitor outcome attainment and preferences through customer assessments (focus group interviews or visitor studies).<br>• Monitor recreation setting condition through onsite patrols May through November. | No changes made. | No change proposed. |
| MD 6094: Close the Johnny Behind the Rocks RMZ to motorized travel, except with an allowance for administrative access agreements with livestock grazing permittees. This management decision does not close motorized travel on the Blue Ridge Road and other roads adjacent to or outside of the SRMA. Motorized travel on and west of Cedar Ridge will be closed as a result of this decision. | No changes made. | |
| MD 6095: The Johnny Behind the Rocks area is open to cross-country nonmotorized travel. | No changes made. | No change proposed. |
| MD 6096: Manage the Johnny Behind the Rocks RMZ as VRM Class II. | No changes made. | No change proposed. |
| MD 6113: Mineral and ROW actions in the Dubois Mill-Site SRMA are managed with the following restrictions:<br>• Closed to oil and gas leasing<br>• Closed to geophysical exploration<br>• Closed to phosphate leasing<br>• Open to locatable minerals<br>• Closed to mineral material disposals<br>• Excluded to major ROWs<br>• Avoided for minor ROWs | No changes made. | No change proposed. |

### 2.19.2 Relevant Appendices

The following table shows which appendices from the 2014 and 2019 plans have management direction that may change through this RMP amendment. If 2019 is not listed in the year, then no change was made to the appendix between the 2015 and 2019 plans. The 2014 Appendices can be found on the Lander RMP ePlanning website. The 2019 Appendices can be found on the Wyoming GRSG ePlanning website.

| ARMPA Appendix Name | Year | Potential for Change in 2023 Plan |
|---|---|---|
| A: Maps | 2014 | Yes |
| A: Approved RMP Amendment with Management Goals, Objectives, and Decisions | 2019 | Yes |
| B: Reclamation Objectives and Standards | 2014 | No |
| C: Exception, Modification, and Waiver Criteria, Avoidance Criteria, and Special Management for Designated Corridors | 2014 | Yes |
| D: Lander Air Resources Management Plan | 2014 | No |
| E: Required Design Features and Best Management Practices | 2014 | Yes |
| B: Required Design Features | 2019 | Yes |
| F: Stipulations and Conditions of Approval in Designated Development Areas and in Non-Designated Development Areas | 2014 | No |
| G: Livestock Grazing Allotments and Range Improvements | 2014 | No |
| H: Wyoming BLM Mitigation Guidelines for Surface-Disturbing and Disruptive Activities | 2014 | No |
| I: Oil and Gas Stipulations | 2014 | Yes |
| J: Species Mentioned in the Lander Field Office Resource Management Plan and Environmental Impact Statement | 2014 | No |
| K: Lands Identified for Disposal | 2014 | No |
| L: Wild Horse Management in the Lander Planning Area | 2014 | Yes |
| M: Greater Sage-grouse Conservation Objectives Final Report Consistency Review | 2014 | No |
| N: Monitoring and Evaluation Plan | 2014 | No |
| O: Final Environmental Impact Statement and Record of Decision Crosswalk Tables | 2014 | No |
| P: Biological Opinion | 2014 | No |
| C: Greater Sage-Grouse Habitat Management Strategy | 2019 | Yes |

# Appendix 2.20
# Worland, Wyoming RMP Revisions

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## 2.20 WORLAND, WYOMING RMP REVISIONS

This appendix presents the approved RMP revision language from the record of decision for the Worland RMP that relate to GRSG management. The table below notes which goals, objectives, appendices, and management decisions/actions have a potential to change as a result of the current planning effort and if so, under which alternatives changes are being considered. Note that any references to tables and appendices are to those applicable RMP appendices that are listed in **Section 2.20.2** of this appendix.

### 2.20.1 Existing GRSG RMP Management –Worland RMP Revisions

**Table 1. Summary of Goals, Objectives, and Management Actions to the Worland RMP**

| 2014/2015 Approved RMPs | 2019 Approved RMPs | Potential Change in 2023 Plan |
|---|---|---|
| **Land Use Plan Revisions/Amendments to the Worland RMP** | | |
| MO MR:2.3: Priority will be given to leasing and development of fluid mineral resources, including geothermal, outside of PHMA and GHMA. When analyzing leasing and authorizing development of fluid mineral resources, including geothermal, in PHMA and GHMA, and subject to applicable stipulations for the conservation of Greater Sage-Grouse, priority will be given to development in non-habitat areas first and then in the least suitable habitat for Greater Sage-Grouse. The implementation of these priorities will be subject to valid existing rights and any applicable law or regulation, including, but not limited to, 30 U.S.C. 226(p) and 43 CFR 3162.3-1(h). | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |
| MO MR:2.4: Where a proposed fluid mineral development project on an existing lease could adversely affect Greater Sage-Grouse populations or habitat, the BLM will work with the lessees, operators, or other project proponents to avoid, reduce, and mitigate adverse impacts to the extent compatible with lessees' rights to drill and produce fluid mineral resources. The BLM will work with the lessee, operator, or project proponent in developing an APD for the lease to avoid and minimize impacts to Greater Sage-Grouse or its habitat and will ensure that the best information about the Greater Sage-Grouse and its habitat informs and helps to guide development of such federal leases. | No changes made. | Potential change under Alternative 3. |

| 2014/2015 Approved RMPs | 2019 Approved RMPs | Potential Change in 2023 Plan |
|---|---|---|
| **MD 2005: Consider interest in exploration for, or leasing of, federal coal (Map 3-5), if any on a case-by-case basis. Allow coal exploration licenses subject to the regulations of 43 CFR 3410, and subject to guidance mitigating for surface-disturbing activities in the *Wyoming BLM Standard Oil and Gas-Lease Stipulations* (Appendix B, *Oil and Gas Lease Notices and Lease Stipulations, including Exception, Modification, and Waiver Criteria* (p. 211)).<br>Before issuing a coal exploration license, require the authorized officer to prepare an environmental assessment or environmental impact statement, if necessary, of the potential effects of the proposed exploration on the natural and socioeconomic environment of the affected area.<br>If an application for a federal coal lease is received, conduct an appropriate land use and environmental analysis, including the coal screening process, to determine whether the area(s) proposed for leasing is (are) acceptable for coal development and leasing (as per 43 CFR 3425). If public lands are determined to be acceptable for further consideration for coal leasing, amend the land use plan as necessary. Only accept federal coal lease applications on those federal coal lands with development potential identified as suitable for further leasing consideration, after application of the coal screens and unsuitability criteria.<br>At the time an application for a new coal lease or lease modification is submitted to the BLM, the BLM will determine whether the lease application area is "unsuitable" for all or certain coal mining methods pursuant to 43 CFR 3461.5. PHMA is essential habitat for maintaining Greater Sage-Grouse for purposes of the suitability criteria set forth at 43 CFR 3461.5(o)(1). The BLM will also consider that USFWS has found "the core area strategy…if implemented by all landowners via regulatory mechanisms, would provide adequate protection for sage-grouse and their habitats in the state" when considering leasing coal in PHMAs under the criteria set for at 43 CFR 3461.5(o)(1) (USFWS 2010). | No changes made. | Potential change under Alternative 3. |

| 2014/2015 Approved RMPs | 2019 Approved RMPs | Potential Change in 2023 Plan |
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| MD 2013: Process oil and gas lease applications on a case-by-case basis. Ensure that leasing activities in PHMAs comply with Greater Sage-Grouse RMP decisions and remain in compliance with laws, regulations, and policy. | Process oil and gas lease applications on a case-by-case basis. Ensure that leasing activities in PHMAs comply with Greater Sage-Grouse RMP decisions and remain in compliance with laws, regulations, and policy (See MDs 4106, 4107, 4108, 4110, and 4152). | Potential change under Alternative 3. |
| **MD 2023: Delineate **Oil and Gas Management Areas** (Map 3-9) (333,488 acres of federal mineral estate) around existing intensively-developed fields, applying a 2-mile buffer from the outer boundary of the existing field (Map 3-10); adding enhanced oil recovery areas identified by the Governor's Office Enhanced Oil Recovery Institute and excluding Greater Sage-Grouse PHMAs. Manage these areas primarily for oil and gas exploration and development.<br>Oil and gas development, including enhanced oil recovery operations, within Oil and Gas Management Areas is allowed to take place at the same level and density as the existing development in the field. Levels and densities beyond the existing field development may require additional reclamation or compensatory offsite mitigation.<br>As oil and gas fields expand or exploration reaches beyond the Oil and Gas Management Areas depicted on Map 3-9, Oil and Gas Management Areas may be enlarged as appropriate. To enlarge Oil and Gas Management Areas, the expansion area would:<br>i) have to be adjacent to the field and under valid oil and gas lease(s) with stipulations allowing surface occupancy and development;<br>ii) have to have a surface density of, on average, at least four well pads per 640-acres; a determination that additional well density is required to efficiently and adequately produce the oil or gas resource;<br>iii) have a project-specific environmental analysis prepared to analyze the impacts and determine operating methods, mitigation, and BMPs to be used in the efficient and comprehensive development of the field;<br>iv) need surface resources to be satisfactorily mitigated; and<br>v) need commitment to accelerate reclamation as required by the authorized officer. | No changes made. | Potential change under Alternative 3. |

| 2014/2015 Approved RMPs | 2019 Approved RMPs | Potential Change in 2023 Plan |
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| MO FM:1.5:: Following wildland fires, conduct appropriate emergency stabilization and rehabilitation when and where needed. In priority Greater Sage-Grouse habitat areas, prioritize suppression immediately after life and property to conserve the habitat. In general Greater Sage-Grouse habitat, prioritize suppression where wildfires threaten priority Greater Sage-Grouse habitat. | No changes made. | No change proposed. |
| MD FM:2.1: Consult and cooperate with adjacent landowners, state and local governments, and other stakeholders to plan and implement prescribed fire and other vegetation treatments across the landscape. In areas of general Greater Sage-Grouse habitat, design and implement fuels treatments with an emphasis on protecting existing sagebrush ecosystems. | No changes made. | No change proposed. |

| 2014/2015 Approved RMPs | 2019 Approved RMPs | Potential Change in 2023 Plan |
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| MD 3008: Suppress fires threatening Greater Sage-Grouse habitats and crucial winter wildlife habitat within Wyoming big sagebrush communities.<br>Where fire would be utilized to meet resource objectives, work closely with resource specialists to protect and improve Greater Sage-Grouse habitat.<br>For fuels management, the BLM would consider multiple tools for fuels reduction and would analyze in NEPA compliance documentation before electing to implement prescribed fire in PHMAs.<br>If prescribed fire is used in Greater Sage-Grouse habitat, the NEPA analysis for the Burn Plan will address:<br>• why alternative techniques were not selected as a viable options;<br>• how Greater Sage-Grouse goals and objectives would be met by its use;<br>• how the COT Report objectives would be addressed and met; and<br>• a risk assessment to address how potential threats to Greater Sage-Grouse habitat would be minimized.<br>Prescribed fire as a vegetation or fuels treatment in Greater Sage-Grouse habitat shall only be considered after the NEPA analysis for the Burn Plan has addressed the four bullets outlined above. Prescribed fire could be used to meet specific fuels objectives that would protect Greater Sage-Grouse habitat in PHMAs (e.g., creation of fuel breaks that would disrupt the fuel continuity across the landscape in stands where annual invasive grasses are a minor component in the understory, burning slash piles from conifer reduction treatments, used as a component with other treatment methods to combat annual grasses and restore native plant communities).<br>Prescribed fire in known crucial winter wildlife habitat shall only be considered after the NEPA analysis for the Burn Plan has addressed the four bullets outlined above. Any prescribed fire in and/or around crucial winter wildlife habitat must be strategically-designed to reduce wildfire risk and protect winter range habitat quality. | No changes made. | No change proposed. |

| 2014/2015 Approved RMPs | 2019 Approved RMPs | Potential Change in 2023 Plan |
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| MO BR:2.6: In PHMAs, the desired condition is to maintain all lands ecologically capable of producing sagebrush (but no less than 70 percent) with a minimum of 15 percent sagebrush cover or as consistent with specific ecological site conditions. The attributes necessary to sustain these habitats are described in Interpreting Indicators of Rangeland Health (BLM Technical Reference 1734-6 [BLM 2005c]). | No changes made. | No change proposed. |
| MG BR:9: GREATER SAGE-GROUSE – Sustain the integrity of the sagebrush biome to provide the amount, continuity, and quality of habitat that is necessary to maintain sustainable populations of Greater Sage-Grouse and other species by achieving the objectives below. | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |
| MO BR:9.1: Maintain large patches of high quality sagebrush habitats, with emphasis on patches occupied by Greater Sage-Grouse. | No changes made. | No change proposed. |
| MO BR:9.2: Maintain connections between sagebrush habitats, with emphasis on connections between habitats occupied by Greater Sage-Grouse. | No changes made. | No change proposed. |
| MO BR:10.1: Reconnect large patches of sagebrush habitat with emphasis on reconnecting patches occupied by stronghold and isolated populations of Greater Sage-Grouse. | No changes made. | No change proposed. |
| MD 4058: Maintain or improve important wildlife habitats through vegetative manipulations, habitat improvement projects, livestock grazing strategies and the application of *The Wyoming Guidelines for Managing Sagebrush Communities with Emphasis on Fire Management* (Wyoming Interagency Vegetation Committee 2002) and the *Wyoming BLM Standard Mitigation Guidelines for Surface-Disturbing and Disruptive Activities* (Appendix F, *Wyoming Bureau of Land Management Mitigation Guidelines for Surface-Disturbing and Disruptive Activities* (p. 349)), BMPs (Appendix C, *Required Design Features and Best Management Practices* (p. 249)), and similar guidance updated over time. | No changes made. | No change proposed. |
| MD 4070: Conduct habitat enhancement vegetation treatments within sagebrush communities as opportunities and funding allow, consistent with EO 2015-4 (Wyoming Office of the Governor 2015). | No changes made. | No change proposed. |

| 2014/2015 Approved RMPs | 2019 Approved RMPs | Potential Change in 2023 Plan |
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| MD 4071: Modify identified hazard fences, and analyze and construct new fences in accordance with wildlife needs, the BLM Fencing Handbook 1741-1, and WO IM 2010-022, *Managing Structures for the Safety of Sage-grouse, Sharp-tailed grouse, and Lesser Prairie-chicken*, and similar guidance and policy as updated over time. | No changes made. | No change proposed. |
| MD 4076: Allow water development projects in crucial elk winter range and in greater Greater Sage-Grouse nesting habitat with 10 inches or less annual precipitation only when adverse effects can be avoided, minimized and/or compensated based on site-specific analysis. Allow existing uses pending site-specific analysis on a priority basis. | No changes made. | No change proposed. |
| MD 4080: Avoid wind energy projects in big game crucial winter range and raptor concentration areas. Wind-energy development would be avoided in Greater Sage-Grouse PHMAs (Map 3-17), and not allowed unless it can be sufficiently demonstrated that the development activity would not result in declines of Greater Sage-Grouse PHMA populations. Sufficient demonstration of "no declines" should be coordinated with the WGFD and USFWS. | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |
| MD 4087: Discourage the use of broad-spectrum insecticides where insect control is required. Target pest control toward key problem areas and schedule applications to be effective in minimum doses in Greater Sage-Grouse brood-rearing areas. Field Offices may implement treatments within Greater Sage-Grouse habitat utilizing RAATS protocols. | No changes made. | No change proposed. |
| MD 4088: Avoid aerial pesticide spraying in favor of ground applications to minimize drift into non-target areas in Greater Sage-Grouse habitat unless benefits of treatments are likely to outweigh impacts. | No changes made. | No change proposed. |
| MD 4089: Avoid applying pesticides to Greater Sage-Grouse breeding habitat during the nesting and early brood-rearing season (March 15 through June 30) to reduce the loss of food supply to chicks and avoid the chance of secondary poisoning unless benefits of treatments are likely to outweigh impacts. | No changes made. | No change proposed. |

| 2014/2015 Approved RMPs | 2019 Approved RMPs | Potential Change in 2023 Plan |
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| MD 4090: Maintain seeps, springs, wet meadows, and riparian vegetation in a functional and diverse condition for young Greater Sage-Grouse and other species that depend on forbs and insects associated with these areas.<br>Consider management actions if desirable green vegetation associated with these wet areas is not available, accessible, or cannot be maintained with current livestock, wildlife, or wild horse use, and the impacts are outweighed by the improved habitat quality. | No changes made. | No change proposed. |
| MD 4091: Restore Greater Sage-Grouse brood-rearing habitats in riparian/wetland areas. | No changes made. | No change proposed. |
| MD 4092: Restore lost riparian functioning systems by repairing abnormally incised drainages to raise water tables and increase water storage and brood-rearing habitats within Greater Sage-Grouse habitat. | No changes made. | No change proposed. |

| 2014/2015 Approved RMPs | 2019 Approved RMPs | Potential Change in 2023 Plan |
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| MD 4093: Manage vegetation composition diversity and structure, as determined by ESD, or other methods that reference site potential, and WGFD protocols to achieve Greater Sage-Grouse habitat management objectives, in cooperation with stakeholders.<br>Evaluate the role of existing seedings that are currently composed of primarily introduced perennial grasses in and adjacent to Greater Sage-Grouse habitat to determine if they should be restored to Greater Sage-Grouse or habitat of higher quality for Greater Sage-Grouse. If these seedings provide value in conserving or enhancing Greater Sage-Grouse habitats, then no restoration would be necessary. Assess the compatibility of these seedings for Greater Sage-Grouse habitat during the land health assessments.<br>Burned areas within PHMAs would be restored to suitable habitat with consideration given to ESDs, reference sites, site potential and local variability.<br>The BLM could bring in burned area rehabilitation and Burned Area Emergency Response teams who would work cooperatively with partners at the federal, state, and local levels to rehabilitate and restore Greater Sage-Grouse habitats in a manner consistent with the core habitat populations area strategy for conservation.<br>DDCT reviews would be conducted in coordination with the WGFD Habitat Protection Program located in Cheyenne, Wyoming at the WGFD headquarters. Areas within PHMAs would be prioritized for restoration of Greater Sage-Grouse habitat beyond immediate response. | No changes made. | No change proposed. |
| MD 4094: Maintain sagebrush and understory diversity (relative to ecological site description) in crucial seasonal Greater Sage-Grouse habitats unless such removal is necessary to achieve Greater Sage-Grouse habitat management objectives. For example, thinning small patches of dense sagebrush may increase desirable forbs in early brood-rearing habitat. | No changes made. | No change proposed. |

| 2014/2015 Approved RMPs | 2019 Approved RMPs | Potential Change in 2023 Plan |
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| MD 4095: Increase the composition and canopy cover of Wyoming big sagebrush, within existing nonnative grass seedings with less than 5 percent sagebrush canopy cover, to greater than or equal to neighboring sagebrush communities or historical levels. (See Shrubland-Salt Desert/Salt Bottom on Map 3-15; deeper soiled, and gentler sloped portions of the Shrubland-Salt Desert/Salt Bottom, colored in pink, would be those areas where sagebrush restoration efforts could be conducted.) | No changes made. | No change proposed. |
| MD 4096: Investigate opportunities to increase sagebrush in lower precipitation zones. | No changes made. | No change proposed. |
| MD 4097: Plan and construct mining and mineral development activities, to the degree possible given state water rights, to minimize disturbances that would result in alterations to springs and riparian Greater Sage-Grouse habitat. Alternative water sources may be developed to replace natural sources that have been affected or destroyed during these development activities. | No changes made. | Potential change under Alternative 3. |
| MD 4098: Treat constructed or non-natural water storage impoundments to control mosquito breeding (and the associated spread of West Nile virus), to prevent disease spread to Greater Sage-Grouse as necessary. | No changes made. | No change proposed. |
| MD 4099: In cooperation with stakeholders, manage to promote the growth and persistence of native shrubs, grasses, and forbs needed by Greater Sage-Grouse for seasonal food and concealment. | No changes made. | No change proposed. |
| MD 4100: In cooperation with stakeholders, design and locate fences so as not to disturb PHMAs. Increase the visibility of fences in these areas which have been identified as hazardous to flying Greater Sage-Grouse. | No changes made. | No change proposed. |
| MD 4101: Conduct fire management activities to minimize overall wildfire size and frequency in sagebrush plant communities where Greater Sage-Grouse habitat objectives are at risk. General priorities for habitat protection:<br>Priority # 1 – Protection of Greater Sage-Grouse PHMAs.<br>Priority # 2 – Wyoming big sagebrush communities outside Greater Sage-Grouse PHMAs and habitats recovering from disturbance within or adjacent to Greater Sage-Grouse PHMAs. | No changes made. | No change proposed. |

| 2014/2015 Approved RMPs | 2019 Approved RMPs | Potential Change in 2023 Plan |
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| MD 4102: Annually maintain FMPs to incorporate updated sagebrush habitat information as well as fire suppression priorities in sagebrush habitats. Incorporate fire management objectives for the management of sagebrush ecosystems into FMPs. Provide fire management objectives for sagebrush ecosystems to initial attack personnel at the beginning of each fire season. | No changes made. | No change proposed. |
| MD 4103: Establish fuels treatment projects at strategic locations to minimize size of wildfires and limit loss of Greater Sage-Grouse habitat. | No changes made. | No change proposed. |
| MD 4104: Reintroduce appropriate fire regimes to limit conifer encroachment into the sagebrush plant communities. Take into account invasive herbaceous species and Fire Regime Group and FRCC (measure of departure from historic fire regime) with treatments. Where possible, achieve a balance between treating areas that have significantly departed from the historic fire regime (Condition Class 3) and areas that are functioning within an appropriate fire regime (Condition Class 1). | No changes made. | No change proposed. |
| MD 4105: Remove conifers encroaching into sagebrush habitats in a manner that considers tribal and cultural values. Prioritize treatments closest to occupied Greater Sage-Grouse habitats and near occupied leks, and where juniper encroachment is phase 1 or phase 2 as defined in Miller et al. (2005). Refine the location of specific priority areas to be treated by utilizing site-specific analysis and principles like those included in the FIAT report (Chambers et. al. [2014]) and other ongoing modeling efforts to address conifer encroachment. | No changes made. | No change proposed. |

| 2014/2015 Approved RMPs | 2019 Approved RMPs | Potential Change in 2023 Plan |
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| **MD 4106: **Inside PHMAs**<br>Prohibit surface occupancy and surface-disturbing activities on or within a 0.6-mile radius of the perimeter of occupied Greater Sage-Grouse leks. The authorized officer may grant an exception if an environmental record of review determines that the action, as proposed or conditioned, would not impair the function or utility of the site for the current or subsequent seasonal habitat, life-history, or behavioral needs of Greater Sage-Grouse (Map 3-17).<br>**Outside PHMAs**<br>Prohibit surface-disturbing and disruptive activities and apply a NSO restriction within a ¼-mile radius of the perimeter of occupied Greater Sage-Grouse leks (Map 3-17). Outside Greater Sage-Grouse PHMAs, the BLM's goal is to sustain important habitats that support core populations and to maintain lek persistence over the long term in sufficient proportions of the Greater Sage-Grouse population to facilitate movement and genetic transfer between core populations, including those found in adjacent states. | **Inside PHMAs**<br>Prohibit surface occupancy and surface-disturbing activities on or within a 0.6-mile radius of the perimeter of occupied Greater Sage- Grouse leks (or lek center if no perimeter is yet mapped).<br>**Outside PHMAs**<br>Prohibit surface-disturbing and disruptive activities and apply a NSO restriction within a ¼-mile radius of the perimeter of occupied Greater Sage-Grouse leks (or lek center if no perimeter is yet mapped) (Map 3-17). Outside Greater Sage-Grouse PHMAs, the BLM's goal is to sustain important habitats that support core populations and to maintain lek persistence over the long term in sufficient proportions of the Greater Sage-Grouse population to facilitate movement and genetic transfer between core populations, including those found in adjacent states.<br>The authorized officer may grant an exception on a case-by-case basis subject to appropriate site-specific analysis, mitigation requirements, and consultation with the State of Wyoming and consistent with the applicable State management strategy (currently Governor of Wyoming's Executive Order 2015-4) (see MD 4152). | Potential change under Alternatives 3 and 6. |

| 2014/2015 Approved RMPs | 2019 Approved RMPs | Potential Change in 2023 Plan |
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| **MD 4107: **Inside PHMAs**<br>Prohibit disruptive activities on or within a 0.6-mile radius of the perimeter of occupied Greater Sage-Grouse leks from March 15 to June 30 (81,281 acres).<br>**Outside PHMAs**<br>Prohibit disruptive activities on or within a ¼ mile radius of the perimeter of occupied Greater Sage-Grouse leks from March 15 to June 30 (3,157 acres).<br>**Inside PHMAs**<br>Prohibit surface-disturbing and/or disruptive activities from March 15 to June 30 to protect Greater Sage-Grouse breeding, nesting, and early brood-rearing habitat (1,021,583 acres). Apply this timing limitation throughout the PHMAs. Activities in unsuitable habitats would be evaluated under the exception and modification criteria and could be allowed on a case-by-case basis.<br>**Outside PHMAs**<br>Prohibit surface-disturbing and/or disruptive activities in Greater Sage-Grouse nesting and early brood-rearing habitat within a 2-mile radius of the perimeter of occupied Greater Sage-Grouse leks from March 15 to June 30.<br>Note: Where credible data support different timeframes for these seasonal restrictions, dates may be expanded by up to 14 days prior to or subsequent to the above dates. | **Inside PHMAs**<br>Prohibit disruptive activities on or within a 0.6-mile radius of the perimeter of occupied Greater Sage-Grouse leks (or lek center if no perimeter is yet mapped) from March 15 to June 30 (81,281 acres).<br>**Outside PHMAs**<br>Prohibit disruptive activities on or within a ¼ mile radius of the perimeter of occupied Greater Sage-Grouse leks (or lek center if no perimeter is yet mapped) from March 15 to June 30 (3,157 acres).<br>**Inside PHMAs**<br>Prohibit surface-disturbing and/or disruptive activities from March 15 to June 30 to protect Greater Sage-Grouse breeding, nesting, and early brood-rearing habitat (1,021,583 acres). Apply this timing limitation throughout the PHMAs. Activities in unsuitable habitats would be evaluated under the exception and modification criteria and could be allowed on a case-by-case basis.<br>**Outside PHMAs**<br>Prohibit surface-disturbing and/or disruptive activities in Greater Sage-Grouse nesting and early brood-rearing habitat within a 2-mile radius of the perimeter of occupied Greater Sage-Grouse leks (or lek center if no perimeter is yet mapped) from March 15 to June 30.<br>Note: Where credible data support different timeframes for these seasonal restrictions, dates may be expanded by up to 14 days prior to or subsequent to the above dates.<br>The authorized officer may grant an exception on a case-by-case basis subject to appropriate site-specific analysis, mitigation requirements, and consultation with the State of Wyoming and consistent with the applicable State management strategy (currently Governor of Wyoming's Executive Order 2015-4) (see MD 4152). | Potential change under Alternatives 3, 4, 5, and 6. |

| 2014/2015 Approved RMPs | 2019 Approved RMPs | Potential Change in 2023 Plan |
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| **MD 4108: **Greater Sage-Grouse winter concentration areas:**<br>Surface-disturbing and/or disruptive activities in sage-grouse winter concentration areas would be prohibited from December 1–March 14. Activities in unsuitable habitats within PHMAs would be evaluated under the exception and modification criteria and could be allowed on a case-by-case basis. Protection of additional mapped winter concentration areas in GHMAs would be implemented only where winter concentration areas are identified as supporting biologically significant numbers of sage-grouse nesting in PHMAs and/or attending leks within PHMAs. Appropriate seasonal timing restrictions and habitat protection measures would be considered and evaluated in consultation with the WGFD in all identified winter concentration areas.<br>Evaluate and allow activities in unsuitable habitats within PHMAs in accordance with exception and modification criteria on a case-by-case basis.<br>Protection of additional mapped winter concentration areas in GHMAs would be implemented only where winter concentration areas are identified as supporting biologically significant numbers of Greater Sage-Grouse nesting in PHMAs and/or attending leks within PHMAs. Appropriate seasonal timing restrictions and habitat protection measures would be considered and evaluated in consultation with the WGFD in all identified winter concentration areas. | **Greater Sage-Grouse winter concentration areas:**<br>Surface-disturbing and/or disruptive activities in sage-grouse winter concentration areas would be prohibited from December 1–March 14. The authorized officer may grant an exception on a case-by-case basis subject to appropriate site-specific analysis, mitigation requirements, and consultation with the State of Wyoming and consistent with the applicable State management strategy (currently Governor of Wyoming's Executive Order 2015-4) (see MD 4152). Protection of additional mapped winter concentration areas in GHMA would be implemented where winter concentration areas are mapped and designated by the State of Wyoming. Appropriate seasonal timing restrictions and habitat protection measures would be considered and evaluated in consultation with the WGFD in all identified winter concentration areas. Where credible data support different timeframes for this seasonal restriction, dates may be expanded by up to 14 days prior to or subsequent to the above dates. | No change proposed. |

| 2014/2015 Approved RMPs | 2019 Approved RMPs | Potential Change in 2023 Plan |
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| **MD 4109: **Density of Disturbances:**<br>In Greater Sage-Grouse PHMAs, the density of disturbance of energy or mining facilities would be limited to an average of one site per square mile (640 acres) within the DDCT, subject to valid existing rights (Appendix D, *Greater Sage-Grouse Habitat Management Strategy* (p. 271)). The one location and cumulative value of existing disturbances would not exceed 5 percent of habitat of the DDCT area. Inside PHMA, all suitable habitat disturbed (any program area) will not exceed 5 percent within the DDCT area using the DDCT process.<br>Consolidate anthropogenic features from development and transmission on the landscape. Allow on a case-by-case basis high profile structures within Greater Sage-Grouse nesting habitat.<br>Sagebrush Treatment: For vegetation treatments in sagebrush within PHMAs, refer to WGFD Protocols for Treating Sagebrush to Benefit Sage-Grouse (WGFD 2011, as updated) and BLMWO IM 2013-128 (Sage-grouse Conservation Related to Wildland Fire and Fuels Management). These recommended protocols, subject to seasonal conditions of approval, would be used in determining whether proposed treatment constitutes a "disturbance" that would contribute toward the 5 percent threshold for habitat maintenance.<br>Additionally, these protocols would be used to determine whether the proposed treatment configuration would be expected to have neutral or beneficial impacts for PHMA populations or if they represent additional habitat loss or fragmentation.<br>Treatments to enhance sagebrush/grasslands habitat for Greater Sage-Grouse would be evaluated based upon habitat quality and the functionality/use of treated habitats post-treatment.<br>The BLM would work collaboratively with partners at the state and local levels to maintain and enhance Greater Sage-Grouse habitats.<br>Seasonal restrictions would be applied, as needed, for implementing fuels management treatments according to the type of seasonal habitat present. | **Density of Disturbances:**<br>In Greater Sage-Grouse PHMAs, the density of disturbance of energy or mining facilities would be limited to an average of one site per square mile (640 acres) within the DDCT, subject to valid existing rights (2019 Wyoming GrSG ARMPA Appendix C, Greater Sage-Grouse Habitat Management Strategy). The one location and cumulative value of existing disturbances would not exceed 5 percent of habitat of the DDCT area. Inside PHMA, all suitable habitat disturbed (any program area) will not exceed 5 percent within the DDCT area using the DDCT process.<br>Consolidate anthropogenic features from development and transmission on the landscape. Allow on a case-by-case basis high profile structures within Greater Sage-Grouse nesting habitat.<br>Sagebrush Treatment: For vegetation treatments in sagebrush within PHMAs, refer to WGFD Protocols for Treating Sagebrush to Benefit Sage-Grouse (WGFD 2015, as updated) and BLM WO IM 2013-128 (Sage-grouse Conservation Related to Wildland Fire and Fuels Management). These recommended protocols, subject to seasonal conditions of approval, would be used in determining whether proposed treatment constitutes a "disturbance" that would contribute toward the 5 percent threshold for habitat maintenance.<br>Additionally, these protocols would be used to determine whether the proposed treatment configuration would be expected to have neutral or beneficial impacts for PHMA populations or if they represent additional habitat loss or fragmentation.<br>Treatments to enhance sagebrush/grasslands habitat for Greater Sage-Grouse would be evaluated based upon habitat quality and the functionality/use of treated habitats post-treatment.<br>The BLM would work collaboratively with partners at the state and local levels to maintain and enhance Greater Sage-Grouse habitats. Seasonal restrictions would be applied, as needed, for implementing fuels management treatments according to the type of seasonal habitat present.<br>Wildfire burns will be treated as disturbed if sagebrush is reduced below 5 percent unless | Potential change under Alternatives 3, 4, 5, and 6. |

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| Wildfire burns will be treated as disturbed if sagebrush is reduced below 5 percent unless there is an implementation plan outlining restoration efforts and 3 years of data showing a trend back to suitable habitat. | there is an implementation plan outlining restoration efforts and 3 years of data showing a trend back to suitable habitat. | |
| *MD 4110: New project noise levels, either individual or cumulative, should not exceed 10 dBA (as measured by L50) above baseline noise at the perimeter of the lek from 6:00 pm to 8:00 am during the breeding season (March 1 to May 15). Specific noise protocols for measurement and implementation will be developed as additional research and information emerges. | Within PHMA (core only), new project noise levels, either individual or cumulative, should not exceed 10 dBA (as measured by L50) above baseline noise at the perimeter of the lek (or lek center if no perimeter is yet mapped) from 6:00 pm to 8:00 am during the breeding season (March 1–May 15). The authorized officer may grant an exception on a case-by-case basis subject to appropriate site-specific analysis, mitigation requirements, and consultation with the State of Wyoming and consistent with the applicable State management strategy (currently Governor of Wyoming's Executive Order 2015-4) (see MD SSS 4). In coordination with the State of Wyoming, specific noise protocols for measurement and implementation will be developed as additional research and information emerges. These measures would be considered at the site-specific project level where and when appropriate. | No change proposed. |
| MD 4111: Allow motorized vehicle use in Greater Sage-Grouse PHMAs consistent with other resource objectives.<br>Manage new road construction in and adjacent to Greater Sage-Grouse habitat consistent with applicable restrictions on surface-disturbing and disruptive activities. Avoid construction of new or local collector roads (as defined in BLM Manual 9113 [BLM 2011d]) within 1.9 miles of the perimeter of occupied Greater Sage-Grouse leks within PHMAs. Prohibit all new roads within 0.6 miles of the perimeter of occupied Greater Sage-Grouse leks within PHMAs. Construct roads to minimum design standards needed for production activities. | Allow motorized vehicle use in Greater Sage-Grouse PHMAs consistent with other resource objectives.<br>Manage new road construction in and adjacent to Greater Sage-Grouse habitat consistent with applicable restrictions on surface-disturbing and disruptive activities. Avoid construction of new or local collector roads (as defined in BLM Manual 9113 [BLM 2011d]) within 1.9 miles of the perimeter of occupied Greater Sage-Grouse leks (or lek center if no perimeter is yet mapped) within PHMAs. Prohibit all new roads within 0.6 miles of the perimeter of occupied Greater Sage-Grouse leks (or lek center if no perimeter is yet mapped) within PHMAs.<br>Construct roads to minimum design standards needed for production activities. | No change proposed. |

| 2014/2015 Approved RMPs | 2019 Approved RMPs | Potential Change in 2023 Plan |
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| **MD 4112: In PHMAs, implement mitigation and minimization guidelines and required design features, including specific measures for Greater Sage-Grouse (refer to Appendix C, *Required Design Features and Best Management Practices* (p. 249)), as applicable and consistent with EO 2015-4 (Wyoming Office of the Governor 2015). Incorporate Greater Sage-Grouse specific measures into project proposals as required design features or mitigation for any authorized federal action, regardless of surface ownership. | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |
| MD 4113: In PHMAs, require the development of a wildlife resource monitoring and mitigation plan to address potential impacts from mineral development on wildlife populations and/or habitat on a case-by-case basis. | No changes made. | Potential change under Alternative 3. |
| MD 4114: Use the following travel management criteria in PHMAs:<br>• During subsequent travel management planning, all routes within PHMAs would undergo a route evaluation to determine its purpose and need and the potential resource and/or user conflicts from motorized travel. Where resource and/or user conflicts outweigh the purpose and need for the route, the route would be considered for closure or considered for relocation outside of sensitive Greater Sage-Grouse habitat.<br>• During implementation-level travel planning, threats to Greater Sage-Grouse and their habitat would be considered when evaluating route designations and/or closures.<br>• During subsequent travel management planning, routes within PHMAs that do not have a purpose or need would be considered for closure.<br>• During subsequent travel management planning, routes within PHMAs that are duplicative parallel, or redundant would be considered for closure.<br>• ● During subsequent travel management planning, OHV timing limitations would be considered in important seasonal habitats where OHV use is a threat.<br>• During subsequent travel management planning, consider limiting snow machine travel to designated routes or consider seasonal closures in Greater Sage-Grouse | No changes made. | No change proposed. |

| 2014/2015 Approved RMPs | 2019 Approved RMPs | Potential Change in 2023 Plan |
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| wintering areas from November 1 through March 31.<br>• During subsequent travel management planning, routes in PHMAs not required for public access or recreation with a current administrative/agency purpose or need would be evaluated for administrative access only.<br>• During subsequent travel management planning, prioritize restoration of routes not designated in a Travel Management Plan within PHMAs.<br>• During subsequent travel management planning, consider using seed mixes or transplant techniques that will maintain or enhance Greater Sage-Grouse habitat when rehabilitating linear disturbances.<br>• During subsequent travel management planning, consider scheduling road maintenance to avoid disturbance during sensitive periods and times to the extent practicable. Use time of day limits (after 10:00 AM to 7:00 PM) to reduce impacts on Greater Sage-Grouse during breeding and nesting periods. | *(See above.)* | *(See above.)* |
| *MD 4115: The Greater Sage-Grouse adaptive management plan provides regulatory assurance that unintended negative impacts to Greater Sage-Grouse habitat will be addressed before consequences become severe or irreversible.<br>Adaptive management triggers are essential for identifying when potential management changes are needed in order to continue meeting Greater Sage-Grouse conservation objectives. With respect to Greater Sage-Grouse, all regulatory entities in Wyoming, including the BLM, use soft and hard triggers. Soft and hard triggers are focused on three metrics: 1) number of active leks, 2) acres of available habitat, and 3) population trends based on annual lek counts. See Appendix D, *Greater Sage-Grouse Habitat Management Strategy* (p. 271) for more information on soft and hard triggers.<br><u>Soft Triggers Response:</u><br>Soft triggers are indicators that management or specific activities may not be achieving the intended results of conservation action or that unanticipated changes to populations or habitats have occurred that have the potential to place habitats or populations at risk. The | The Greater Sage-Grouse adaptive management plan provides regulatory assurance that unintended negative impacts to Greater Sage- Grouse habitat will be addressed before consequences become severe or irreversible.<br>Adaptive management triggers are essential for identifying when potential management changes are needed in order to continue meeting Greater Sage-Grouse conservation objectives. With respect to Greater Sage-Grouse, all regulatory entities in Wyoming, including the BLM, use soft and hard triggers. Soft and hard triggers are focused on three metrics: 1) number of active leks, 2) acres of available habitat, and 3) population trends based on annual lek counts. See 2019 Wyoming GrSG ARMPA Appendix C, Greater Sage-Grouse Habitat Management Strategy for more information on soft and hard triggers.<br><u>Soft Triggers Response</u>:<br>Soft triggers are indicators that management or specific activities may not be achieving the intended results of conservation action or that unanticipated changes to populations or habitats have occurred that have the potential to place habitats or populations at risk. The | Potential change under Alternatives 3, 4, 5, and 6. |

| 2014/2015 Approved RMPs | 2019 Approved RMPs | Potential Change in 2023 Plan |
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| soft trigger is any deviation from normal trends in habitat or population in any given year. Metrics include, but are not limited to, annual lek counts, wing counts, aerial surveys, habitat monitoring, and DDCT evaluations. For population metrics, normal population trends are calculated as the 5-year running mean of annual population counts. BLM field offices, with the assistance of their respective land and RMP implementation groups, local WGFD offices, and local sage-grouse working groups will evaluate the metrics with the Adaptive Management Working Group on an annual basis. The purpose of these strategies is to address localized greater sage-grouse population and habitat changes byproviding the framework in which management will change if monitoring identifies negative population and habitat anomalies in order to avoid crossing a hard trigger threshold.<br>Soft triggers require immediate monitoring and surveillance to determine causal factors and may require curtailment of activities in the short or long term, as allowed by law. The project level adaptive management strategies will identify appropriate responses where the project's activities are identified as the causal factor. The management agency (BLM) and the Adaptive Management Work Group will implement an appropriate response strategy to address causal factors not attributable to a specific project or to make adjustments at a larger regional or statewide level.<br><u>Hard Trigger Response:</u><br>Hard triggers are indicators that management is not achieving desired conservation results. Hard triggers would be considered a catastrophic indicator that the species is not responding to conservation actions, or that a larger-scale impact or set of impacts is having a negative effect.<br>Within the range of normal population variables (5-year running mean of annual population counts), hard triggers shall be determined to take effect when two of the three metrics exceeds 60 percent of normal variability for the area under management in a single year, or when any of the three metrics exceeds 40 percent of normal variability for a 3 year time period within a 5-year range of analysis. A minimum of 3 consecutive years in | soft trigger is any deviation from normal trends in habitat or population in any given year. Metrics include, but are not limited to, annual lek counts, wing counts, aerial surveys, habitat monitoring, and DDCT evaluations. For population metrics, normal population trends are calculated as the 5-year running mean of annual population counts. BLM field offices, with the assistance of their respective land and RMP implementation groups, local WGFD offices, and local sage-grouse working groups will evaluate the metrics with the Adaptive Management Working Group on an annual basis. The purpose of these strategies is to address localized Greater Sage-Grouse population and habitat changes by providing the framework in which management will change if monitoring identifies negative population and habitat anomalies in order to avoid crossing a hard trigger threshold.<br>Soft triggers require immediate monitoring and surveillance to determine causal factors and may require curtailment of activities in the short or long term, as allowed by law. The project level adaptive management strategies will identify appropriate responses where the project's activities are identified as the causal factor. The management agency (BLM) and the Adaptive Management Work Group will implement an appropriate response strategy to address causal factors not attributable to a specific project or to make adjustments at a larger regional or statewide level.<br><u>Hard Trigger Response</u>:<br>Hard triggers are indicators that management is not achieving desired conservation results. Hard triggers would be considered a catastrophic indicator that the species is not responding to conservation actions, or that a larger-scale impact or set of impacts is having a negative effect.<br>Within the range of normal population variables (5-year running mean of annual population counts), hard triggers shall be determined to take effect when two of the three metrics exceeds 60 percent of normal variability for the area under management in a single year, or when any of the three metrics exceeds 40 percent of normal variability for a 3 year time period within a 5-year range of analysis. A minimum of 3 consecutive years in a 5-year period is used to determine trends | *(See above.)* |

| 2014/2015 Approved RMPs | 2019 Approved RMPs | Potential Change in 2023 Plan |
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| a 5-year period is used to determine trends (i.e., years 1-2-3, years 2-3-4, years 3-4-5). | (i.e., years 1-2-3, years 2-3-4, years 3-4-5). Upon determination that a hard trigger has been tripped, the BLM will immediately defer issuance of discretionary authorizations for new actions within the Biologically Significant Unit for a period of 90 days. In addition, within 14 days of a determination that a hard trigger has been tripped, the Adaptive Management Work Group will convene to develop an interim response strategy and initiate an assessment to determine the causal factor or factors (hereafter called the causal factor assessment). The AMWG would define a process to review and reverse adaptive management actions once the identified causal factor is resolved (e.g., returning to previous management once objectives of interim management strategy have been met).<br>In making amendments to this plan, the BLM will coordinate with the USFWS as BLM continues to meet its objective of protecting, restoring, and enhancing Greater Sage-Grouse habitat by reducing, minimizing or eliminating threats to that habitat. The hard and soft trigger data will be analyzed as soon as it becomes available after the signing of the ROD and then at a minimum, analyzed annually thereafter. | *(See above.)* |
| MD 4142: Base future adjustments to the appropriate management level on monitoring information and multiple use considerations through development of and/or revisions to HMA Plans. Update HMA plans to include Greater Sage-Grouse objectives. | No changes made. | Potential change under Alternative 3. |
| No similar action. | *MD 4151: The BLM will update its Greater Sage-Grouse habitat management areas, including biologically significant units (BSUs), in conjunction with the State of Wyoming's core areas, upon issuance of any Wyoming Governor's Executive Order revising or amending the core area boundaries and upon completion of appropriate NEPA analysis and process. The BLM will complete the appropriate NEPA documentation (including appropriate public comment) prior to adopting any revised core area boundaries (e.g., maintenance action or plan amendment, environmental assessment, etc.). | Potential change under Alternatives 3, 4, 5, and 6. |

| 2014/2015 Approved RMPs | 2019 Approved RMPs | Potential Change in 2023 Plan |
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| No similar action. | *MD 4152: Specific to management for Greater Sage-Grouse, all RMPs are amended as follows: Adopt the State of Wyoming's Greater Sage-Grouse Compensatory Mitigation Framework to the extent consistent with federal law, regulations, and policy.<br>In all Greater Sage-Grouse habitat, when authorizing third-party actions in designated Greater Sage-Grouse habitat, the BLM will seek to achieve the planning-level Greater Sage-Grouse management goals and objectives through implementation of mitigation and management actions, consistent with valid existing rights and applicable law. Under this Plan Amendment, management would be consistent with the Greater Sage-Grouse goals and objectives, and in conformance with BLM Manual 6840, Special Status Species Management. In accordance with BLM Manual 6840, the BLM will undertake planning decisions, actions and authorizations "to minimize or eliminate threats affecting the status of [Greater Sage-Grouse] or to improve the condition of [Greater Sage-Grouse] habitat" across the planning area. Accordingly, before authorizing third-party actions that result in habitat loss and degradation, the BLM will complete the following steps, in alignment with the Governor of Wyoming's Executive Order 2015-4 (July 29, 2015):<br>1. Work jointly with the WGFD to evaluate projects and recommend mitigation in the form of avoidance and minimization.<br>2. The WGFD will determine if the State requires or recommends any additional mitigation – including compensatory mitigation – under State regulations, policies, or programs related to the conservation of Greater Sage-Grouse.<br>3. Incorporate state required or recommended mitigation into the BLM's NEPA decision-making process, if the WGFD determines that compensatory mitigation is required to address impacts to GRSG habitat as a part of State policy or authorization, or if a proponent voluntarily offers mitigation.<br>4. Analyze whether the compensatory mitigation (deferring to the appropriate State authority to quantify habitat offsets, durability, and other aspects used to | Potential change under Alternatives 3, 4, 5, and 6. |

| 2014/2015 Approved RMPs | 2019 Approved RMPs | Potential Change in 2023 Plan |
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| *(See above.)* | determine the recommended compensatory mitigation action):<br>• achieves measurable outcomes for Greater Sage-Grouse habitat function on a landscape scale as determined by WGFD that are at least equal to the lost or degraded values in accordance with the Governor of Wyoming's Executive Order 2015-4.<br>• provides benefits that are in place for at least the duration of the impacts.<br>• accounts for a level of risk that the mitigation action may fail or not persist for the full duration of the impact.<br>5. Ensure mitigation outcomes are consistent with the State of Wyoming's mitigation strategy and principles outlined in 2019 Wyoming GrSG ARMPA Appendix C, The Greater Sage-Grouse Habitat Management Strategy.<br>The BLM has determined that compensatory mitigation must be voluntary unless required by other applicable law and in recognition that State authorities may also require compensatory mitigation (IM 2019-018, *Compensatory Mitigation*, December 6, 2018). Therefore, consistent with valid existing rights and applicable law, when authorizing third-party actions that result in habitat loss and degradation, the BLM will consider voluntary compensatory mitigation actions only as a component of compliance with a State mitigation plan, program, or authority, or when offered voluntarily by a project proponent.<br>Project-specific analysis will be necessary to determine how a compensatory mitigation proposal addresses impacts from a proposed action. The BLM will cooperate with the State to determine appropriate project design and alignment with State policies and requirements, including those regarding compensatory mitigation. When the BLM is considering compensatory mitigation as a component of the project proponent's submission or based on a mitigation requirement from the State, the BLM's NEPA analysis would evaluate the need to avoid or minimize impacts of the proposed project and achieve the goals and objectives of this RMPA. The BLM will defer to the appropriate State authority to quantify habitat offsets, durability, | *(See above.)* |

| 2014/2015 Approved RMPs | 2019 Approved RMPs | Potential Change in 2023 Plan |
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| *(See above.)* | and other aspects used to determine the recommended compensatory mitigation action. | *(See above.)* |
| MO LR:1.5: Effects of infrastructure projects, including siting, will be minimized using the best available science, updated as monitoring information on current infrastructure projects becomes available. | No changes made. | No change proposed. |
| MD 6014: The Secretary's policy is, generally, not to dispose of public lands. However, FLPMA Sections 201 & 202 state the Secretary shall 'prepare and maintain on a continuing basis an inventory of all public lands and their resource and other values...' and '...develop, maintain, and, when appropriate, revise land use plans which provide by tracts or areas for the use of the public lands', respectively. Therefore, as mandated by FLPMA Sections 201 & 202, the following tract(s) of public land have been found to meet criteria for disposal in FLPMA Section 203 (Sales) and/or FLPMA Section 206 (Exchanges) during this land use planning effort (Appendix I, Land Disposal and Acquisition (p. 379); Map 3-21. The identification of a public land tract as having met FLPMA criteria for disposal is NOT, in itself, a decision to dispose of public lands. The process for disposing of public lands via FLPMA Section 203 or Section 206 is a lengthy multi-decisional process requiring a comprehensive site-specific analysis, survey, and follow-on decisions prior to a final decision being made by the Department of Interior.<br>Disposal can include none, some, or all of the mineral estate as allowed by 43 CFR 2720 and FLPMA Section 209(b)(1). A mineral potential report would determine if a surface estate disposal includes none, some, or all of the mineral estate. (Map 3-21)<br>Lands classified as PHMAs and GHMAs for Greater Sage-Grouse will be retained in federal management unless: (1) the agency can demonstrate that disposal of the lands, including land exchanges, will provide a net conservation gain to the Greater Sage-Grouse or (2) the agency can demonstrate that the disposal of the lands, including land exchanges, will have no direct or indirect adverse impact on conservation of the Greater Sage-Grouse. Consider exceptions where there is mixed ownership. Allow land exchanges for | Retain approximately 2,048,905 acres of BLM-administered land. 52,080 acres of BLM-administered land are available for disposal by sale, exchange or other means (Map 3-21) (Appendix I, Land Disposal and Acquisition (p. 381)).<br>Disposal can include none, some, or all of the mineral estate as allowed by 43 CFR 2720 and FLPMA Section 209(b)(1). A mineral potential report would determine if a surface estate disposal includes none, some, or all of the mineral estate.<br>Lands classified as PHMAs and GHMAs for Greater Sage-Grouse will be retained in federal management unless: (1) the agency can demonstrate that disposal of the lands, including land exchanges, is in the public's best interest or (2) the agency can demonstrate that the disposal of the lands, including land exchanges, will have no direct or indirect adverse impact on conservation of the Greater Sage-Grouse. Consider exceptions where there is mixed ownership. Allow land exchanges for additional or more contiguous federal ownership patterns within PHMAs.<br>For PHMAs with minority federal ownership, include an additional, effective mitigation agreement for any disposal of federal land. Consider pursuing a permanent conservation easement as a final preservation measure.<br>For lands in GHMAs that are identified for disposal, the BLM will only dispose of such lands consistent with the goals and objectives of this plan, including, but not limited to, the land use plan objective to maintain or increase Greater Sage-Grouse abundance and distribution.<br>Note: All land actions to acquire or dispose of lands would require a site specific analysis under NEPA. | No change proposed. |

| 2014/2015 Approved RMPs | 2019 Approved RMPs | Potential Change in 2023 Plan |
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| additional or more contiguous federal ownership patterns within PHMAs.<br>For PHMAs with minority federal ownership, include an additional, effective mitigation agreement for any disposal of federal land.<br>Consider pursuing a permanent conservation easement as a final preservation measure.<br>For lands in GHMAs that are identified for disposal, the BLM will only dispose of such lands consistent with the goals and objectives of this plan, including, but not limited to, the land use plan objective to maintain or increase Greater Sage-Grouse abundance and distribution.<br>Note: All land actions to acquire or dispose of lands would require a site specific analysis under NEPA. | *(See above.)* | *(See above.)* |
| **MD 6028: Designate ROW corridors as shown on Map 3-24. PHMAs are designated as avoidance areas for high voltage transmission line and pipeline ROWs. All authorizations in these areas must comply with the conservation measures outlined in this Approved RMP, including the RDFs and avoidance criteria presented in Appendix C, *Required Design Features and Best Management Practices* (p. 249).<br>Within PHMAs, specific to management for Greater Sage-Grouse, all RMPs are amended as follows:<br>**New Transmission Lines (greater than 115 kV):**<br>Allow new transmission lines greater than 115 kV in PHMA only (1) when located within 0.5 miles or less of an existing 115 kV or greater transmission lines constructed prior to 2008; or (2) in designated RMP corridors authorized for aboveground transmission lines. Do not count Transmission lines routed using one or more of the two criteria listed above against the DDCT 5 percent disturbance cap.<br>Consider new transmission lines greater than 115 kV proposed outside of these areas where it can be demonstrated that declines in Greater Sage-Grouse populations could be avoided through project design and/or mitigation. These projects will be subject to the density and disturbance restrictions for PHMAs.<br>Incorporate the *Framework for Sage-grouse Impact Analysis for Interstate Transmission Lines* (BLM 2012b) and other appropriate | Designate ROW corridors as shown on Map 3-24. PHMAs are designated as avoidance areas for high voltage transmission line and pipeline ROWs. All authorizations in these areas must comply with the conservation measures outlined in this Approved RMP, including the RDFs and avoidance criteria presented in 2019 Wyoming GrSG ARPMA Appendix B, Required Design Features and Best Management Practices. Within PHMAs, specific to management for Greater Sage-Grouse, all RMPs are amended as follows:<br>**New Transmission Lines (greater than 115 kV):**<br>Allow new transmission lines greater than 115 kV in PHMA only (1) when located within 0.5 miles or less of an existing 115 kV or greater transmission lines constructed prior to 2008; or (2) in designated RMP corridors authorized for aboveground transmission lines. Do not count Transmission lines routed using one or more of the two criteria listed above against the DDCT 5 percent disturbance cap.<br>Consider new transmission lines greater than 115 kV proposed outside of these areas where it can be demonstrated that declines in Greater Sage-Grouse populations could be avoided through project design and/or mitigation. These projects will be subject to the density and disturbance restrictions for PHMAs.<br>Incorporate the Framework for Sage-grouse Impact Analysis for Interstate Transmission Lines (BLM 2012b) and other appropriate documents into the review of transmission line | Potential change under Alternatives 3, 4, 5, and 6. |

| 2014/2015 Approved RMPs | 2019 Approved RMPs | Potential Change in 2023 Plan |
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| documents into the review of transmission line proposals, consistent with the three routing criteria described above.<br>For new projects within PHMAs that may require future utility lines, including distribution and transmission lines or pipelines, include the proposed utility lines in their DDCT as part of the proposed disturbance. Count lines permitted, but not located in the above mentioned routes or a designated corridor, toward the 5 percent disturbance calculation (line distance is equal to the anticipated construction footprint or construction ROW width multiplied by length and includes all access roads, staging area, and other surface disturbance associated with construction outside of the construction ROW).<br>**New Electric Distribution Lines (less than 115 kV):**<br>Require burial of new electric distribution lines where economically feasible. If not economically feasible, distribution lines may be authorized when effectively designed/mitigated to protect Greater Sage-Grouse and when the authorized officer determines that overhead installation is the action alternative with the fewest adverse impacts while still meeting the project need. Consider agricultural and residential lines to be adequately mitigated for Greater Sage-Grouse if constructed at least 0.6 mile from the lek perimeter with appropriate timing constraints and constructed to the latest APLIC standards. These ROW authorizations will be subject to approval by the State Director.<br>**Pipelines:**<br>Allow new pipelines through PHMAs: (1) within an RMP corridor currently authorized for that use or designated through future RMP amendments; or (2) constructed in or adjacent to existing utilities (buried and aboveground) or roads. Pipelines constructed in RMP corridors or adjacent to existing utilities or roads will require completion of a DDCT analysis for baseline data collection, but the project is not required to meet the threshold of 5 percent. However, within 6 months of the completion of construction, the project proponent will provide the authorized officer with as-built drawings so that the total | proposals, consistent with the three routing criteria described above.<br>For new projects within PHMAs that may require future utility lines, including distribution and transmission lines or pipelines, include the proposed utility lines in their DDCT as part of the proposed disturbance. Count lines permitted, but not located in the above mentioned routes or a designated corridor, toward the 5 percent disturbance calculation (line distance is equal to the anticipated construction footprint or construction ROW width multiplied by length and includes all access roads, staging area, and other surface disturbance associated with construction outside of the construction ROW).<br>**New Electric Distribution Lines (less than 115 kV):**<br>Require burial of new electric distribution lines where economically feasible. If not economically feasible, distribution lines may be authorized when effectively designed/mitigated to protect Greater Sage-Grouse and when the authorized officer determines that overhead installation is the action alternative with the fewest adverse impacts while still meeting the project need. Consider agricultural and residential lines to be adequately mitigated for Greater Sage-Grouse if constructed at least 0.6 mile from the lek perimeter (or lek center if no perimeter is yet mapped) with appropriate timing constraints and constructed to the latest APLIC standards. These ROW authorizations will be subject to approval by the State Director.<br>**Pipelines:**<br>Allow new pipelines through PHMAs: (1) within an RMP corridor currently authorized for that use or designated through future RMP amendments; or (2) constructed in or adjacent to existing utilities (buried and aboveground) or roads. Pipelines constructed in RMP corridors or adjacent to existing utilities or roads will require completion of a DDCT analysis for baseline data collection, but the project is not required to meet the threshold of 5 percent. However, within 6 months of the completion of construction, the project proponent will provide the authorized officer with as-built drawings so that the total | *(See above.)* |

| 2014/2015 Approved RMPs | 2019 Approved RMPs | Potential Change in 2023 Plan |
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| disturbance within PHMAs can be calculated annually. | disturbance within PHMAs can be calculated annually. | *(See above.)* |
| MD 6029: Manage 1,767,274 acres as ROW avoidance areas (Map 3-24).<br>Manage PHMAs as ROW avoidance areas for new ROW or SUA permits (799,391 acres). Within PHMAs where new ROWs/SUAs are necessary, locate new ROWs/SUAs within designated RMP corridors or adjacent to existing ROWs/SUAs where technically feasible. Subject to valid existing rights, including non-federal land inholdings, locate new, required ROWs/SUAs adjacent to existing ROWs/SUAs or where impacts to Greater Sage-Grouse are minimized.<br>Work with proponents to design ROW applications to protect Greater Sage-Grouse. | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |

| 2014/2015 Approved RMPs | 2019 Approved RMPs | Potential Change in 2023 Plan |
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| MD 6040: Allow temporary closures to motorized vehicle use in areas that pose public health and safety risks, and/or where resource damage is imminent. In PHMAs and GHMAs, temporary closures will be considered in accordance with 43 CFR subpart 8364 (Closures and Restrictions); 43 CFR subpart 8351 (Designated National Area); 43 CFR subpart 6302 (Use of Wilderness Areas, Prohibited Acts, and Penalties); 43 CFR subpart 8341 (Conditions of Use). Temporary closure or restriction orders under these authorities are enacted at the discretion of the authorized officer to resolve management conflicts and protect persons, property, and public lands and resources. Where an authorized officer determines that off-highway vehicles are causing or will cause considerable adverse effects upon soil, vegetation, wildlife, wildlife habitat, cultural resources, historical resources, threatened or endangered species, wilderness suitability, other authorized uses, or other resources, the affected areas shall be immediately closed to the type(s) of vehicle causing the adverse effect until the adverse effects are eliminated and measures implemented to prevent recurrence. (43 CFR 8341.2) A closure or restriction order should be considered only after other management strategies and alternatives have been explored. The duration of temporary closure or restriction orders should be limited to 24 months or less; however, certain situations may require longer closures and/or iterative temporary closures. This may include closure of routes or areas. | No changes made. | No change proposed. |
| MD 6054: Design recreational sites, recreation facility development, and recreational access to avoid riparian habitat areas or develop and manage them in a manner that minimizes effects on riparian habitats. Construction of recreation facilities within PHMA must conform with the avoidance and minimization measures of this plan. If it is determined that these conservation measures are inadequate for the conservation of Greater Sage-Grouse, the BLM will require and ensure compensatory mitigation that provides a net conservation gain to the species. | Design recreational sites, recreation facility development, and recreational access to avoid riparian habitat areas or develop and manage them in a manner that minimizes effects on riparian habitats. Construction of recreation facilities within PHMA must conform to the avoidance and minimization measures of this plan. If it is determined that these conservation measures are inadequate for the conservation of Greater Sage-Grouse, the BLM will consider mitigation consistent with the applicable State management strategy (currently Governor of Wyoming's Executive Order 2015-4 (see also MD 4152). | No change proposed. |

| 2014/2015 Approved RMPs | 2019 Approved RMPs | Potential Change in 2023 Plan |
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| **MD 6198: In cooperation, consultation, and coordination with permittees/lessees, cooperators, and interested public, develop and implement appropriate livestock grazing management actions to enhance land health, improve forage for livestock, and meet other multiple use objectives by using the *Wyoming Guidelines for Livestock Grazing Management*, other appropriate BMPs (see Appendix C, *Required Design Features and Best Management Practices* (p. 249)), and development of appropriate range improvements. The BLM will prioritize (1) the review of grazing permits/leases, in particular to determine if modification is necessary prior to renewal, and (2) the processing of grazing permits/leases in PHMAs. In setting workload priorities, precedence will be given to existing permits/leases in areas not meeting Land Health Standards, with focus on allotments containing riparian areas or wet meadows. The BLM may use other criteria for prioritization to respond to urgent natural resource concerns (e.g., wildfire) and legal obligations.<br>The BLM will collaborate with appropriate federal agencies, and the State of Wyoming as contemplated under EO 2013–3 (Wyoming Office of the Governor 2013), to 1) develop appropriate conservation objectives; (2) defined a framework for evaluating situations where Greater Sage-Grouse conservation objectives are not being achieved on federal land, to determine if a causal relationship exists between improper grazing (by wildlife or wild horses or livestock) and Greater Sage-Grouse conservation objectives; and 3) identify appropriate site-specific actions to achieve Greater Sage-Grouse conservation objectives within the framework. | In cooperation, consultation, and coordination with permittees/lessees, cooperators, and interested public, develop and implement appropriate livestock grazing management actions to enhance land health, improve forage for livestock, and meet other multiple use objectives by using the Wyoming Guidelines for Livestock Grazing Management, other appropriate BMPs (see 2019 Wyoming GrSG ARMPA Appendix B, Required Design Features and Best Management Practices), and development of appropriate range improvements. The BLM will prioritize (1) the review of grazing permits/leases, in particular to determine if modification is necessary prior to renewal, and (2) the processing of grazing permits/leases in PHMAs. In setting workload priorities, precedence will be given to existing permits/leases in areas not meeting Land Health Standards, with focus on allotments containing riparian areas or wet meadows. The BLM may use other criteria for prioritization to respond to urgent natural resource concerns (e.g., wildfire) and legal obligations.<br>The BLM will collaborate with appropriate federal agencies, and the State of Wyoming as contemplated under EO 2013–3 (Wyoming Office of the Governor 2013), to 1) develop appropriate conservation objectives; (2) defined a framework for evaluating situations where Greater Sage-Grouse conservation objectives are not being achieved on federal land, to determine if a causal relationship exists between improper grazing (by wildlife or wild horses or livestock) and Greater Sage-Grouse conservation objectives; and 3) identify appropriate site-specific actions to achieve Greater Sage-Grouse conservation objectives within the framework. | Potential change under Alternatives 3, 4, 5, and 6. |

| 2014/2015 Approved RMPs | 2019 Approved RMPs | Potential Change in 2023 Plan |
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| *MD 6202: Utilize a rangeland health assessment, resource monitoring, or analysis to determine if livestock grazing adjustments in amounts, kinds, or season are necessary. The NEPA analysis for renewals and modifications of livestock grazing permits/leases that include lands within PHMAs will include specific management thresholds based on Greater Sage-Grouse Habitat Objectives Table (Table 2.7, "Greater Sage-Grouse Seasonal Habitat Objectives" (p. 22)) and Land Health Standards (43 CFR 4180.2) and one or more defined responses that will allow the authorizing officer to make adjustments to livestock grazing that have already been subjected to NEPA analysis. Greater Sage-Grouse Habitat Objectives Table (Table 2.7, "Greater Sage-Grouse Seasonal Habitat Objectives" (p. 22)), Land Health Standards (43 CFR 4180.2) and ecological site potential, and one or more defined responses that will allow the authorizing officer to make adjustments to livestock grazing that have already been subjected to NEPA analysis. | Within PHMA, if monitoring data show the wildlife/special status species standard has not been met nor progress being made toward meeting that standard, there would be an evaluation and a determination made as to the cause. If it is determined that the current authorized livestock use is a significant causal factor in failing to achieve the wildlife/special status species standard~~s~~, the BLM would address the achievement or progress toward achieving the LHSs (43 CFR 4180.2) and, if needed, Greater Sage-Grouse habitat maintenance or improvement.<br>When NEPA analysis is required for a specific implementation action, one alternative would include mechanisms to make adjustments to meet or make progress toward meeting the wildlife/special status species standard. The analysis should also identify the BLM-approved data collection methodologies used for monitoring conditions and determining when adjustments are necessary. If current grazing management meets land health standards and provides for Greater Sage-Grouse habitat, there would be no need to analyze an alternative for Greater Sage-Grouse.<br>Authorized uses in PHMA that incorporate habitat objectives for Greater Sage-Grouse must develop desired conditions based on Greater Sage-Grouse habitats present in the allotment and the ecological potential of sites that supports these habitats. Metrics used to monitor for objectives must be developed and inform the wildlife/SSS portion of the Standards for Healthy Rangelands.<br>Within PHMA, seasonal habitat objectives for Greater Sage-Grouse apply only to those habitats delineated within an allotment during the specific season (e.g., breeding season objectives during breeding season). Data needed to inform the relationship between the authorized use and habitat condition would come from sample locations that appropriately reflect the impact of the authorized use on habitat conditions. Data points should fall within Greater Sage-Grouse seasonal habitat areas and be collected on ecological sites that have the potential to produce Greater Sage-Grouse habitat. | Potential change under Alternatives 3, 4, 5, and 6. |

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| MD 6214: Allotments within PHMAs, focusing on those containing riparian areas, including wet meadows, will be prioritized for field checks to help ensure compliance with the terms and conditions of the grazing permits. Field checks could include monitoring for actual use, utilization, and use supervision. | No changes made. | Potential change under Alternatives 3, 4, 5, and 6. |

### 2.20.2 Relevant Appendices

The following table shows which appendices from the 2015 and 2019 plans have management direction that may change through this RMP amendment. If 2019 is not listed in the year, then no change was made to the appendix between the 2015 and 2019 plans. The 2015 Appendices can be found on the Bighorn Basin RMP ePlanning website. The 2019 Appendices can be found on the Wyoming GRSG ePlanning website.

| ARMPA Appendix Name | Year | Potential for Change in 2023 Plan |
|---|---|---|
| A: Maps | 2015 | Yes |
| A: Approved RMP Amendment with Management Goals, Objectives, and Decisions | 2019 | Yes |
| B: Oil and Gas Lease Notices and Lease Stipulations; including Exception, Modification, and Waiver Criteria | 2015 | Yes |
| C: Required Design Features and Best Management Practices | 2015 | Yes |
| B: Required Design Features | 2019 | Yes |
| D: Greater Sage-Grouse Habitat Management Strategy | 2015 | Yes |
| C: Greater Sage-Grouse Habitat Management Strategy | 2019 | Yes |
| E: Laws, Regulations, Policies, and Guidance | 2015 | No |
| F: Wyoming Bureau of Land Management Mitigation Guidelines for Surface-Disturbing and Disruptive Activities | 2015 | No |
| G: Federal Oil and Gas Operations on Split-Estate Lands | 2015 | No |
| H: Monitoring and Evaluation | 2015 | No |
| I: Land Disposal and Acquisition | 2015 | No |
| J: Recreation Management | 2015 | No |
| K: Biological Opinion | 2015 | No |
| L: Implementation | 2015 | No |
| M: Bighorn Basin Air Resource Management Plan | 2015 | No |
| N: Seasonal Raptor Stipulations for All Surface-Disturbing and Disruptive Activities | 2015 | No |
| O: Livestock Grazing | 2015 | No |
| P: Final Environmental Impact Statement and Record of Decision Crosswalk Tables | 2015 | No |

# Appendix 3

## Greater Sage-Grouse Habitat Management Area State-by-State Mapping Strategies

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# Appendix 3. Greater Sage-Grouse Habitat Management Area State-by-State Mapping Strategies

New spatial information published since 2015 provided additional data for revision of habitat management area boundaries that may provide for increased conservation of GRSG. This information included GRSG habitat persistence Wann et al., 2022), habitat and genetic connectivity (Cross et al., 2018, Row et al., 2018, Cross et al., 2022, Oyler-McCance et al., 2022), GRSG distribution (Doherty et al., 2016, Coates et al., 2021) and likelihood of sagebrush habitat persistence under changing climatic conditions (Palmquist et al., 2021, Rigge et al., 2021). The BLM reviewed this new data and coordinated with state wildlife agencies to consider adjustments to the habitat management areas to enhance GRSG conservation. Some states (OR, NV, WY) were already in the process of updating habitat management area delineations based on local data and the BLM worked closely with these states to consider all data in these revisions. Descriptions of efforts in each state within the planning area are provided below.

## 3.1 COLORADO

The BLM has incorporated Habitat Management Area (HMA) boundaries submitted by Colorado Parks and Wildlife (CPW) into the mapping efforts for the Greater Sage-Grouse Resource Management Plan Amendment effort. BLM Colorado relies on CPW's expertise as the state wildlife agency to map greater sage-grouse (GRSG) habitat using the best available science. The revised habitat Priority Habitat Management Area (PHMA) and General Habitat Management Area (GHMA) boundaries currently represent the best-known habitat delineations of GRSG habitat in Colorado.

The definitions of PHMA and GHMA have not changed since initially defined in the 2015 ARMPA. PHMAs have been identified as having the highest conservation value to maintaining sustainable GRSG populations. they include breeding, late brood-rearing, and winter concentration areas. The BLM has identified these areas in coordination with CPW. GHMAs are areas of seasonal or year-round GRSG habitat outside of priority habitat. The BLM has identified these areas in coordination with CPW. In Colorado, the BLM and CPW incorporate an additional category, Linkage Management Areas (LMA) which were previously referred to as Linkage Connectivity Habitat Management Areas (LCHMAs) in the 2015 and 2019 ARMPAs. LMAs have been identified as broader regions of connectivity important to facilitate the movement of GRSG and maintain ecological processes, though they are not considered occupied habitat (Colorado Greater Sage-grouse Steering Committee, 2008). The BLM has removed the terms 'connectivity' and 'habitat' from the classification to reduce confusion with other applications of the term connectivity. Similarly, these areas are not considered occupied habitat though they might still contain sagebrush or associated vegetation communities that could serve as stop over points for grouse moving between populations. More information on the background and mapping methodology for LMAs can be found in the Colorado Sage-Grouse Conservation Plan (Colorado Greater Sage-grouse Steering Committee, 2008).

Prior to the current planning process, the BLM and CPW adopted refined HMA maps based on the modeling efforts of Olsson Consultants on behalf of the Associated Governments of Northwest Colorado (DOI-BLM-CO-S000-2020-0003-CX). The multi-year (2016-2019) collaborative mapping process refined the previously mapped areas to remove non-habitat in HMAs or expand areas with documented GRSG use. The 2019 re-

mapping effort incorporated state-specific, timely research and mapping tools. For the full methodology, see Olsson Project No. 016-516 (2019).

The refined HMA (2019) dataset was created by preparing fine-scale population-specific Species Distribution Models (SDMs) to map revised PHMA and GHMA areas for each of the six GRSG populations within the current occupied range of Colorado. First, known presence locations of marked GRSG were used to train Random Forest and Resource Selection Function (RSF) models to estimate seasonal (e.g., breeding, summer-fall and winter) habitat suitability. Secondly, the seasonal model results were classified into high or low habitat suitability categories and subsequently compiled to produce a year-round habitat suitability map. Third, the resulting year-round habitat suitability maps were used to develop revised PHMA and GHMA areas for each population. All areas classified as highly suitable habitat in each population's year-round classified habitat layer were classified as PHMA, while the remaining low habitat suitability areas were classified as GHMA. Finally, the current occupied range for each population was modified to exclude areas identified as unsuitable habitats (Olsson 2019). CPW reviewed the dataset and made minor modifications to include areas outside of previously mapped occupied range where evidence of GRSG occupancy exists. The BLM made slight modifications to the dataset by incorporating a minimum mapping unit and snapping the GIS layers to the state boundary. The 2019 mapping update did not model or adjust LMA boundaries.

During the current planning effort, the BLM coordinated with CPW to review the previous HMA compared to new data that became available since 2015. The BLM and CPW also coordinated with the wildlife agencies from Wyoming and Utah to determine if there was relevant cross-border information. The BLM and CPW revised two areas in the Northwest CO population to incorporate new (2017-2022) lek count data and to incorporate GRSG location data provided by Utah Division of Wildlife Resources. The updates resulted in approximately 49,000 acres of previously mapped GHMA becoming PHMA and 1,400 acres of previously unmapped areas becoming GHMA.

Alternative 1 uses the refined HMA (2019) dataset that was incorporated into the 2015 Northwest Colorado GRSG ARMPA via plan maintenance action. Alternative 2 uses the previous HMA dataset that was originally used for the 2015 and 2019 ARMPAs. Because of the timing of the preliminary injunction for the 2019 ARMPA, the BLM only applied the maintenance action and updated maps to the 2015 ARMPA.

Alternatives 4, 5, and 6 incorporate the most recent lek count and telemetry data from both Colorado and adjacent states. Based on these data, approximately 49,000 acres of previously mapped GHMA would be classified as PHMA and 1,400 acres of previously unmapped areas would be classified as GHMA. Both changes occur in the Northwest Colorado population. They difference between alternative 1 and alternatives 4, 5, and 6 is a 4.2% increase of PHMA in Northwest Colorado resulting in a 2.6% increase of PHMA in all of Colorado. The portion of previously unmapped area that would be classified as GHMA represents a 0.05% increase of total habitat management area extent in the Northwest Colorado population.

Alternative 3 represents the total habitat management area extent of alternatives 4, 5, and 6 but PHMA and GHMA would both be classified as PHMA. Alternative 3 includes the 1,400 acres of previously unmapped area in the Northwest Colorado population and therefore has a larger spatial extent than Alternative 1.

Compared to all other alternatives, alternative 2 includes the highest acreage because many of the interior areas of non-habitat had not been removed. However, there are some areas where the most recent data indicate GRSG use that would not be captured by the alternative 2 HMAs. Using the HMAs in alternative 2 would require more on-the-ground verification and more plan criteria that addresses non-habitat.

Alternatives 1, 4, 5, and 6 still require implementation-level verification but represent a more accurate depiction of GRSG habitat in Colorado. Alternatives 3, 4, 5, and 6 incorporate the most recent GRSG data.

## 3.2 IDAHO

BLM Idaho reviewed and revised HMAs for Alternatives 3, 4, 5, and 6 due to the availability of new data on GRSG, vegetation, and new range wide science on GRSG. BLM Idaho worked closely with Idaho's Governor's Office of Species Conservation (OSC), the Idaho Department of Fish and Game (IDFG), and other cooperating agencies during the review and revisions. First, IDFG worked to revise the extent of HMA based on biology, i.e. GRSG observations and habitat. Second, BLM Idaho reviewed HMA revisions as well as new range wide science and made HMA designations based on the 2015 Idaho-Southwest Montana Approved Resource Management Plan Amendment (ARMPA) for Alternatives 3 and 4. Third, the State of Idaho (OSC, IDFG) independently reviewed 2015 HMAs and new information including the modified HMA extent from Alternatives 3 and 4 and solicited input from stakeholders and other State agencies. The State provided BLM Idaho an initial draft in early May and a final draft in late September, taking into account the above input and assigning HMA designations based on definitions from the Idaho 2021 Plan (State of Idaho 2021). BLM used the State of Idaho's final draft for HMA designations for Alternatives 5 and 6.

### 3.2.1 Data Sources

Data sources used during HMA review and revisions for all alternatives included:

- **GRSG observations and population data:**
  - Lek survey data
  - Idaho breeding bird density (IDFG 2020)
  - GPS and VHF radiotelemetry studies, including individual movements and connectivity areas between seasonal ranges
  - Other reliable observations of unmarked birds since 2000 (e.g. incidental observations during targeted sage-grouse surveys and big game aerial surveys, falconry reports)
- **GRSG habitat models:**
  - General Habitat Suitability Index (HSI; seasons pooled) (IDFG 2018, 2019a)
  - Winter habitat suitability model (IDFG 2019b)
  - Late Brood-rearing (LBR) habitat suitability model (IDFG 2019b)
  - Spring habitat suitability model (IDFG 2019b)
  - GRSG breeding habitat (Doherty et al. 2016)
  - Craters of the Moon (CRMO) Sage-Grouse Habitat (Univ of Idaho and NPS 2018)
- **Remote sensing habitat models:**
  - Sagebrush cover (Rangeland Condition Monitoring Assessment and Projection [RCMAP] 2020, 2021)
  - Tree canopy cover (Rangeland Analysis Platform [RAP] 2021; Allred et al. 2021)
  - Annual grass cover (RCMAP 2020)
- **Other data:**
  - Fire history; perimeters through 2021 (BLM, NIFC data)
  - Visual interpretation of ortho-imagery (e.g., 2021 NAIP [OCM Partners 2023], Google Earth imagery)
  - Anthropogenic features from the Idaho Sage-grouse Habitat Quantification Tool

Additional data sources used for Alternative 4 included:

- **New range wide science on GRSG**
  - GRSG breeding bird density (Doherty et al. 2016)
  - GRSG lek persistence (Wann et al. 2023)
  - Genetic connectivity (Row et al. 2018, Cross et al. 2023)
  - Sagebrush Conservation Design tool (Doherty et al. 2022)

### 3.2.2 Methods

#### *HMA background for Alternatives 3, 4, 5, and 6*

First, IDFG revised the extent of HMA using the 2015 HMA as a base map and revised HMA based on direct evidence of habitat use (i.e., locations of observations) or a body of evidence that predicts GRSG space use irrespective of land ownership. Habitat was delineated using the best available science from the data sources listed above.

*HMA Additions.* In general, HMA was added if an area met one or more of the following criteria: documented GRSG observations, ≥ 3 models predicted suitable habitat, known winter or summer seasonal distributions, suitable (≥ 8%) sagebrush cover, and low (< 30%) tree canopy cover. With few exceptions, additions were located within a 10-km buffer of occupied and pending leks (i.e., 2022 management status). This criterion was a means to exclude seemingly good sagebrush habitat that appeared to be unoccupied.

*HMA Subtractions.* Areas that were subtracted from the 2015 HMA map generally lacked GRSG observations, had low habitat model agreement (< 3 models), low sagebrush cover and/or high tree canopy cover and annual grass cover (> 20%). Non-habitat areas were generally removed from the margins, whereas some small gaps of non-habitat within existing HMAs were filled, particularly if near GRSG observations. Occupied areas subject to more recent disturbance were not subtracted, particularly if they were expected to recover naturally or through restoration and are adjacent to quality habitat.

A concerted effort was made to consistently represent habitat across the state, and rationales were developed to justify additions and subtractions. Local experts were consulted as needed. The new 'biology map' was used for the HMA extent for Alternatives 3 and 4 and an early draft of Alternatives 5 and 6.

#### *HMA for Alternative 4*

For HMA designations under Alternative 4, BLM Idaho evaluated the GRSG biology map's proposed additions and subtractions, and the new range wide science on GRSG and designated HMA based on the 2015 ARMPA definitions:

**PHMA (Priority):** BLM-administered lands identified as having the highest value to maintaining sustainable GRSG populations. Areas of PHMA largely coincide with areas identified as priority areas for conservation in the United States Fish and Wildlife (USFWS) Conservation Objectives Team (COT) report. These areas include breeding, late brood-rearing, winter concentration areas, and migration or connectivity corridors.

**IHMA (Important):** BLM-administered lands that provide a management buffer for PHMA and connect patches of PHMA. IHMA encompass areas of generally moderate to high conservation value habitat and populations but that are not as important as PHMA.

**GHMA (General):** BLM-administered lands where some special management will apply to sustain GRSG populations; areas of occupied seasonal or year-round habitat outside of PHMA or IHMA.

Efforts were made to protect PHMA by a) avoiding isolating or fragmenting large blocks of PHMA, and b) applying new range-wide science, i.e. lek persistence, breeding bird density, genetic connectivity. To focus on areas with high conservation value based on the new science, BLM Idaho combined the following data layers: lek persistence (medium or high; Wann et al 2022), breeding bird density (50 and 25 relative percentage of the population and the highest densities of breeding birds; Doherty et al. 2016); and genetic connectivity (> 90% or > 95%; Cross et al. 2023). This resulted in a raster layer with values ranging from 0 to 6. Any areas classified as 3 or higher by this model were compared with the existing HMA designation. If these areas were not in PHMA, new polygons were drawn, generally following the extent of values ≥ 4, or corresponding to either two of the three layers (lek persistence, breeding bird density, Priority Genetic Pathways). In some instances, the polygon boundary was refined with information from the Key Habitat map or aerial imagery. Areas with high tree cover (≥ 30%) or high annual grass cover (≥ 20%) were excluded from additional areas of high conservation value and were not added to PHMA.

### *HMA for Alternatives 5 and 6*

For these alternatives, the BLM used HMA boundaries for GRSG provided by the State of Idaho for consideration in the LUP effort. This map was created by the IDFG and OSC to assist the BLM in their land use planning effort initiated in 2021 (86 FR 66331).

Consistent with the other alternatives, the State's map for alternative 5 (and alternative 6) adopts a 3-tiered habitat zoning strategy – PHMA, IHMA, and GHMA - to represent a management continuum strategy for GRSG conservation (see the 2021 Idaho Plan for more details, available at https://species.idaho.gov/wildlife-species/greater-sage-grouse/).

This HMA map was based on IDFG's "Biology Map" (version 03/08/2023), which describes GRSG habitat extent (i.e., space use) in Idaho, with the BLM's 2019 GRSG HMA applied. Between draft and final HMA maps, the State of Idaho refined the HMA extent further. HMAs were updated using new science and state policy direction. HMA types reflect breeding bird density (indexed by male lek attendance), habitat quality (suitability, the extent, configuration, and degree of fragmentation), GRSG occupancy and movements patterns. Data sources used are those listed under GRSG observations, Habitat suitability models, and remote sensing habitat models (see details listed above).

In general, PHMA encompassed high and medium-high BBD (25-50%), large areas of intact, habitat (medium and high HSI, high sagebrush cover (>8%), low tree canopy cover (<30%), and low annual herbaceous cover (<20%)), important connectivity and seasonal habitat, especially winter, as evidenced by telemetry locations, and a lack of disturbance (e.g., fire, anthropogenic features). IHMA serves to connect and buffer PHMA and encompassed slightly lower quality and/or more fragmented habitat, with lower BBD (50-100%). GHMA encompassed the lowest quality habitat and BBD (100% or outside the 10km occupied lek buffers) and mesic habitats used in summer (e.g., wet meadows, alfalfa fields).

When information was lacking, best professional judgments were made. There were a few exceptions to these general rules concerning policy (e.g., special community values) and land ownership. Other science products were referenced, e.g., lek persistence, landscape importance, sagebrush ecological integrity, and genetic connectivity models, but these were not primary decision support tools.

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## 3.3 MONTANA/DAKOTAS

In the Montana-Dakotas portion of their range, GRSG are found in southwestern Montana and across eastern Montana from the Canadian to the Wyoming border, as well as in northwestern South Dakota, and southwestern North Dakota. In Montana, there are about 1,000 confirmed active GRSG leks, out of 1,892 known lek locations (MT FWP 2022). The number of confirmed active leks has grown since 2002 as survey efforts have identified new leks and have been able to identify the status of unconfirmed leks. The Dakotas are on the far eastern edge of GRSG range and the two states' populations are considered at a higher risk of extirpation because of their small numbers and isolation. GRSG in the Dakotas form a population connected to areas in eastern Montana and northeast Wyoming, though it is unclear how many birds move between the states (Cross et al. 2016, Row et al. 2018, Oyler-McCance et al. 2022). In addition, GRSG may reside near (within a handful of miles) their spring breeding grounds, leks, or undertake migratory movements between seasonal habitats. Differences between seasonal movements across the range may be driven by weather, juxtaposition of seasonal habitats, and other factors. Therefore, to account for differences between states and GRSG populations, the strategy for identifying HMAs, in cooperation with state natural resource entities, varies both among the three states, and across Montana.

In Montana, the Governor's Executive Order (EO) 12-2015 delineated core areas, general habitat, and connectivity habitat. Core areas capture the leks for 75-80% of displaying males and associated breeding and other seasonal habitats. These areas are considered the highest conservation priority. General Habitat, therefore, contains about 1/5 of the displaying males and is also an important component. The EO states, "Development scenarios in General Habitat are more flexible than in Core Areas, but should still be designed and managed to maintain populations, habitats, and essential migration routes, since this Conservation Strategy requires habitat connectivity and movement between populations in Core Areas." The Montana EO also identifies connectivity habitat, specifically a corridor where birds move from spring and summer areas close to the Canadian border to wintering areas farther south in Valley County.

Conversely, both North and South Dakota use a different approach than Montana to account for fewer leks, small populations sizes, and being found on the periphery of the range. Both states included all active leks (known breeding population) in their core areas. In South Dakota, active leks were buffered by 4 mi (6.4km) and in North Dakota 5.3m (8.5km) to capture breeding areas and habitat (SD GF&P 2022, NDG&F 2014). Then these buffered areas were refined to account for large areas of non-habitat, bird location information, resource selection functions, and expert opinion (along with collaboration with neighboring states and the BLM). In 2022, the State of SD Game, Fish, and Parks released a new GRSG Action Plan with update core areas accounting for new GRSG movement data.

In the 2015 GRSG Plans in MT-Dakotas, BLM used the core areas from the three states and general habitat from Montana as a starting point to identify HMAs. BLM designated Priority, Restoration, and General HMAs

(PHMA, RHMA, and GHMA). Primarily PHMA is equivalent to the state identified core areas. Two main differences exist, first small adjustments were made during the planning process based on cooperating agency and public input to identify PHMA in some areas. Second, the BLM designated some core areas as RHMA, where there were ongoing or imminent impacts to these high-quality habitats to emphasize the long-term restoration needs. The objectives for these areas include restoring habitat in order to provide the ability for establishing or enhancing GRSG populations. In Montana the EO general habitat was used as a starting point to identify GHMA, and individual plans worked with local experts and stakeholders to refine these, as needed. To identify general habitat in North and South Dakota the BLM used the current occupied range, along with local vegetation mapping and biologists' opinion, to account for areas where there is limited evidence of breeding habitat but known seasonal or sporadic use by GRSG.

To create HMAs for this current planning effort the BLM built off these prior efforts and again engaged cooperating agencies and stakeholders in the process. The BLM combined local knowledge, experience since the 2015 plans, and updated state information to compliment and provide context to new range wide and management zone habitat modeling efforts. The new GRSG science was used to identify areas to consider emphasizing based on management zone or range wide importance, and to refine the type, quality, and location of habitat areas. Throughout the process the BLM sought consistency, as appropriate and supported, with state natural resource entity core and general (also connectivity in MT) habitat areas. The two types of possible changes to be made in the range of alternatives by considering new information since prior planning efforts are: First, areas that should be added (or omitted) that provide (or do not) habitat for GRSG; and Second, what changes to HMA types should be made across Montana-Dakotas. HMAs are delineated as approximate boundaries and representations of habitat, utilize models and coarse grain data, and don't account for the dynamic nature of GRSG populations. Therefore, habitat characteristics should be verified with local data and efforts and there may be areas of non-habitat contained within HMAs.

The BLM considered designating (including new areas and adjustments) four types of HMAs. These include the 2015 types, PHMA, RHMA, and GHMA, and an additional HMA called Connectivity (CHMA) to capture unique, potential migration areas, particularly in silver sage habitat. Priority habitat (PHMA) includes areas with relatively limited impacts and containing substantial and high-quality habitat. These areas have been identified as having the highest conservation value to maintaining sustainable GRSG populations or maintaining the extent of the GRSG range. Restoration Habitat (RHMA) are areas with ongoing or imminent impacts that recently (i.e., in the 21st Century) contained substantial and high-quality GRSG habitat. In general, these areas differ from other HMAs as the BLM is identifying separate management actions to emphasize restoring habitat to establish or enhance GRSG populations. General habitat (GHMA) are areas with or without ongoing or imminent impacts containing seasonal or year-round habitat outside other HMA, including for the purpose of promoting movement and genetic diversity. Finally, Connectivity Habitat (CHMA) are areas that provide regions of connectivity important to facilitate the movement of GRSG and maintain ecological processes. While typically unoccupied or with inactive leks, this HMA boundary represents where stopover sites may exist, likely within a matrix of degraded or converted habitat or non-habitat, particularly in silver sagebrush habitats in northern Montana.

In both Alternatives 1 and 2 HMAs are the 2015 designations, as MT/Dak was not part of the 2019 plan amendments. In these alternatives two areas of the state with known GRSG habitat do not have designated HMAs because the Butte Field Office and the Upper Missouri River Breaks National Monument (UMRBNM) were not part of the 2015 planning effort. While there are no designated HMAs for Butte and UMRBNM these RMPs contain GRSG related objectives and management actions. While there are some differences between the MT EO habitat boundaries and the BLM 2015 GRSG Plan HMAs, the proportion of birds found

in different habitat types remains similar. BLM PHMA and RHMA boundaries encompass 75-80% of known displaying males (similar to core areas) with the remaining 1/5 to 1/4 of the state population found in GHMA (similar to general habitat). In North and South Dakota BLM PHMA matches the core habitat identified by those states at the time, capturing the majority of breeding habitat for all known active leks.

Alternative 3 considers HMA boundary adjustments to the 2015 plans, utilizing those HMAs as a starting point. Changes account for areas of GRSG habitat or leks identified since 2015, removal of areas that are not, and highly unlikely to be, occupied in the future and state identified connectivity habitats in Montana. This alternative would consider the same management across all HMAs, (i.e., all occupied HMAs as PHMA), therefore changes are focused on refining the extent of habitat. Through the planning process the BLM identified that in North Dakota and South Dakota GRSG habitat extent has not changed since 2015 Records of Decision (RODs). In Montana the BLM added in areas of habitat mapped by MT FWP where there is evidence of use, while also removing areas designated by the BLM in 2015 but are not considered GRSG habitat by MT Fish, Wildlife, and Parks (FWP) or based on multiple lines of evidence are not GRSG habitat. In addition, habitat in Butte and UMRBNM was included as HMAs. Finally, due to the unique behavior of GRSG in silver sage habitat (in the Havre, Malta, and Glasgow Field Offices under the HiLine RMP) the BLM mapped and designated Connectivity habitat (CHMA). These areas included state connectivity habitat as well as additional areas that may also provide for GRSG movement between known populations. All changes were made by considering local knowledge, cooperating agency input, and multiple sources of information, e.g., based on the preponderance of evidence.

For Alternative 4, 5 and 6 the outer boundaries (extent) for these alternatives remains the same as determined in Alternative 3. In addition, HMA designation do not vary between the alternatives 4, 5 and 6. The CHMA areas identified in Alternative 3 were included in 4, 5 and 6 as well. The criteria used to consider adjustment from prior HMA designations was to improve consistency between BLM field offices, between BLM and state delineations, and between states (including Idaho and Wyoming), while accounting for new science and on-the-ground knowledge to consider adjustments to HMA boundaries. In some instances, meeting all criteria was not possible, as aspects were in conflict (e.g., consistency between multiple entities). The BLM weighed these various inputs and utilized the preponderance of evidence to designate HMA types. Overall, the goal is that changes are supported with a sound rationale including relevant biological and/or management considerations. The types of changes made in comparison with Alternative 1 and 2 HMAs include switching between RHMA and PHMA (where different management was not needed or for consistency across boundaries), changing GHMA to PHMA (areas of regional importance and for consistency with the state core areas or across state borders), switching GHMA to CHMA or identifying new CHMA (areas where habitat remains that may be important for movement), and changing PHMA to GHMA (improved consistency with state core areas). The proportion of breeding birds in HMAs among the three states remain about the same as Alternatives 1 and 2, with around 80% of birds (breeding habitat) in PHMA in Montana, whereas all known leks are within PHMA in North and South Dakota.

Consistent definitions are needed for HMAs in Montana/Dakotas due to variations in language between existing plans, lack of CHMA definitions in Alternatives 1 and 2, and to apply HMA definitions in the Upper Missouri River Breaks National Monument and Butte RMPs. HMAs would be defined in all applicable action alternatives as:

**PHMA**: Areas with limited impacts containing substantial and high quality GRSG habitat that have been identified as having the highest conservation value to maintaining both sustainable sage-grouse populations and the range of GRSG. Management actions would emphasize the protection and enhancement of GRSG.

Areas are delineated using mapped state core areas, GRSG density/habitat models, genetic connectivity information, and other resource information that the BLM has identified in coordination with respective state and federal agencies. HMAs are delineated as approximate boundaries and representations of habitat, and therefore there may be areas of non-habitat contained within.

**RHMA**: Areas with ongoing or imminent anthropogenic impacts that recently (i.e. in the 21st Century) contained substantial and high-quality GRSG habitat and/or supported high density sustainable GRSG populations. Management actions would emphasize restoring habitat in order to provide the ability for establishing or enhancing GRSG populations to sustainable, dense levels. Areas are delineated using mapped state core areas, GRSG density/habitat models, genetic connectivity information other resource information, and human disturbance/footprint data. HMAs are delineated as approximate boundaries and representations of habitat, and therefore there may be areas of non-habitat contained within.

**GHMA**: Areas with or without ongoing or imminent impacts containing seasonal or year-round habitat outside other habitat management areas, including for the purpose of promoting movement and genetic diversity. Management actions will maintain, enhance, or restore habitat for GRSG. HMAs are delineated as approximate boundaries and representations of habitat, and therefore include potential or unoccupied habitat and may contain areas of non-habitat.

**CHMA**: Areas that provide regions of connectivity important to facilitate the movement of GRSG and maintain ecological processes, including between priority populations, adjacent states, and across international borders. This HMA boundary represents where stopover sites may exist, likely within a matrix of degraded or converted habitat or non-habitat. Areas are delineated using results from analyses of seasonal migratory movements and habitat characteristics conducive to movements, particularly between silver sagebrush and big sagebrush habitats.

## 3.4 NEVADA/CALIFORNIA

Greater Sage-Grouse Habitat Management Area (HMA) delineation in BLM's resource management plans (RMPs) in Nevada and northeastern California is informed by a science-based modeling process. As a summary, the model is informed by the following: resource selection information informed by telemetry locations from radio-marked greater sage-grouse (GRSG); the relationship of those telemetry points with associated habitat characteristics such as land cover composition, water resources, habitat configuration, elevation, and topography (each at multiple spatial scales related to the observed GRSG movement patterns); and a space use index based on GRSG breeding densities at leks. The modeled combination of these habitat characteristics and site use resulted in a model output of potential management prioritization scenarios (e.g., Priority, General and Other Habitat Management Area categories). The strength of using this model to identify the Habitat Management Areas (HMAs) is that it can be updated as new data become available.

Following the USFWS 2010 finding (75 Fed. Reg. 13910 [Mar. 23, 2010]) that the listing of GRSG was warranted but precluded and that regulatory mechanisms to protect the species were lacking, both the BLM and State of Nevada began planning processes to increase conservation and management of GRSG and its habitat. In 2013, there was a coordinated decision between the BLM, State of Nevada and US Forest Service (USFS) to develop a single science-based HMA delineation process (https://www.blm.gov/press-release/greater-sage-grouse-maps-available-public-comment) that coalesced in 2014 with the USGS publication: Spatially explicit modeling of greater sage-grouse (Centrocercus urophasianus) habitat in Nevada and northeastern California: a decision-support tool for management (Coates et al. 2014).

Mapping efforts prior to this publication varied widely as seen in the 2013 Nevada and Northeastern California GRSG Proposed Land Use Plan Amendment and Draft Environmental Impact Statement (2013 DEIS). In that document, the HMA maps in the BLM's Preferred Alternative and the State's Alternative differed by over 34 million acres in the management categories that were to become Priority, General and Other HMAs and included a nearly 5-million-acre difference for Priority and General HMAs (combined). This was due to each agency using differing strategies to identify the important GRSG areas, as well as lack of a consistent mapping approach. Following the release of the 2013 DEIS, the Sagebrush Ecosystem Program provided BLM with the 2014 Nevada Greater Sage-grouse Conservation Plan, which included an HMA map for use in the State's Alternative and for consideration by BLM and USFS in developing the Proposed Alternative in the 2015 Final EIS (2015 FEIS). Ultimately, the state and federal maps were both based on the 2014 USGS model and associated publication and were similar, but not identical. The main differences between these maps were the naming convention for HMA categories and inclusion of Sagebrush Focal Areas in the BLM's Proposed Alternative. In terms of HMA acres, the Proposed Alternative included about 1.2 million, or five percent, more than the State's Alternative within the 23-million-acre management area.

A central strength of adopting a science-based strategy, and challenge for management, is that science continues to improve over time as additional information is collected and new mapping products and techniques become available. The need to update the map as new information became available was disclosed and discussed throughout the 2013 DEIS, 2015 FEIS and ROD, and Nevada's Sage-grouse Conservation Plan. Following September publication of BLM's 2015 ROD, the Sagebrush Ecosystem Program (SEP) adopted a new State map (on December 11, 2015) that included the results of an updated version of the 2014 HMA model (Coates et al., 2016) and removed modeled HMA that fell outside of the Nevada Department of Wildlife's Population Management Unit boundaries.

On September 23, 2015, Western Exploration LLC and several additional plaintiffs filed a complaint seeking judicial review of the BLM and USFS actions under the Administrative Procedure Act, 5 U.S.C. § 706. While litigation continued, BLM was not able to update the HMA map included in the 2015 ROD to reflect changes made in the State of Nevada's HMA map. On March 31, 2017, the court ordered the BLM to conduct supplemental NEPA analysis to evaluate substantial changes between the 2013 DEIS and 2015 FEIS, including the addition of SFAs and their management, while not supporting other claims.

On October 11, 2017, BLM released a Notice of Intent to consider the possibility of amending some, all or none of the BLM land use plans that were amended or revised in 2014 and 2015 regarding GRSG conservation. This effort resulted in targeted amendments to BLM RMPs through the March 2019 ROD. Through this planning effort, the Nevada and Northeastern California Sub-region updated BLM's HMA map to match the State of Nevada's map within Nevada. However, these updates could not be completed in California where updated satellite imagery was not available during the USGS 2016 model update. USGS later updated the model to include new imagery of lands in California (Brussee et al., 2019).

On October 16, 2019, the U.S. District Court for the District of Idaho issued a preliminarily injunction, temporarily preventing the BLM from implementing the 2019 amendments, but did not vacate them. Since the 2019 plans were temporarily enjoined, the BLM reverted to the HMA map included in the 2015 ARMPA. Consistent with the intent of the BLM's decision to identify GRSG HMAs using the USGS model, the BLM updated the HMA map for Nevada and California through a plan maintenance action in 2022. This action allowed the Nevada BLM and the State of Nevada to use the same HMA map and for the California BLM to incorporate the 2019 model results into HMAs in California.

In late 2022, the BLM worked with the USGS and other state, local, and federal partners to begin updating the 2016 HMA model. This update is consistent with the approach from the previous two efforts while also incorporating new data and information related to habitat selection and space use. It also includes survival rates during reproductive life stages and specific seasons (e.g., brood-rearing or winter) and identifies corridors that link seasonal habitats. This update allows areas of high importance to current population dynamics (i.e., source areas) to be mapped. The final version of the USGS HMA model was not published in time for inclusion in the BLM's 2024 Draft EIS. However, USGS provided BLM with unpublished results for use in preparing the Draft EIS range of alternatives and impact analyses. This ensured that the BLM was using the best science available at the time.

Within this EIS, the HMA maps for NV/CA differ by Alternative. The HMA map in Alternative 1 displays management areas as identified in the maintained 2015 ARMPA. Maintenance Action # 5 (BLM 2022) updated the 2015 ARMPA HMA with information USGS published in 2016 and 2019 (Coates et al., 2106, Brussee et al., 2019). Alternative 2 uses HMA delineations as presented in the 2019 ARMPA. Alternative 3 uses the draft results of the updated model (Milligan et al. 2024 (in review)) but treats all categories of HMA as PHMA. Alternative 4 also uses the draft results of the updated model and includes all three HMA categories (areas identified as PHMA+ by USGS are merged with PHMA). Alternative 5 takes into consideration the Population Management Units (PMUs) defined by NDOW and uses the same HMA results as Alternative 4 within these units. Areas identified by the USGS model that are outside of PMUs have not been occupied by grouse for decades and are not included in the State's management of the population. Despite providing landscapes characteristics that are likely consistent with GRSG habitat, these areas are not considered important to population persistence. In terms of HMA, Alternative 6 is the same as Alternative 5. The difference between Alternatives 5 and 6 is the inclusion of ACEC in Alternative 6.

The unpublished results that BLM used for this Draft EIS includes more than six years of additional field data collected since the last published version (Coates et al., 2016) and advances in methodology to produce the HMA model (Milligan et al. 2024 (in review)). It represents an estimate of how HMA model results may change as the model continues to be refined. It is anticipated that the final published model, associated maps, and documentation will be available during the spring of 2024; the BLM intends to incorporate the final published version into the Final EIS. There will likely be differences in the spatial distribution of HMAs between the Draft EIS version and the final published version. This iterative evolution is anticipated as addressed in both the 2015 and 2019 RODs that focus on using the results of the model as the primary tool to identify alignment of GRSG HMAs. These anticipated updates are also consistent with the BLM using the best available information to consider decisions, as well as Congress' direction that the BLM maintain and use updated inventories of public land resources as part of the planning process.

Not all areas within HMAs will include characteristics associated with GRSG habitat. For example, areas of connectivity between seasonal habitats or areas recovering from fire might not support vegetation used by GRSG but these areas will be included in HMAs. Mapping errors are also anticipated to occur with HMA maps and the BLM provides mechanisms to correct those errors when encountered within this current planning process (2024 DEIS).

Within the USGS modeling framework, Priority HMA is defined as: 1) areas with relatively high habitat selection index (HSI) and relatively high likelihood of occupancy, or 2) source areas, which were defined as high selection and high survival during reproductive life stages, that were outside of areas of high occupancy. General HMA includes those areas of: 1) relatively high HSI but low occupancy, 2) relatively low HSI but high occupancy, or 3) relatively low HSI corridors that connect seasonal priority habitats (i.e., nesting areas

around leks to brood-rearing source areas). Areas with moderate to low HSI and low evidence of occupancy were included as Other HMA.

The BLM's definitions for HMA are as follows:

**Priority HMA**: Areas that have been identified as having the highest conservation value to maintaining sustainable Greater Sage-Grouse populations. These areas are occupied seasonally or year-round and include breeding, late brood-rearing, and winter concentration areas.

**General HMA**: An area that is likely to be occupied seasonally or year-round outside of a Priority Habitat Management Area and where management will apply to sustain the Greater Sage-Grouse populations. GHMA may include active leks, seasonal habitats, and fragmented or marginal habitat, as well as areas identified as corridors connecting seasonal habitats.

**Other HMA**: Areas with appropriate environmental conditions for Greater Sage-Grouse that are less used by Greater Sage-Grouse or have marginal habitat suitability.

### 3.4.1 Literature Cited

Brussee, B.E., Coates, P.S., Ricca, M.A., Chenaille, M.P., 2019, Spatially explicit modeling of annual and seasonal habitat for greater sage-grouse (Centrocercus urophasianus) in northeastern California: U.S. Geological Survey data release, https://doi.org/10.5066/P99E64Y4.

## 3.5 OREGON

The definitions of PHMA and GHMA have not changed since initially defined in the 2015 ARMPA. PHMA and GHMA are defined as follows:

**PHMA**: BLM-administered lands identified as having the highest value to maintaining sustainable GRSG populations. Areas of PHMA largely coincide with areas identified as Priority Areas for Conservation in the USFWS's COT report. These areas include breeding, late brood-rearing, winter concentration areas, and migration or connectivity corridors.

**GHMA:** BLM-administered lands where some special management will apply to sustain GRSG populations; areas of occupied seasonal or year-round habitat outside of PHMA.

IM 2012-044 directed the BLM to collaborate with state wildlife agencies to identify and map GRSG Preliminary Priority Habitat and Preliminary General Habitat. In Oregon, the BLM developed maps for these habitats based on the Oregon Department of Fish and Wildlife's (ODFW) GRSG core and low-density habitat maps (Hagen 2011) for the 2015 BLM Oregon Greater Sage-Grouse Approved Resource Management Plan Amendment. The ODFW core and low-density habitats were initially delineated in 2011 and had not been updated since this initial mapping. Since 2011 Oregon has discovered over 150 new leks, acquired over a million locations from radio- and GPS- marked GRSG, and has benefitted from improved habitat suitability models. Additionally, there are many GRSG leks used in the 2011 mapping process that are no longer occupied by GRSG. Hence, in March 2022 ODFW notified the BLM, other partners, and the public that they would be reviewing and revising Oregon's GRSG core and low-density habitat designations and Oregon's Greater Sage-grouse Conservation Assessment and Strategy using new information and again using the methods and process published in Hagen 2011.

The ODFW's draft GRSG core and low-density habitat designation maps were not available for BLM's Draft EIS analysis needs in early 2023. After coordinating with ODFW, Oregon BLM followed the steps described

in the ODFW Greater Sage-grouse Conservation Assessment and Strategy for Oregon (Hagen 2011 pp. 79-83) using data collected up through the 2022 field season. The BLM developed maps that are conservative (i.e., few areas are clipped or reduced to omit non-habitat and therefore likely to show more habitat than the ODFW map will), and were rough estimates of expected core and low-density areas that were anticipated in the draft ODFW maps.

For alternative 3 all BLM identified core and low-density habitat from the model was considered draft Priority HMA. In addition to habitat identified by the model, the spring and summer kernel density estimates (90% utilization) from radio- or GPS-tagged GRSG marked in Oregon from 2000 to present provided by ODFW was included as priority habitat. The areas defined as General HMA in the 2015 BLM Oregon Greater Sage-Grouse Approved Resource Management Plan Amendments, based on combining ODFW low density habitat layer with the Durtsche et al. 2010 model layer, were not edited and were added as Priority HMA.

For alternatives 4, 5, and 6, all BLM newly modeled core habitat was considered Priority PHMA minus non-habitat clipped areas. For alternative 4 the areas defined as General HMA in the 2015 BLM Oregon Greater Sage-Grouse Approved Resource Management Plan Amendments were not edited and were included as General HMA in addition to the newly modeled low-density habitat.

However, for alternatives 5 and 6 the areas defined as General HMA used the newly modeled low-density habitat and Habitat Assessment Framework (HAF) mapped seasonal habitats (rather than the Durtsche 2010 model used in alternatives 1 through 4). The seasonal habitat maps BLM developed with ODFW provide more accurate boundaries for GRSG distribution than maps generated from ODFW low density and Durtsche et al (2010). Not all Oregon GRSG areas had HAF seasonal habitats mapped as of February 2023, but all areas are expected to be completed in time to be included in the BLM Final EIS.

ODFW completed their GRSG core and low-density habitat designation map update, and the Oregon Fish and Wildlife Commission approved it in December 2023, which was not in time for incorporation into the BLM's Draft EIS analysis. Oregon BLM anticipates using the final ODFW habitat designation maps to the maximum extent possible as a replacement of our draft PHMA and GHMA in the action alternatives in the BLM Final EIS.

## 3.6 UTAH

HMA definitions are defined below for both the 2015 and 2019 GRSG planning efforts. For HMA designations under Alternatives 3, 4, 5, and 6, BLM Utah evaluated the GRSG new range wide science and the State of Utah's 2019 SGMA boundaries to propose additions and subtractions consistent with the concepts for each alternative as identified below in each alternative discussion, and designated HMAs based on the 2019 ARMPA definition for PHMA and the 2015 definition for GHMA.

**BLM Utah 2015 PHMA**: BLM-administered lands identified as having the highest value to maintaining sustainable GRSG populations. Areas of PHMA largely coincide with areas identified as Priority Areas for Conservation in the USFWS's COT Report. These areas include breeding, late brood-rearing, winter concentration areas, and migration or connectivity corridors.

**BLM Utah 2015 GHMA**: BLM-administered lands where some special management will apply to sustain GRSG populations. Areas of occupied seasonal or year-round habitat outside of PHMA.

**BLM Utah 2019 PHMA**: Areas prioritized for managing Greater Sage-Grouse populations (management is only applicable to actions on BLM-administered lands). These management areas include high-quality habitat, and may also include areas with poor quality, potential habitat, and non-habitat. PHMA largely

coincides with the State of Utah's Sage-Grouse Management Areas (SGMAs). In the SGMA, the State identified areas of seasonal habitat, non-habitat, and opportunity areas, though management is focused on the habitat. PHMA are areas that include all the seasonal habitats for the corresponding Greater Sage-Grouse populations, including breeding, late brood-rearing, winter areas, and migration or connectivity corridors.

**BLM Utah 2019 GHMA**: Not Applicable since GHMA was removed.

The BLM Utah coordinated closely with the State of Utah in developing HMA maps for this planning process. Both the BLM and the state prioritized GRSG populations and associated habitat into these two categories, though there varying levels of inclusion across the different alternatives. For all alternatives, PHMA represents areas of the highest value to maintaining sustainable GRSG populations, areas of seasonally or year-round occupied habitat, and/or areas where sagebrush restoration or rehabilitation can provide additional GRSG habitat. Based on new science and information discussed in coordination with cooperating agencies, local biologists, etc., GHMA and PHMA was adjusted across alternatives 3, 4, 5, and 6 using various alternative concepts/strategies. One of the primary differences among the alternatives is how GHMA is used. Of the 380 known occupied GRSG leks in Utah, the alternatives include the following within PHMA:

- Alternative 1: 353 (92.8%) are in PHMA
- Alternative 2: 354 (93.1%) are in PHMA
- Alternative 3: 380 (100%) are in PHMA
- Alternative 4: 366 (96.3%) are in PHMA
- Alternatives 5 and 6: 342 (90%) are in PHMA

**Alternative 1** in Utah would retain PHMA and GHMA as identified in the 2015 GRSG ARMPA. In that effort, the BLM used the State of Utah's Sage-Grouse Management Areas (SGMA) as the primary tool to identify PHMA (with a few exceptions such as the Tavaputs Plateau), and the State's 2009 occupied GRSG habitat map as the basis of the GHMA. The SGMAs and PHMA focused on managing the most important GRSG populations in the state, regardless of the quality of the habitat associated with those populations.

It is important to note that the State of Utah's 2009 occupied habitat data was very broad in nature, and was developed to identify the general areas of potential habitat where GRSG could potentially be found and may not have reflected where birds were actually known to exist. As such, some areas identified for GHMA in the 2015 GRSG ARMPA have subsequently been identified as non-habitat. This includes areas such as west of Sanpete Valley (west of Ephraim and Mt. Pleasant), Porphyry Bench near Price, and Blue Bench north of Duchesne. While these areas were identified as habitat during the 2015 planning effort and included as GHMA in that effort, they have not had any documented birds using them for over 20 years, have no occupied or historically known leks, are poor-quality habitat, and do not provide connectivity habitat for birds moving between population areas or seasonal habitats. Under Alternative 1, there are five occupied leks that occur outside of PHMA/GHMA boundaries: two are in the Box Elder area, one in Sheeprocks, and two in the Rich area.

In the 2015 ARMPA, 97.5 percent of the BLM's PHMA was contained in areas identified as habitat in the State of Utah SGMAs. Further, 99.5 percent of the state's mapped habitat within SGMAs is within PHMA. The major difference between the BLM and State of Utah maps was how areas of lower priority are depicted. The state chose not to map lower priority areas of occupied GRSG habitat outside SGMAs, whereas the BLM mapped these areas as GHMA. Further, based on the State of Utah's Conservation Plan, SGMAs "encompass more than 90 percent of Utah's breeding populations, seasonal movements and the landscapes that provide the greatest potential to increase sage-grouse "usable space" [through habitat protection and

enhancements]" (State of Utah, 2019). The state determined that GRSG "habitats outside the SGMAs are not required for long-term conservation of the species. Much of this habitat has already been heavily disturbed by human and natural causes, and it is not suitable for enhancement or improvement. Therefore, sage-grouse populations in these areas are not considered essential to perpetuate the species in Utah" and the state did not provide any "specific management actions for this habitat" (State of Utah 2019).

***Statewide (Alternative 1) - Habitat Management Area Acres***

- 5,548,837 acres in PHMA
  - 2,079,470 of the BLM-administered surface acres are in PHMA
  - 1,197,778 of the BLM-administered mineral estate are in PHMA
- 1,684,818 acres in GHMA
  - 437,737 of the BLM-administered surface acres are in GHMA
  - 403,125 of the BLM-administered mineral estate are in GHMA
- 42,069 acres as Occupied Anthro Mountain (National Forest System lands)

***Leks Under Alternative 1 HMAs:***

- 353 (92.8%) of the 380 occupied leks in Utah are in PHMA
- 14 (3.7%) of the 380 occupied leks in Utah are in GHMA
- 7 (1.8%)of the 380 occupied leks in Utah are in Occupied Anthro Mountain
- 5 (1.3%) of the 380 occupied leks in Utah are outside any Utah habitat management area

**Alternative 2** is based on the BLM's 2019 GRSG ARMPA. In that effort, the BLM sought to increase HMA alignment with the State of Utah's SGMAs and prioritized the importance of management prescriptions on PHMA. This was to focus protection in the State on the seasonal habitats that support over 95 percent of GRSG populations in Utah, while removing the designation and management of GHMA to de-emphasize management in areas that were less important or not habitat. Other than removal of GHMA, there were very few changes in the HMAs under Alternative 2, though some differences in the BLM's PHMA and the State's SGMA remained in the West Tavaputs area, where the BLM maintained PHMA in an area where the State did not include an SGMA. Under Alternative 2, based on 2023 occupied leks, 19 occupied leks would occur outside of PHMA boundaries: 2 in the Box Elder population area, 4 in the Rich County area, 1 in the Sheeprocks area, 5 in Morgan-Summit area, and 7 in South Slope Uintah/Blue Bench. Most of these leks do not occur on BLM-managed lands.

***Statewide (Alternative 2) - Habitat Management Area Acres***

- 5,548,837 acres in PHMA
  - 2,079,476 of the BLM-administered surface acres are in PHMA
  - 1,235,904 of the BLM-administered mineral estate are in PHMA
- 0 acres in GHMA
- 42,069 acres as Occupied Anthro Mountain (National Forest System lands)

***Leks Under Alternative 2 HMAs:***

- 354 (93.1%) of the 380 occupied leks in Utah are in PHMA
- 0 of the 380 occupied leks in Utah are in GHMA
- 7 (1.8%) of the 380 occupied leks in Utah are in Occupied Anthro Mountain
- 19 (5%) of the 380 occupied leks in Utah are outside any Utah habitat management area

**Alternative 3** HMA boundaries were developed to represent the strongest GRSG management approach within the BLM's jurisdiction. All HMAs in Alternative 3 are managed as PHMA. PHMA under Alternative 3 encompasses a total of 9,802,136 acres. As compared to the other alternatives, the PHMA boundaries under Alternative 3 more closely aligns with the State of Utah's SGMA areas, though the management under Alternative 3 is more restrictive than what the State recommends. The State's SGMAs were developed to be inclusive of a variety of habitat types associated with the various GRSG populations throughout Utah. The State's plan clearly notes that the entirety of the SGMAs do not provide habitat for GRSG, but include areas of habitat, non-habitat, and potential habitat (opportunity areas). In the 2015 and 2019 planning efforts, the BLM focused PHMA in the areas the State coarsely mapped as "habitat" within the SGMAs in the original 2013 GRSG State plan. Under alternative 3, the BLM included the entirety of the SGMAs as PHMA, as well as areas of restoration areas that occurred on the periphery of the 2015 HMAs. The following are additional concepts used to build alternative 3:

- Include in PHMA all areas of GHMA from the 2015 plans.
- Apply new science, especially research on habitat connectivity, resulting in inclusion of the State of Utah's opportunity habitats.
- Include all occupied leks in PHMA.
- Include areas of non-habitat that are encompassed in large parts by PHMA or could provide corridors between valleys and occupied habitat.
- Include areas of GRSG habitat treatments that occur on the periphery of 2015 HMAs.
- Remove municipalities >2,500 acres.

Alternative 3 is the only alternative where the GHMA from alternative 1 becomes PHMA. Expanding the GHMA designation in Alternative 1 to PHMA includes some areas of unoccupied habitat, historic habitat where birds have not been observed in 20 years or more or may have never occurred (e.g., habitat west of Sanpete Valley), areas of non-habitat (e.g., phase 3 pinyon-juniper, rock outcrops), areas which are currently not habitat but could become habitat through significant habitat restoration, etc, which raises the concern of "when applying leasing restrictions, the least restrictive constraint to meet the resource protection objective should be used" (2018 FEIS Appendix 2 p. 2-28). Under Alternative 3, there are no occupied leks that are not encompassed by PHMA.

***Statewide (Alternative 3) - Habitat Management Area Acres***

- 9,801,294 acres in PHMA
  - 3,567,018 of the BLM-administered surface acres are in PHMA
  - 2,379,058 of the BLM-administered mineral estate are in PHMA
- 0 acres in GHMA

***Leks Under Alternative 3 HMAs:***

- 380 (100%) of the 380 occupied leks in Utah are in PHMA
- 0 of the 380 occupied leks in Utah are in GHMA
- 0 of the 380 occupied leks in Utah are outside any Utah habitat management area

**Alternative 4** would manage for a combination of PHMA and GHMA similar to alternatives 1 and 2. Some areas that were used to expand PHMA in alternative 3 were incorporated in alternative 4, such as the State of Utah's opportunity habitat, occupied leks, connectivity corridors based on the new science, as well as habitat improvement projects completed for the benefit of GRSG. However, many new areas of expansion would become GHMA where occupancy is uncertain or unknown (e.g., restoration areas, connectivity

corridors). Under Alternative 4, there are no occupied leks that occur outside of PHMA or GHMA. The vast majority of leks are within PHMA, except for 2 leks in the Rich population area northeast of Mountain Green, 5 leks in Morgan-Summit area, and 7 leks on Tribal lands in Uintah South Slope-Blue Bench, which are in GHMA. Under Alternative 4, there are no occupied leks that fall outside PHMA or GHMA. The following are additional concepts used to build alternative 4:

- Adjust boundaries for PHMA to include areas where monitoring shows GRSG utilization.
- Remove some areas of GHMA that have not provided habitat for an extended period.
- Refine boundaries on the periphery of HMAs to more closely align with the Utah State University (USU) GRSG Seasonal Habitat Model.
- Remove municipalities >2,500 acres.

***Statewide (Alternative 4) - Habitat Management Area Acres***

- 5,833,555 acres in PHMA
  - 2,191,844 of the BLM-administered surface acres are in PHMA
  - 1,291,398 of the BLM-administered mineral estate are in PHMA
- 3,314,103 acres in GHMA
  - 1,195,069 of the BLM-administered surface acres are in GHMA
  - 990,776 of the BLM-administered mineral estate are in GHMA

***Leks Under Alternative 4 HMAs:***

- 366 (96.3%) of the 380 occupied leks in Utah are in PHMA
- 14 (3.7%) of the 380 occupied leks in Utah are in GHMA
- 0 of the 380 occupied leks in Utah are outside any Utah habitat management area

**Alternatives 5 and 6** uses HMA boundaries developed, provided, and preferred by the State of Utah. The State incorporated agency biologist and stakeholder feedback to further refine the HMAs from alternative 4 and provide an expanded range of HMA delineation. This alignment prioritizes HMAs that encompass 95.6 percent of the male GRSG counted on leks during 2023 surveys. The following are additional concepts used to build this alternative:

- Expansion of HMAs to include active leks recently added to the state active sage-grouse lek data set;
- Expansion of HMAs to include wildlife management areas and other areas already subject to state-specific sage-grouse management;
- Refinement of HMAs using localized habitat assessment data and knowledge, including cross-state edge-mapping and review of existing BLM boundary adjustments;
- Updated HMAs to reflect changes in municipal boundaries; and
- Removal of large water bodies

Under alternatives 5 and 6, there are 25 occupied leks that are outside of PHMA or GHMA: 5 leks in Morgan-Summit on private lands, 7 leks in South Slope Uintah/Blue Bench on tribal lands, 7 leks in Anthro Mountain on National Forest System lands which are protected under the 2015 USFS Land Management Plan Amendment and Record of Decision, and 6 leks in West Tavaputs (5 on private, 1 on BLM). With this alignment, alternatives 5 and 6 would prioritize habitat management areas (PHMA and GHMA) that encompass 95.6 percent of the male GRSG counted on leks during 2023 surveys (not the percent of leks,

but the percent of males counted on leks). This includes 2,740 (93.8%) males counted within PHMA, 54 (1.8%) counted in GHMA and 127 (4.3%) counted outside of any HMA.

***Statewide (Alternatives 5 and 6) - Habitat Management Area Acres***

- 4,876,186 acres in PHMA
  - 1,626,862 of the BLM-administered surface acres are in PHMA
  - 1,118,527 of the BLM-administered mineral estate are in PHMA
- 1,499,184 acres in GHMA
  - 645,971 of the BLM-administered surface acres are in GHMA
  - 348,908 of the BLM-administered mineral estate are in GHMA

***Leks Under Alternatives 5 and 6 HMAs:***

- 342 (90%) of the 380 occupied leks in Utah are in PHMA
- 13 (3.4%) of the 380 occupied leks in Utah are in GHMA (two in the Rich area, and 11 in the Sheeprocks area)
- 25 (6.6%) of the 380 occupied leks in Utah are outside any Utah habitat management area

Alternatives 5 and 6 do not include any HMA designation for portions of the Uintah population area south of Highway 40, including the Deadman's Bench, East Bench, and Book Cliffs areas. The GRSG populations within this area were steadily declining during the preparation of the 2015 FEIS; however, in Deadman's Bench, there were 2 leks that had less than 10 birds since 1989 and suggested that the population was connected to other populations. Same with East Bench at the timing of the 2015 FEIS, "East Bench leks are the only known active leks in the last 10 years. However, it is unknown if there are leks on tribal lands in the western portion of this area because UDWR does not have access." (2015 FEIS p. 3-25). In 2023, the leks in these areas were documented as unoccupied. In coordination with local biologists, there is some limited bird use in these areas; however, the extent of use is largely unknown and the leks are no longer considered occupied by the State of Utah.

Habitats in the South Slope Uintah/Blue Bench and Uintah Population Area (Deadman's Bench, East Bench, and Book Cliffs) have been fragmented due to mineral development activities through much of the area, which has likely contributed to loss of occupied leks within these areas since the 2015 plans. Under alternative 1 development could still occur in GHMA similar to what was analyzed in the 2015 Final EIS, "despite the…[Greater Sage-Grouse] conservation measures, leasing and development in these areas could result in human alteration, direct loss, and fragmentation of seasonal [Greater Sage-Grouse] habitats, which, in most cases, have already been fragmented by mineral development activities. Fragmentation could further limit the amount of usable habitat available for the small and declining population of [Greater Sage-Grouse] that occupy this area [GHMA]" (2015 Final EIS, page 4-119). The limited information available for this area provides little insight into the population movements, important seasonal habitats, and connectivity with other populations. BLM lacks regulatory discretion on resources within the South Slope/Blue Bench and Book Cliffs areas since they are predominantly private and Tribal lands. Split estate in this area is limited; therefore, BLM does not have much regulatory responsibility over the mineral estate. The BLM has more jurisdiction in the Deadman's Bench and East Bench areas, removal of GHMA in these areas could result in further habitat loss, degradation, and direct disturbance to the small population of birds that occupy this area as a result of oil and gas leasing.

In addition to the differences in GHMA identified in Alternatives 5 and 6, Anthro Mountain and West Tavaputs have not been identified as either PHMA or GHMA.

*Anthro Mountain-West Tavaputs* – The Anthro Mountain area is predominantly National Forest System land and management would remain the same because USFS is not part of this current planning effort; however, there is a small sliver of BLM land (1,397 acres) in the very southern portion near the Bad Land Cliffs and predominantly tribal lands in the very northernmost extent (Cottonwood Canyon/Cottonwood Ridge). Under alternatives 5 and 6, the BLM portion (1,397 acres) would not be managed as PHMA. The majority of telemetry use is on the USFS lands; however, some birds do use the BLM portions. The easternmost portion of Anthro Mountain has 7 occupied leks (all on USFS) and some birds have been documented moving up to 25 miles outside of the Anthro Mountain area.

The West Tavaputs area is a mix of BLM, State of Utah State Institutional Trust Lands Administration (SITLA), and private lands. There are 6 occupied leks in this area. "Telemetry data suggest some birds are moving large distances to separated areas of seasonal habitats, including movements off the plateau. These seasonal movements include Emma Park, West Tavaputs, Fruitland, and Blue Bench and can range between 14 and 33 miles" (2015 FEIS Section 3.3.5, p. 3-27). Similar to what was analyzed in the 2015 FEIS under Alternative E, "SGMAs would not include the Anthro Mountain and West Tavaputs populations. These populations may be important for redundancy and may provide connectivity to northeastern Utah GRSG populations. While there is documented movement between these two areas and other population areas (e.g., Emma Park and portions of the Uintah Population Area on private and tribal lands), it is unknown what level of connectively is necessary to prevent isolation of populations and how important these areas are to maintaining genetic viability." (2015 FEIS, Section 4.3.6, p. 4-99).

The 2015 FEIS stated, "a total of 1,417 wells are predicted to be drilled from 709 pads within the occupied habitat of the Carbon Population Area, with a total disturbance estimated to be 6,384 acres. Development of 1,417 wells from 709 pads within occupied habitat in the Carbon Population Area would most likely impact some portions of the population to a greater degree than others. Removing management for Anthro Mountain and West Tavaputs would be similar to Alternative E from the 2015 Final EIS (Section 4.3.6 of the 2015 FEIS), which states "impacts would be the greatest in these areas because they have high oil and gas potential. The majority of the lands have already been leased, and they include GRSG habitat outside of PHMA and GHMA that would not be afforded any protection under this alternative." In the Carbon Population per the 2015 FEIS (4.3.2 p. 4-28 RFD), "most of the development is expected to occur in the Gasco, West Tavaputs, Gordon Creek, Drunkards Wash, and Brundage Canyon development areas. Developing 709 pads, additional wells, and ancillary facilities would likely cause direct habitat loss, functional habitat loss, and fragmentation and may impact the local GRSG population. The development in some of these areas may hinder the function of seasonal habitat for some of the local populations, causing localized population declines. The northern population that uses these areas for most of their life history needs would most likely decline. The population that is centered in the central region of the Carbon Population Area (Emma Park) would be impacted to a lesser degree because development is not currently focused in this area, this habitat would be left more intact, and the local birds are mostly nonmigratory." Potential connectivity for Tavaputs, Emma Park, and Tribal lands is unknown.

*Sheeprocks* – The Sheeprocks area is predominantly BLM, USFS, SITLA, and private land. There are 11 leks in this area. From 2007 to 2016, the 10-year running mean population of male birds on Sheeprock population area leks was 51 males, with 119 males in 2007 and 21 males in 2016. The 10-year decline went from an estimated 472 birds to 84 birds. Isolation and small-size was identified as a major causal factor in the Causal Factor Analysis [BLM 2021] for the Sheeprocks population. Since 2016 when Sheeprocks hit a hard population trigger under the 2015 ARMPA, the population has been augmented through translocations of sage-grouse from other populations in Utah. Telemetry data has been collected in association with the

translocations. Translocations has led to a heavily augmented population that is isolated and shows no connectivity or movement corridors to other populations.

Under Alternatives 5 and 6, Sheeprocks would be entirely managed as GHMA. The boundary would also remove prior PHMA/GHMA north of Faust/Rush Valley and areas in the Little Sahara Recreation Area south of Old Highway 148 (Weiss Highway), which was identified in the 2019 planning effort. These are two small areas in the Sheeprocks area, which would be "managed as available for cross-country OHV use. Approximately 6,320 acres in the 5 Mile Pass area in GHMA on the northeastern portion of Sheeprocks, and 7,900 acres in the Little Sahara Sand Dunes area in GHMA on the southern portion of the Sheeprocks population would be managed as available for cross-country OHV use. The acres in both areas are directly adjacent to other areas that are also available to cross-country OHV use, and were originally part of the same open areas prior to 2015. The 2015 Final EIS notes that "habitat loss could occur associated with cross-country OHV use" (2015 Final EIS page 4-52). However, a review of GPS tracking data for GRSG in the Sheeprocks area indicates that none of the collared birds (a sub-sample of the total population) used the areas proposed to be made available to cross-country use again (Chelak and Messmer 2017). "Due to the long-term use in both of these areas prior to 2015, these areas have likely already experienced the habitat losses, so this change is not anticipated to result in impacts on Greater Sage-Grouse or its habitat." [2018 FEIS p. 4-22].

## 3.7 WYOMING

BLM Wyoming used the most current scientific information, GRSG leks, and local expertise to update and revise GRSG HMA's across the state. HMAs in Alternatives 5 and 6 were developed by the State of Wyoming and adopted by the BLM as developed. For Alternatives 3 and 4, BLM first considered the existing HMA boundaries as identified in the 2015 and 2019 plans. The original HMA boundaries were updated and revised using the following data sources: (A) modeled GRSG lek persistence (Wann et al. 2023), (B) modeled sagebrush habitats that currently have high ecological integrity (Doherty et al. 2022), (C) modeled sagebrush habitats that are projected to have high ecological integrity into the near future (2030-2060) (Doherty et al. 2022), (D) genetic connectivity (Row et al. 2018; Cross et al. 2023), (E) sagebrush, invasive annual grass and conifer canopy cover (estimated in 2021; Rigge et al. 2021a,b); (F) terrain ruggedness (i.e., a measure of the variation in terrain slope and aspect; Welty and Jefferies 2018); (G) fire perimeter data from 1985 to 2021 (National Interagency Fire Center); (H) active energy development data (Wyoming Oil and Gas Conservation Commission); (I) GRSG lek activity status (Whitford and Bish 2022); (J) National Agriculture Imagery Program (NAIP) aerial imagery (2019); and (K) local expertise and data.

Wyoming's efforts to update GRSG core areas began in March, 2023. The State generated Draft 1 of proposed changes to core areas the week of May 15. The State's Draft 1 polygons were overlayed with BLM's HMA polygons so that the extent of both efforts was captured in Alternative 4.

Wyoming revised their core area designated habitats several times between release of Draft 1 in May and the final version released October 18, 2023. The final version of the State's core area polygons was adopted by the BLM as Alternatives 5 and 6.

Three tiers of habitat designations were considered for HMAs: (1) Priority Habitat Management Areas (PHMA); (2) Stewardship Habitat Management Areas (SHMA); and (3) General Habitat Management Areas (GHMA). PHMA was the only designation considered in Alternative 3; PHMA and GHMA were designations considered in Alternative 4; and PHMA, SHMA and GHMA were designations considered in Alternatives 5 and 6. Definitions of PHMA and GHMA are the same as those in the 2019 plan, and the definition of SHMA is the same as that provided to BLM by the State of Wyoming for the areas receiving this designation.

Generalized management statements were added to the definitions of PHMA and GHMA for clarity and to align the information provided in these definitions with the definition of SHMA received from the State.

**PHMAs:** GRSG habitats that have the highest conservation value for maintaining or increasing GRSG populations. The management in these areas is focused towards maintaining, enhancing, and where necessary restoring conditions suitable for GRSG across the seasonal ranges included as PHMA (breeding, brood-rearing, winter, and connectivity).

**SHMAs:** GRSG habitats that are generally characterized by large percentages of private land, existing disturbance and prior and existing rights, and fragmented landscapes but that continue to support substantial populations of GRSG, provide important connections between populations, and are important for maintaining GRSG populations. Management in SHMA is consistent with GHMA restrictions.

**GHMA:** used to designate all occupied and potential GRSG habitats not designated as PHMA or SHMA. Management in GHMA is focused on sustaining habitats suitable for GRSG populations using these areas.

Although the total area considered PHMA, SHMA and GHMA combined did not differ between alternatives 3, 4, 5 and 6, different combinations of habitat designations among alternatives were considered to provide a range of alternatives and as such planning flexibility resulting from EIS analyses. Alternative 3 is the conservation-forward alternative and the BLM is analyzing all habitats occupied by GRSG plus habitats that provide suitable habitat conditions for the species in the State as PHMA. The overall extent of PHMA in alternative 3 is considered as the extent of PHMA, SHMA and GHMA combined in alternatives 4, 5, and 6.

Alternatives 4, 5, and 6 considered revisions to the current (Alternatives 1 and 2) PHMA (core area) designated areas. In general, alternative 4 follows closely with the results of the research described above resulting in more habitats in the State being designated as PHMA compared to alternative 5. Alternatives 5 and 6 put more weight on GRSG lek count information and existing and potential anthropogenic disturbance compared to alternative 4 resulting in a more focused application of the PHMA designation to areas identified as being associated with GRSG leks supporting a greater percentage of the State's population of GRSG. An area in northeastern Wyoming was identified following the State's process as supporting high GRSG populations but was designated as SHMA in Alternative 5 because of high levels of existing disturbance and private lands. Revisions to the designation of areas currently considered PHMA (Alternatives 1 and 2) that no longer provide GRSG with suitable habitat conditions were incorporated into alternatives 4, 5, and 6.

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# Appendix 4

## Lek Status Definition Comparison

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# Appendix 4. Lek Status Definition Comparison

Leks are traditional breeding display areas where male GRSG gather to attract and breed females (Connelly et al., 2011). Counts of males on leks are the primary method to monitor sage-grouse. Lek counts aid in estimating trend and potentially size of breeding populations and determine location of breeding habitats, informing conservation actions (Cook, et al. 2022). Previous lek count guidelines (I.e., Autenrieth et al., 1982, updated by Connelly et al., 2003) have been adjusted by each state across the species' range, resulting in inconsistencies and unintentional biases that create challenges when calculating population trends across state lines (Cook et al., 2022). Given the importance of lek definitions and counts in guiding GRSG management across its range, the Western Association of Fish and Wildlife Agencies (WAFWA) has drafted new guidelines that provide consistent population trend analyses and management applications (Cook, et al., 2022). The BLM is adopting the lek definitions developed by WAFWA to ensure consistency across the RMPs.

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**Lek Definition Comparison – Nevada/California, Utah, Idaho, Oregon, Colorado, Wyoming, North Dakota, and South Dakota**

| Term | WAFWA Definition | NV/CA (2015 BLM plan unless otherwise noted) | UT (2015 BLM Plan unless otherwise noted) | ID (2015 BLM Plan unless otherwise noted) | OR (2015 BLM Plan unless otherwise noted) | CO (2015 BLM plan unless otherwise noted) | WY (2015 9-Plan BLM plan unless otherwise noted) | ND (2015 BLM plan only, no 2019 plan) | SD (2015 BLM plan only, no 2019 plan) |
|---|---|---|---|---|---|---|---|---|---|
| Lek | A lek is a traditional location where at least 2 male greater sage-grouse congregate during at least 2 springs within a 10-year period to perform their strutting display and opportunistically breed with females. Although males are territorial on leks and occupy an area, not a point, the representative location for the lek is the estimated or calculated center of the display activity. The 'lek' is the standard reporting and analysis unit for evaluating population status and long-term trends. Because males may alter their display locations within and between years (for numerous possible reasons), these multiple locations 'within' the lek have been referred to as "sub-leks", "satellite leks", "alternative leks", or "temporary leks". The location provided for the overall 'lek' should represent the dominant, largest, and/or most recent annual activity center. The lek identifier is the critical piece of data to remain consistent over time, the location can shift over time. | 2015 plan: A traditional courtship display area attended by male sage-grouse in or adjacent to sagebrush dominated habitat. A lek is designated based on observations of two or more male sage-grouse engaged in courtship displays. Sub-dominant males may display on itinerant strutting areas during population peaks. Such areas usually fail to become established leks. Therefore, a site where less than five males are observed strutting should be confirmed active for two years before meeting the definition of a lek (Connelly et al. 2000; Connelly et al. 2003, 2004). Each state may have a slightly different definition of lek, active lek, inactive lek, occupied lek, and unoccupied leks. Regional planning will use the appropriate definition provided by the state of interest.<br>2019 Plan: . A traditional display area where two or more male Greater Sage-Grouse have attended in 2 or more of the previous 5 years. The area is typically in an open site in or next to sagebrush-dominated habitats (Connelly et al. 2003). Generally, lek sites are traditional, with the same lek sites used year after year (Scott 1942; Batterson and Morse 1948; Wiley 1978; | 2015 plan: A traditional courtship display area attended by male sage-grouse in or adjacent to sagebrush dominated habitat. A lek is designated based on observations of two or more male sage-grouse engaged in courtship displays. Sub-dominant males may display on itinerant strutting areas during population peaks. Such areas usually fail to become established leks. Therefore, a site where less than five males are observed strutting should be confirmed active for two years before meeting the definition of a lek (Connelly et al. 2000, 2003, 2004). Each state may have a slightly different definition of lek, active lek, inactive lek, occupied lek, and unoccupied leks. Regional planning will use the appropriate definition provided by the state of interest. Leks can be different shapes, may move, and may change size year to year. When specific information is available for lek edges that information would be used for determining management buffers.<br>2019Plan: An arena where male Greater Sage-Grouse display for the purpose of gaining breeding territories and attracting females. These arenas are usually open areas with short | 2015 plan: A traditional courtship display area attended by male GRSG in or next to sagebrush-dominated habitat. A lek is designated based on observations of two or more male GRSG engaged in courtship displays. Each state may have a slightly different definition of lek, active lek, inactive lek, occupied lek, and unoccupied leks. Regional planning will use the appropriate definition provided by the state of interest.<br>2019 plan: An area where male Greater Sage-Grouse display for the purpose of gaining breeding territories and attracting females. These arenas are usually open areas with short vegetation within sagebrush habitats, usually on broad ridges, benches, or valley floors where visibility and hearing acuity are excellent. (Note – 2019 plan does not include other definitions) | 2015 Plan: An area where male sage-grouse display during the breeding season to attract females (also referred to as strutting-ground). Each state may have a slightly different definition of lek, active lek, inactive lek, occupied lek, and unoccupied leks.<br>2019 Plan: An arena where male sage-grouse display for the purpose of gaining breeding territories and attracting females. These arenas are usually open areas with short vegetation within sagebrush habitats, usually on broad ridges, benches, or valley floors where visibility and hearing acuity are excellent. | 2015 plan: An arena where male sage-grouse display for the purpose of gaining breeding territories and attracting females. These arenas are usually open areas with short vegetation within sagebrush habitats, usually on broad ridges, benches, or valley floors where visibility and hearing acuity are excellent. Also called "strutting ground" (CPW 2008a).<br>2019 plan: Same as above, though omitted "Also called "strutting ground" (CPW 2008a)." (Note – 2019 plan does not include other definitions) | 2015 plan: A courtship display area attended by male Greater Sage-Grouse in or adjacent to sagebrush dominated habitat. A lek is designated by two or more male sage-grouse engaged in courtship displays. For management purposes, leks with less than five males observed strutting should be confirmed active for two years to meet the definition of a lek (Connelly et al 2000, Connelly et al. 2003, 2004).<br>2019 Plan: An arena where male Greater Sage-Grouse display for the purpose of gaining breeding territories and attracting females. These arenas are usually open areas with short vegetation within sagebrush habitats, usually on broad ridges, benches, or valley floors where visibility and hearing acuity are excellent. | A traditional courtship display area attended by male Greater Sage-Grouse in or adjacent to sagebrush dominated habitat. A lek is designated based on observations of two or more male Greater Sage-Grouse engaged in courtship displays. Sub-dominant males may display on itinerant strutting areas during population peaks. Such areas usually fail to become established leks. Therefore, a site where less than five males are observed strutting should be confirmed active for two years before meeting the definition of a lek (Connelly et al 2000, Connelly et al. 2003, 2004). Each state may have a slightly different definition of lek, active lek, inactive lek, occupied lek, and unoccupied leks. Regional planning will use the appropriate definition provided by the state of interest. | For this RMP analysis, leks are areas used by sage-grouse during the mating season where males display to attract receptive females. Lek locations are typically used with great fidelity for decades or longer, though they may move some over time. These sites are characterized by low vegetation with sparse shrubs often surrounded by big sagebrush communities. Leks are considered to be the center of sage-grouse activities. Existence of a greater sage-grouse lek is supported by data collection. Supporting data defined as: a) minimum of 2 years with 2 or more males lekking on site (preferred); or b) 1 year with 2 or more males lekking on site followed with evidence of lekking (vegetation trampling, feathers, and droppings) during subsequent year. For the purpose of this RMP analysis, BLM follows South Dakota Game, Fish, & Parks in recognizing leks as active or inactive. |

| Term | WAFWA Definition | NV/CA (2015 BLM plan unless otherwise noted) | UT (2015 BLM Plan unless otherwise noted) | ID (2015 BLM Plan unless otherwise noted) | OR (2015 BLM Plan unless otherwise noted) | CO (2015 BLM plan unless otherwise noted) | WY (2015 9-Plan BLM plan unless otherwise noted) | ND (2015 BLM plan only, no 2019 plan) | SD (2015 BLM plan only, no 2019 plan) |
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| Lek *(cont.)* | *(See above.)* | Autenrieth 1981). Taller sagebrush on the outskirts of the leks is necessary as a food source, escape cover, nesting cover for females, and loafing cover during the day (Patterson 1952; Gill 1965; Klebenow 1985). | vegetation within sagebrush habitats, usually on broad ridges, benches, or valley floors where visibility and hearing acuity are excellent. | *(See above.)* | *(See above.)* | *(See above.)* | *(See above.)* | *(See above.)* | *(See above.)* |
| Active | A lek that has more than 2 or more males counted during two or more lek counts within the last 10 years. | 2015: Any lek that has been attended by 2 or more males at least twice in the last 5 years<br>2019: 2 or more male observed at least twice in the last 5 years. | Any lek that has been attended by male sage-grouse during the strutting season | Any lek that has been attended by more than one male GRSG during the breeding season. | A lek attended by 1 male sage-grouse or more during the breeding season. Acceptable documentation of sage-grouse presence includes observation of birds using the site or recent signs of lek attendance (e.g. fresh droppings, feathers). New leks found during ground counts or surveys are given an annual status of active. | An open area that has been attended by more than two male sage-grouse more than two of the previous five years (Connelly et al. 2000a). This definition is derived mainly from observations of leks in large, stable populations and may not be appropriate for small populations with reduced numbers of males attending leks in fragmented sagebrush communities. Therefore, for smaller populations (e.g., Meeker – White River) that are isolated or disjunct from larger, more stable populations, an active lek is defined as an open area where one or more sage-grouse have been observed on more than one occasion engaging in courtship or breeding behavior. An area used by displaying males in the last five years is considered an active lek (CPW 2008a). | Any lek that has been attended by male Greater Sage-Grouse during the strutting season. | Any lek that has been attended by male Greater Sage- Grouse during the strutting season. | No similar definition. |
| Occupied | No similar definition. | A lek that has been active during at least one strutting season within the prior 10 years. | A lek that has been active during at least one strutting season within the prior 10 years. | A lek that has been active during at least one breeding season within the prior 5 years. | A regularly visited lek that has had 1 male or more counted in one or more of the last 7 years. Designate and protect surrounding area as Category 1 habitat. | A lek that has been active during at least one strutting season within the prior 10 years. | A lek that has been active during at least one strutting season within the prior 10 years. | A lek that has been active during at least one strutting season within the prior 10 years. | No similar definition. |

| Term | WAFWA Definition | NV/CA (2015 BLM plan unless otherwise noted) | UT (2015 BLM Plan unless otherwise noted) | ID (2015 BLM Plan unless otherwise noted) | OR (2015 BLM Plan unless otherwise noted) | CO (2015 BLM plan unless otherwise noted) | WY (2015 9-Plan BLM plan unless otherwise noted) | ND (2015 BLM plan only, no 2019 plan) | SD (2015 BLM plan only, no 2019 plan) |
|---|---|---|---|---|---|---|---|---|---|
| Inactive | A lek at which all observations within the last 10 years have been less than 2 males and that has had at least 2 males recorded during a lek count between 11 to 20 years ago. | 2015 Plan: Any lek where sufficient data suggests that there 0 or 1 male during every visit (minimum 2 visits) in the last 5 years.<br><br>2019 Plan: 0 or 1 male observed during every visit (minimum two visits) in the last 5 years. | Any lek where sufficient data suggests that there was no strutting activity throughout a strutting season. Absence of strutting sage-grouse during a single visit is insufficient documentation to establish that a lek is inactive. This designation requires documentation of either: 1) an absence of sage-grouses on the lek during at least 2 ground surveys separated by at least seven days. These surveys must be conducted under ideal conditions (April 1-May 7 (or other appropriate date based on local conditions), no precipitation, light or no wind, half-hour before sunrise to one hour after sunrise) or 2) a ground check of the exact known lek site late in the strutting season (after April 15) that fails to find any sign (tracks, droppings, feathers) of strutting activity. Data collected by aerial surveys should not be used to designate inactive status as the aerial survey may actually disrupt activities. | Any lek where sufficient data suggests that there was no strutting activity throughout a breeding season. Absence of male GRSG during a single visit is insufficient documentation to establish that a lek is inactive. This designation requires documentation of one of the following scenarios:<br>• An absence of GRSG on the lek during at least two ground surveys separated by at least seven days. These surveys must be conducted under acceptable conditions (clear to partly cloudy and winds less than 10 knots per hour) and in the absence of obvious disturbance (April 1-May 7 or other appropriate date based on local conditions)<br>• A ground check of the exact known lek site late in the breeding season that fails to find any sign (tracks, droppings, feathers) of strutting activity. Data collected by aerial surveys should not be used to designate inactive status as the aerial survey may actually disrupt activities. | A lek with sufficient survey data to suggest that there was no male attendance throughout a breeding season. Absence of male grouse during a single visit is insufficient documentation to establish that a lek is inactive. This designation requires documentation of either: 1) an absence of birds on the lek during at least two ground surveys separated by at least seven days. These surveys must be conducted under acceptable weather conditions (clear to partly cloudy and winds less than 15 kilometers per hour [less than 10 miles per hour]) and in the absence of obvious disturbance or, 2) a ground check of the exact known lek site late in the strutting season that fails to find any sign (fresh droppings/feathers) of attendance. Data collected by aerial surveys alone may not be used to designate inactive status. | Any lek where sufficient data suggests that there was no strutting activity throughout a strutting season. Absence of strutting grouse during a single visit is insufficient documentation to establish that a lek is inactive. This designation requires documentation of either: 1) an absence of sage-grouses on the lek during at least 2 ground surveys separated by at least seven days. These surveys must be conducted under ideal conditions (April 1-May 7, or other appropriate date based on local conditions, no precipitation, light or no wind, half-hour before sunrise to one hour after sunrise) or 2) a ground check of the exact known lek site late in the strutting season (after April 15) that fails to find any sign (tracks, droppings, feathers) of strutting activity. Data collected by aerial surveys should not be used to designate inactive status as the aerial survey may actually disrupt activities. | Any lek where sufficient data suggests that there was no strutting activity throughout a strutting season. Absence of strutting grouse during a single visit is insufficient documentation to establish that a lek is inactive. This designation requires documentation of either: 1) an absence of sage-grouses on the lek during at least two ground surveys separated by at least seven days. These surveys must be conducted under ideal conditions (April 1-May 7 (or other appropriate date based on local conditions), no precipitation, light or no wind, half-hour before sunrise to one hour after sunrise) or 2) a ground check of the exact known lek site late in the strutting season (after April 15) that fails to find any sign (tracks, droppings, feathers) of strutting activity. Data collected by aerial surveys should not be used to designate inactive status as the aerial survey may actually disrupt activities. | Any lek where sufficient data suggests that there was no strutting activity throughout a strutting season. Absence of strutting grouse during a single visit is insufficient documentation to establish that a lek is inactive. This designation requires documentation of either: 1) an absence of Greater Sage-Grouses on the lek during at least two ground surveys separated by at least seven days. These surveys must be conducted under ideal conditions (April 1-May 7 (or other appropriate date based on local conditions), no precipitation, light or no wind, half- hour before sunrise to one hour after sunrise) or 2) a ground check of the exact known lek site late in the strutting season (after April 15) that fails to find any sign (tracks, droppings, feathers) of strutting activity. Data collected by aerial surveys should not be used to designate inactive status as the aerial survey may actually disrupt activities. | No similar definition. |
| Unoccupied lek | No similar definition. | A lek that has either been “destroyed” or “abandoned.” | A lek that has been active during at least one strutting season within the prior 10 years. | An unoccupied lek is one that has not been active for 5 consecutive years. To be designated unoccupied, a lek must be inactive (see above criteria) for 5 consecutive breeding seasons. | A lek that has been counted annually and has had no birds for 8 or more consecutive years. Mitigation category based on habitat type and condition. | A lek that has either been “destroyed” or “abandoned.” | A lek that has either been “destroyed” or “abandoned.” | A lek that has either been “destroyed” or “abandoned.” | No similar definition. |

| Term | WAFWA Definition | NV/CA (2015 BLM plan unless otherwise noted) | UT (2015 BLM Plan unless otherwise noted) | ID (2015 BLM Plan unless otherwise noted) | OR (2015 BLM Plan unless otherwise noted) | CO (2015 BLM plan unless otherwise noted) | WY (2015 9-Plan BLM plan unless otherwise noted) | ND (2015 BLM plan only, no 2019 plan) | SD (2015 BLM plan only, no 2019 plan) |
|---|---|---|---|---|---|---|---|---|---|
| Historical | A lek at which all observations within the last 20 years have been less than 2 males, but previously met the definition of a lek.<br>(Previously "Historic", Coates et al. 2021) | 2015 Plan: Any lek that has been attended by 0 or 1 male during every visit (minimum 5 visits) in the last 30 years.<br>2019 Plan: 0 or 1 male observed during every visit (minimum five visits) in the last 30 years. | No similar definition. | No similar definition. | A lek that has been unoccupied prior to 1980 and remains so. Mitigation category based on habitat type and condition (1980 serves as the baseline for evaluating population objectives under ODFW's Sage-grouse Conservation Strategy, thus leks unoccupied prior to 1980 are not included in the baseline for population abundance and distribution.) | No similar definition. | (Former term for "unoccupied lek".) There are two types of unoccupied leks, "destroyed" or "abandoned." Management protection will not be afforded to unoccupied leks. | No similar definition. | No similar definition. |
| Pending Active | A lek with one observation of at least 2 males in the last 10 years and at least one observation of at least 2 males more than 10 years ago. This status captures leks insufficiently monitored to classify as Active, Inactive, or Historical but contains a more recent observation than Pending Historical.<br>(Previously "Pending New", Coates et al. 2021) | 2015 Plan: Any lek that has been attended by 2 or more males only once in the last 5 years.<br>2018 Plan: 2 or more males observed only once in the last 5 years. | No similar definition. | No similar definition. | (called "Occupied-pending") A lek not counted regularly in the last 7 years, but birds were present at last visit. Designate and protect surrounding area as Category 1 habitat. These leks should be resurveyed at a minimum of two additional years to confirm activity | No similar definition. | No similar definition. | No similar definition. | No similar definition. |
| Pending Historical | A lek with insufficient observations in the last 10 years to classify as Active, Inactive, Historical, or Pending Active. This requires one observation of at least 2 males recorded 11 to 20 years ago and at least one observation of at least 2 males more than 20 years ago.<br>(Previously "Pending Old", Coates et al. 2021) | No similar definition. | No similar definition. | No similar definition. | (Called "Pending Lek") A lek not counted regularly in the last seven years, but birds were present one or more years of that period. | No similar definition. | No similar definition. | No similar definition. | No similar definition. |

| Term | WAFWA Definition | NV/CA (2015 BLM plan unless otherwise noted) | UT (2015 BLM Plan unless otherwise noted) | ID (2015 BLM Plan unless otherwise noted) | OR (2015 BLM Plan unless otherwise noted) | CO (2015 BLM plan unless otherwise noted) | WY (2015 9-Plan BLM plan unless otherwise noted) | ND (2015 BLM plan only, no 2019 plan) | SD (2015 BLM plan only, no 2019 plan) |
|---|---|---|---|---|---|---|---|---|---|
| Lek Complex | Considered an "outmoded" definition.<br>1. A grouping of leks that likely have frequent movement of individuals between leks.<br>2. A single lek recorded in multiple locations in multiple years in relatively close proximity. | 2015 Plan: A lek or group of leks within 2.5 kilometers (1.5 miles) of each other between which male GRSG may interchange from one day to the next. Fidelity to leks has been well documented. Visits to multiple leks are most common among yearlings and less frequent for adult males, suggesting an age-related period of establishment (Connelly et al. 2004).<br>2019 Plan: (called "Lek Cluster") A group of leks in the same vicinity, among which Greater Sage-Grouse may interchange over time, and representing a group of closely related individuals. | A lek or group of leks within 2.5 kilometers (1.5 miles) of each other between which male sage-grouse may interchange from one day to the next. Fidelity to leks has been well documented. Visits to multiple leks are most common among yearlings and less frequent for adult males, suggesting an age-related period of establishment (Connelly et al. 2004). | A lek or group of leks within 2.5 kilometers (1.5 miles) of each other between which male GRSG may interchange from one day to the next. Fidelity to leks has been well documented. Visits to multiple leks are most common among yearlings and less frequent for adult males, suggesting an age-related period of establishment (Connelly et al. 2004). | A collection of lek sites typically with small numbers of males which are associated with a larger lek site in the vicinity (less than or equal to 1 mile). A count of a lek complex generally includes systematically acquiring and recording information about all displaying males in a series of leks where no 2 lek sites are more than 1 mile apart. | A lek or group of leks within 2.5 km (1.5 mi) of each other between which male sage-grouse may interchange from one day to the next. Fidelity to leks has been well documented. Visits to multiple leks are most common among yearlings and less frequent for adult males, suggesting an age-related period of establishment (Connelly et al. 2004). | A lek or group of leks within 2.5 km (1.5 mi) of each other between which male sage-grouse may interchange from one day to the next. Fidelity to leks has been well documented. Visits to multiple leks are most common among yearlings and less frequent for adult males, suggesting an age-related period of establishment (Connelly et al. 2004). | A lek or group of leks within 2.5 kilometers (km) (1.5 miles) of each other between which male Greater Sage-Grouse may interchange from one day to the next. Fidelity to leks has been well documented. Visits to multiple leks are most common among yearlings and less frequent for adult males, suggesting an age-related period of establishment (Connelly et al. 2004). | No similar definition. |
| Destroyed lek | No similar definition. | A formerly active lek site and surrounding sagebrush habitat that has been destroyed and is no longer suitable for GRSG breeding | A formerly active lek site and surrounding sagebrush habitat that has been destroyed and is no longer suitable for sage-grouse breeding. | No similar definition | No similar definition. | A formerly active lek site and surrounding sagebrush habitat that has been destroyed and is no longer suitable for sage-grouse breeding. | A formerly active lek site and surrounding sagebrush habitat that has been destroyed and is no longer suitable for sage-grouse breeding. | A formerly active lek site and surrounding sagebrush habitat that has been destroyed and is no longer suitable for Greater Sage-Grouse breeding. | No similar definition. |
| Abandoned lek | No similar definition. | A lek in otherwise suitable habitat that has not been active during a period of 10 consecutive years. To be designated abandoned, a lek must be "inactive" (see above criteria) in at least four non-consecutive strutting seasons spanning the 10 years. The site of an "abandoned" lek should be surveyed at least once every 10 years to determine whether it has been re-occupied by sage-grouse. | A lek in otherwise suitable habitat that has not been active during a period of 10 consecutive years. To be designated abandoned, a lek must be "inactive" (see above criteria) in at least four non-consecutive strutting seasons spanning the 10 years. The site of an "abandoned" lek should be surveyed at least once every 10 years to determine whether it has been re-occupied by sage-grouse. | No similar definition. | No similar definition. | A lek in otherwise suitable habitat that has not been active during a period of 10 consecutive years. To be designated abandoned, a lek must be "inactive" (see above criteria) in at least four non-consecutive strutting seasons spanning the 10 years. The site of an "abandoned" lek should be surveyed at least once every 10 years to determine whether it has been re-occupied by sage-grouse. | A lek in otherwise suitable habitat that has not been active during a period of 10 consecutive years. To be designated abandoned, a lek must be "inactive" in at least four non-consecutive strutting seasons spanning the 10 years. The site of an "abandoned" lek should be surveyed at least once every 10 years to determine whether it has been re-occupied by sage-grouse. | A lek in otherwise suitable habitat that has not been active during a period of 10 consecutive years. To be designated abandoned, a lek must be "inactive" (see above criteria) in at least four non-consecutive strutting seasons spanning the 10 years. The site of an "abandoned" lek should be surveyed at least once every 10 years to determine whether it has been re-occupied by Greater Sage-Grouse. | No similar definition. |

## Lek Status Definition Comparison – MT and WY 2015 Plans

| Term | WAFWA Definition | Billings | Lewistown | HiLine | Miles City | Buffalo | Bighorn Basin | Lander |
|---|---|---|---|---|---|---|---|---|
| Lek | A lek is a traditional location where at least 2 male greater sage-grouse congregate during at least 2 springs within a 10-year period to perform their strutting display and opportunistically breed with females. Although males are territorial on leks and occupy an area, not a point, the representative location for the lek is the estimated or calculated center of the display activity. The 'lek' is the standard reporting and analysis unit for evaluating population status and long-term trends. Because males may alter their display locations within and between years (for numerous possible reasons), these multiple locations 'within' the lek have been referred to as "sub-leks", "satellite leks", "alternative leks", or "temporary leks". The location provided for the overall 'lek' should represent the dominant, largest, and/or most recent annual activity center. The lek identifier is the critical piece of data to remain consistent over time, the location can shift over time. | An assembly area where birds, especially sage-grouse, carry on display and courtship behavior. Also referred to as a "strutting ground". | A traditional courtship display area attended by male sage-grouse in or next to sagebrush dominated habitat. A lek is designated based on observations of two or more male sage-grouse engaged in courtship displays. Subdominant males may display on itinerant strutting areas during population peaks. Such areas usually fail to become established leks; therefore, a site where less than five males are observed strutting should be confirmed active for two years before meeting the definition of a lek (Connelly et al 20008; Connelly et al. 20039, Connelly, et al. 200410). Each state may have a slightly different definition of lek, active lek, inactive lek, occupied lek, and unoccupied leks. Regional planning will use the appropriate definition provided by the state of interest. | Data supports existence of lek. Supporting data defined as: (a) minimum of 2 years with 2 or more males lekking on site (preferred); or (b) 1 year with 2 or more males lekking on site followed with evidence of lekking (vegetation trampling, feathers, and droppings) during subsequent year. | A traditional breeding area for sage-grouse and sharp-tailed grouse in which males assemble to establish dominance, display, and breed. Also called dancing grounds or strutting grounds. Confirmed sage-grouse lek: • a minimum of 2 years with 2 or more males lekking on site (preferred), or • 1 year with two or more males lekking on site, followed with evidence of lekking (vegetation trampling, feathers, and droppings) during the subsequent year. | A traditional courtship display area attended by male Greater Sage-Grouse in or adjacent to sagebrush dominated habitat. A lek is designated based on observations of two or more male Greater Sage-Grouse engaged in courtship displays. Before adding the suspected lek to the database, it must be confirmed by an additional observation made during the appropriate time of day, during the strutting season. Sign of strutting activity (tracks, droppings, feathers) can also be used to confirm a suspected lek. Sub-dominant males may display on itinerant (temporary) strutting areas during population peaks. Such areas usually fail to become established leks. Therefore, a site where small numbers of males (less than 5) are observed strutting should be confirmed active for two years before adding the site to the lek database. | A traditional courtship display area attended by male sage-grouse in or adjacent to sagebrush dominated habitat. A lek is designated based on observations of two or more male sage-grouse engaged in courtship displays. Before adding the suspected lek to the database, it must be confirmed by an additional observation made during the appropriate time of day, during the strutting season. Sign of strutting activity (tracks, droppings, feathers) can also be used to confirm a suspected lek. Sub-dominant males may display on itinerant (temporary) strutting areas during population peaks. Such areas usually fail to become established leks. Therefore, a site where small numbers of males (<5) are observed strutting should be confirmed active for two years before adding the site to the lek database | No similar definition. (only "occupied Lek" below) |
| Active | A lek that has more than 2 males counted during two or more lek counts within the last 10 years. | Data supports existence of lek. Supporting data defined as: a) minimum of 2 years with 2 or more males lekking on site (preferred) or b) 1 year with 2 or more males lekking on site followed with evidence of lekking (vegetation trampling, feathers, and droppings) during subsequent year. | No similar definition. | Default assignment unless criteria are met for "inactive" or "extirpated." | Default assignment unless criteria are met for "inactive" or "extirpated." | No similar definition. | No similar definition. | No similar definition. |
| Occupied | No similar definition. | No similar definition. | No similar definition. | No similar definition. | No similar definition. | No similar definition. | No similar definition. | A lek that has been active during at least one strutting season within the last 10 years. |

| Term | WAFWA Definition | Billings | Lewistown | HiLine | Miles City | Buffalo | Bighorn Basin | Lander |
|---|---|---|---|---|---|---|---|---|
| Inactive | A lek at which all observations within the last 10 years have been less than 2 males and that has had at least 2 males recorded during a lek count between 11 to 20 years ago. | 10 years with no males or sign of lek activity - supported by surveys conducted during 3 or more years over the last 10 years. Sage grouse abundance patterns have generally fit within a 10-year time frame, encompassing both years of abundance and relative scarcity. For the purpose of assigning lek status, 10 years with 3 years of supporting data is minimal for characterizing a lek as inactive. However, the capacity for surveying leks at a greater annual frequency in 10 years is generally limited and therefore this Status Definition incorporates both biological (i.e., past abundance patterns) and current administrative factors. | No similar definition. | 10 years with no sign of lek activity - supported by surveys conducted during 3 or more years over the last 10 years. | 10 years with no sign of lek activity and supported by surveys conducted during 3 or more years over the last 10 years. | No similar definition. | No similar definition. | No similar definition. |
| Unoccupied lek | No similar definition. | No similar definition. | No similar definition. | No similar definition. | No similar definition. | No similar definition. | No similar definition. | No similar definition. |
| Historical | A lek at which all observations within the last 20 years have been less than 2 males, but previously met the definition of a lek.<br>(Previously "Historic", Coates et al. 2021) | No similar definition. | No similar definition. | No similar definition. | No similar definition. | No similar definition. | No similar definition. | No similar definition. |
| Pending Active | A lek with one observation of at least 2 males in the last 10 years and at least one observation of at least 2 males more than 10 years ago. This status captures leks insufficiently monitored to classify as Active, Inactive, or Historical but contains a more recent observation than Pending Historical.<br>(Previously "Pending New", Coates et al. 2021) | No similar definition. | No similar definition. | No similar definition. | No similar definition | No similar definition. | No similar definition. | No similar definition. |

| Term | WAFWA Definition | Billings | Lewistown | HiLine | Miles City | Buffalo | Bighorn Basin | Lander |
|---|---|---|---|---|---|---|---|---|
| Pending Historical | A lek with insufficient observations in the last 10 years to classify as Active, Inactive, Historical, or Pending Active. This requires one observation of at least 2 males recorded 11 to 20 years ago and at least one observation of at least 2 males more than 20 years ago.<br>(Previously "Pending Old", Coates et al. 2021) | No similar definition. | No similar definition. | No similar definition. | No similar definition. | No similar definition. | No similar definition. | No similar definition. |
| Lek Complex | Considered an "outmoded" definition.<br>1. A grouping of leks that likely have frequent movement of individuals between leks.<br>2. A single lek recorded in multiple locations in multiple years in relatively close proximity. | No similar definition. | No similar definition. | No similar definition. | No similar definition. | No similar definition. | No similar definition. | No similar definition. |
| Destroyed lek | No similar definition. | No similar definition. | No similar definition. | No similar definition. | No similar definition. | No similar definition. | No similar definition. | No similar definition. |
| Abandoned lek | No similar definition. | ("Confirmed Extirpated") Habitat changes have caused birds to permanently abandon a lek (e.g., plowing, urban development, overhead power- line). | No similar definition. | ("Extirpated") Habitat changes have caused birds to permanently abandon a lek (e.g., plowing, urban development, overhead power line). | (Extirpated) habitat changes have caused birds to abandon permanently a lek (e.g., plowing, urban development, overhead power lines). | No similar definition. | No similar definition. | No similar definition. |
| Provisionally confirmed Greater Sage-Grouse lek | — | — | — | Only one year of survey data is available but more than 5 males were observed. | — | — | — | — |
| Unconfirmed Greater Sage-Grouse lek | — | — | — | Single count with no subsequent survey or a reported lek without supporting survey data. | — | — | — | — |

# Appendix 5

## Evaluation of Areas of Critical Environmental Concern for Greater Sage-Grouse Habitat

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# Appendix 5. Evaluation of Areas of Critical Environmental Concern for Greater Sage-Grouse Habitat

## 5.1 INTRODUCTION

The Federal Land Policy and Management Act (FLPMA) requires that priority shall be given to the designation and protection of areas of critical environmental concern (ACECs). ACECs are defined in FLPMA Section 103(a) (43 United States Code 1702) and in 43 Code of Federal Regulations (CFR) 1601.0-5(a) as "areas within the public lands where special management attention is required (when such areas are developed or used or where no development is required) to protect and prevent irreparable damage to important historic, cultural, or scenic values, fish and wildlife resources or other natural systems or processes, or to protect life and safety from natural hazards." The following analysis and the resultant findings for ACEC relevance and importance criteria has been performed pursuant to FLPMA Section 202(c)(3) (43 United States Code 1712), 43 CFR 1610.7-2, and BLM Manual 1613, *Areas of Critical Environmental Concern.*

## 5.2 REQUIREMENTS FOR ACEC DESIGNATION

To be eligible for designation as an ACEC, an area must meet both the relevance and importance criteria described in 43 CFR 1610.7-2 and BLM Manual 1613, and it must require special management to protect and prevent irreparable damage to those values. The planning regulations define relevance and importance as follows:

> Relevance—There shall be present a significant historic, cultural, or scenic value; a fish or wildlife resource or other natural system or process; or natural hazard.
>
> Importance—The above-described value, resource, system, process, or hazard shall have substantial significance and values. This generally requires qualities of more than local significance and special worth, consequence, meaning, distinctiveness, or cause for concern. A natural hazard can be important if it is a significant threat to human life or property.

Additional clarification provided in BLM Instruction Memorandum 2023-013 states that during review of relevance and importance, evaluations should consider "whether relevant values contribute to landscape intactness, climate resiliency, habitat connectivity, or opportunities for conservation or restoration, or have substantial significance to Tribes or Alaska Native Corporations, as defined in the Alaska National Interest Lands Conservation Act, in a way that may support Tribal co-stewardship or traditional and customary uses."

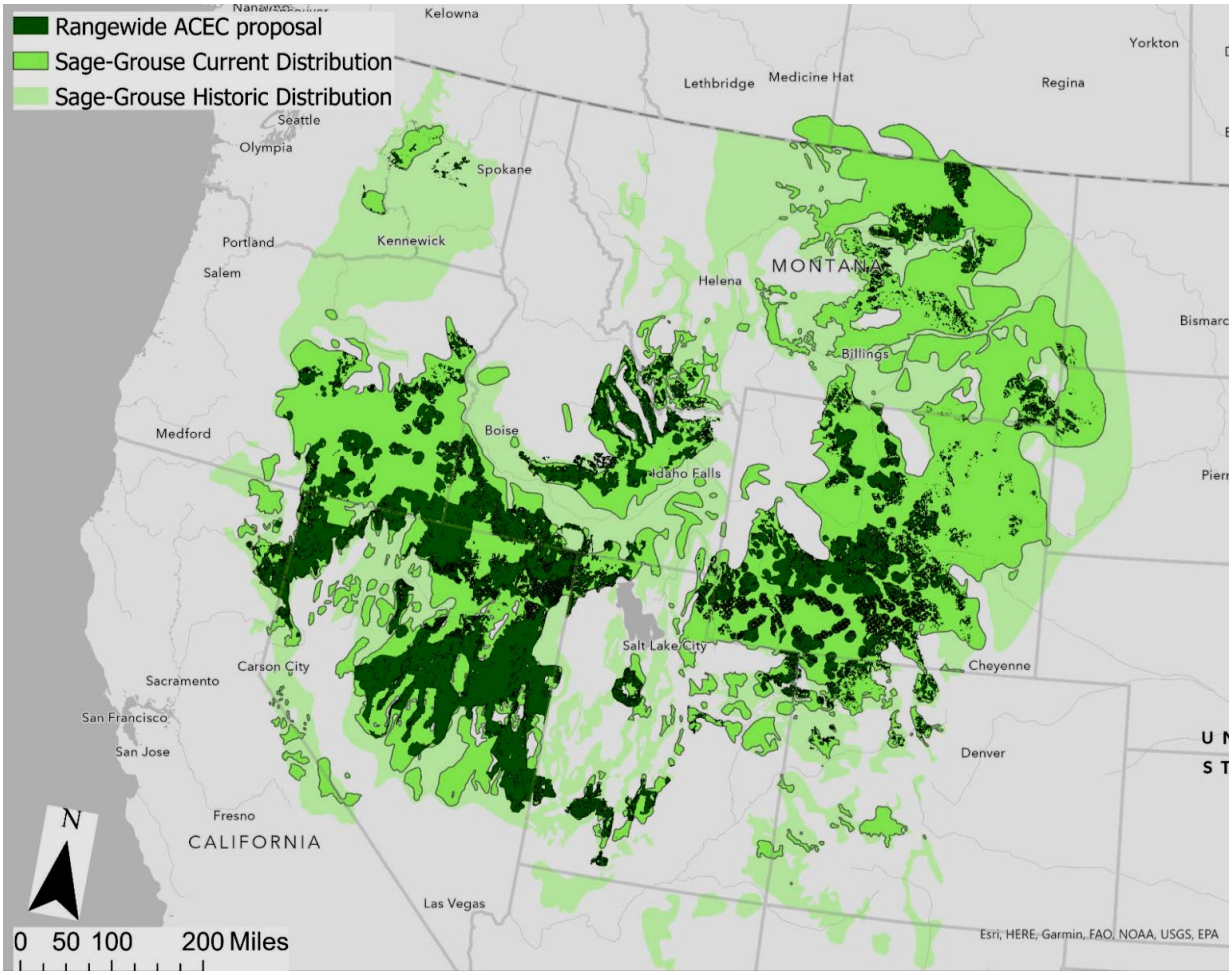
The BLM's ACEC manual provides additional guidance on the requirement for special management attention, noting that such management "would not be prescribed in the absence of the designation. (In other words, the concept of special management is relative.)" While relevance and importance are evaluated to determine if a potential ACEC should be further analyzed in the draft environmental impact statement (DEIS), the need for special management is generally considered when analyzing alternatives with and without the potential ACEC and its associated management. Only those areas that meet relevance and importance criteria are identified as potential ACECs and considered in the DEIS.

## 5.3 NOMINATIONS

The BLM's Notice of Intent (86 FR 66331) for this greater sage-grouse (GRSG) amendment effort invited the public "to nominate or recommend areas that may be considered for designation as areas of critical environmental concern (ACEC), per 43 CFR 1610.7-2." Because this planning effort is only considering amending resource management plan (RMP) actions related to GRSG and its habitat, the invitation clarified that "nominations or recommendation of potential ACECs should be relevant to the preliminary purpose and need of this planning initiative." In other words, any ACEC nomination (or component thereof) that included values other than GRSG and its habitat were not evaluated or included as part of this planning effort. However, ACEC nominations that included GRSG as one of the (potentially many) nominated values were considered, but only for GRSG habitat.

In response to the BLM's request for nominations, one formal nomination was provided during the scoping period. A group of several non-governmental organizations, represented by the American Bird Conservancy, nominated 48,202,418 acres of public lands throughout the planning area as the "Sagebrush Sea Reserve ACEC." **Figure 5-1** is an image from the nomination letter, showing the extent of the nominated area.

**Figure 5-1. Sagebrush Sea Reserve ACEC Nomination**



For most of the proposal, the nominated area "is squarely based on the Sage-grouse Priority Areas for Conservation" (PACs) from the US Fish and Wildlife Service's (USFWS) 2013 Conservation Objectives Team Report (COT Report). However, in Wyoming the nominated area was expanded beyond the PACs to also include all the 75% breeding density areas from Doherty, et. al 2010[1], as well as new Wyoming Core Area designations from 2015. From all those areas in Wyoming the nominators removed areas with a density of active oil and gas wells that exceeded five wells per square mile. For Nevada, the nominated area expanded beyond the PACs "to increase coverage of important seasonal habitats for [GRSG] and ensure connectivity between numerous patches of high-quality habitat that are separated by rocky mountain ranges, playas, and other expanses of marginal quality habitat." In addition to identifying the area for consideration, the proposal also included suggestions for how the nominated ACEC should be managed.

Later in the planning process, additional ACEC nominations were submitted. These later submissions were associated with specific areas, though they included a wide variety of potential values beyond just GRSG habitat. These nominations include the following:

| Additional Externally Nominated GRSG ACECs | | |
|---|---|---|
| **Nominated Area Name** | **Location/State** | **Size** |
| Little Sandy | Central Wyoming | 367,362 acres |
| Red Desert | Central Wyoming | 153,763 acres |
| McDermitt Caldera | NE Nevada/SE Oregon | No specific area delineated |
| Frenchman Breaks Expansion | Northern Montana | 45,725 acres |
| Musselshell Breaks | Central Montana | 122,290 acres |
| North of the Charles M Russell National Wildlife Refuge | Central Montana | 185,055 acres |
| Powderville Expansion | Eastern Montana | 20,053 acres |

## 5.4 EVALUATION PROCESS

### 5.4.1 ACEC Evaluation in Prior GRSG Planning Efforts

The BLM evaluated GRSG habitat for consideration as ACECs during the 2015 greater sage-grouse (GRSG) plan amendment process. Conducted at the state or field office levels, those evaluations determined that Priority Habitat Management Areas (PHMA) for GRSG met relevance and importance criteria because it contains habitat that is valuable for all life stages, including lekking, brood-rearing, and winter range. However, the BLM decided not to designate PHMA as ACECs in the applicable Records of Decision because it was determined that the management actions for PHMA would be sufficient to protect GRSG habitat and, as such, ACEC designation of PHMA was not required. During the 2019 planning process, ACEC nominations were not reconsidered.

### 5.4.2 ACEC Evaluation Approach in the Current GRSG Planning Effort

The BLM evaluated for potential ACECs across the entirety of GRSG habitat on BLM-administered lands, with no distinction between habitat management areas, specific nominated areas, or prior identified areas. With all habitat as the starting point, BLM then considered available data at multiple spatial scales to determine what, if any areas met relevance and importance criteria. Because the BLM evaluated all GRSG habitat, the evaluation of externally provided ACEC nominations simply had to determine if any new data had been provided that had already been considered in the rangewide analyses.

[1] Doherty, K.E., J.D. Tack, J.S. Evans, J.SN. and D.E. Naugle. 2010. Mapping breeding densities of greater sage-grouse: a tool for range-wide conservation planning. BLM completion report: Agreement # L10PG00911.

The evaluation for relevance and importance criteria was conducted in a two-step approach that started with rangewide scientific data and models, followed by a review by staff at the state and field office levels who are more familiar with the local habitat conditions. The evaluation considered multiple lines of information, never relying on just one data set to conclude a criterion was met. Rangewide models were an important starting point, but incorporation of local information, and considerations of data accuracy and scale of application were carefully reviewed prior to making the preliminary delineations and for the evaluation of nominations. The preliminary evaluations described in this appendix will be adjusted based on information provided during the public review of the Draft EIS. These evaluations will be finalized in the Final EIS and analysis in chapter 4 updated, as necessary, to inform whether the potential ACECs should be considered proposed ACECs.

***Relevance Criteria***

In this evaluation process, the BLM considered just two of the relevance criteria: 1) a wildlife resource, and 2) a natural process or system – related to GRSG habitats. No cultural, scenic, values or natural hazards were evaluated.

Because the relevance criterion is simply the presence of a wildlife resource or a natural process or system, areas within the mapped habitat management areas generally met the relevance criteria at this scale of habitat mapping (populations or seasonal habitats). The BLM affirmed the presence of GRSG populations or associated sagebrush habitats with multiple data inputs (distribution maps, seasonal habitats, leks, etc.). All areas with GRSG and their habitats were determined to meet the relevance criteria.

Areas of split surface and mineral estates, where the BLM manages the mineral estate but not the surface, were not included in the relevance evaluation. Areas where the agency administers just the mineral estate would have no wildlife resource within the agency's jurisdiction, and therefore the area would not meet the relevance criterion.

***Importance Criteria***

Once confirming the presence of GRSG and associated habitats, the BLM then evaluated importance criteria. Importance evaluation must include an assessment of: "the value, resource, system, process or hazard…must have substantial significance and values" (BLM-M-1613.1.B). The BLM's planning regulation notes that substantial significance "generally requires qualities of more than local significance and special worth, consequence, meaning, distinctiveness, or cause for concern." This evaluation effort focused on determining whether a given area of GRSG habitat being considered has characteristics that make it more than locally significant, and the evaluation compared areas of GRSG habitat to determine if any particular area had characteristics that were more than locally important. The importance criteria considerations are not an assessment of biological value of habitat to a given population, but how that habitat and its characteristics compare to other GRSG habitat throughout the species range. Rising to a level of national importance required multiple lines of evidence identifying and area as exemplary for GRSG.

***Priority Areas for Conservation (PACs) and Sagebrush Focal Areas (SFAs)***

The BLM did not simply relabel prior designations as ACECs for this planning effort. Rather than using the composite results of prior mapping efforts, which were identified for purposes different than land use planning or ACEC evaluation, this evaluation sought to use primary data-sets. Neither the COT Report nor the SFAs specifically considered the various components associated with the importance criteria. While there may be overlap in evaluation for ACEC criteria, previous designations were not developed using the regulatory and policy criteria associated with the BLM ACEC process. Additionally, PACs and SFAs were

developed using data that was available at the time of their publication (2013 and 2015, respectively). The PACs were developed by the States and helped inform the BLM's habitat management areas in the 2015 GRSG amendment effort. Since the 2013 COT Report, the BLM has worked with state wildlife agencies to update habitat management area boundaries in three states. For this amendment, the BLM is working with all the states to re-evaluate the habitat management areas based on new science and research products that have been completed since 2015. For these reasons, the BLM did not use PACs or SFAs as an automatic delineation of potential ACECs, or as justification that the area met importance criteria.

### 5.4.3 Rangewide Preliminary Evaluation

A series of rangewide spatial layers (see list below) were visually reviewed across the entire GRSG range. This preliminary review focused on areas outside of the SFAs designated in 2015, with the understanding that new data associated with the SFAs would be reviewed at the state level as a next step in the evaluation. The purpose of the review was to identify potential areas where multiple data sources indicated areas of high value or concern related to GRSG use and conservation. The resulting areas were identified as an initial screening for consideration by BLM State and Field Office staff to determine if they should be carried forward to discussions with partners. Every layer in the list below was considered but some carried more importance in some areas than others. For example, areas that models indicated as important genetic connectivity may have resulted in that layer receiving more emphasis than others where genetic connectivity was not a factor.

After initial areas were identified, the size and extent of the polygons were reviewed in context of the presence of BLM-administered lands. Areas where the BLM had marginal or scattered parcels were removed, as the effectiveness of habitat management is such areas is low without cross-ownership coordination. Some areas extend beyond BLM lands simply for consideration of external factors that may influence the conservation value of the areas being considered. For each area, the information supporting the decision to identify that area for further consideration is outlined below.

***Layers reviewed***

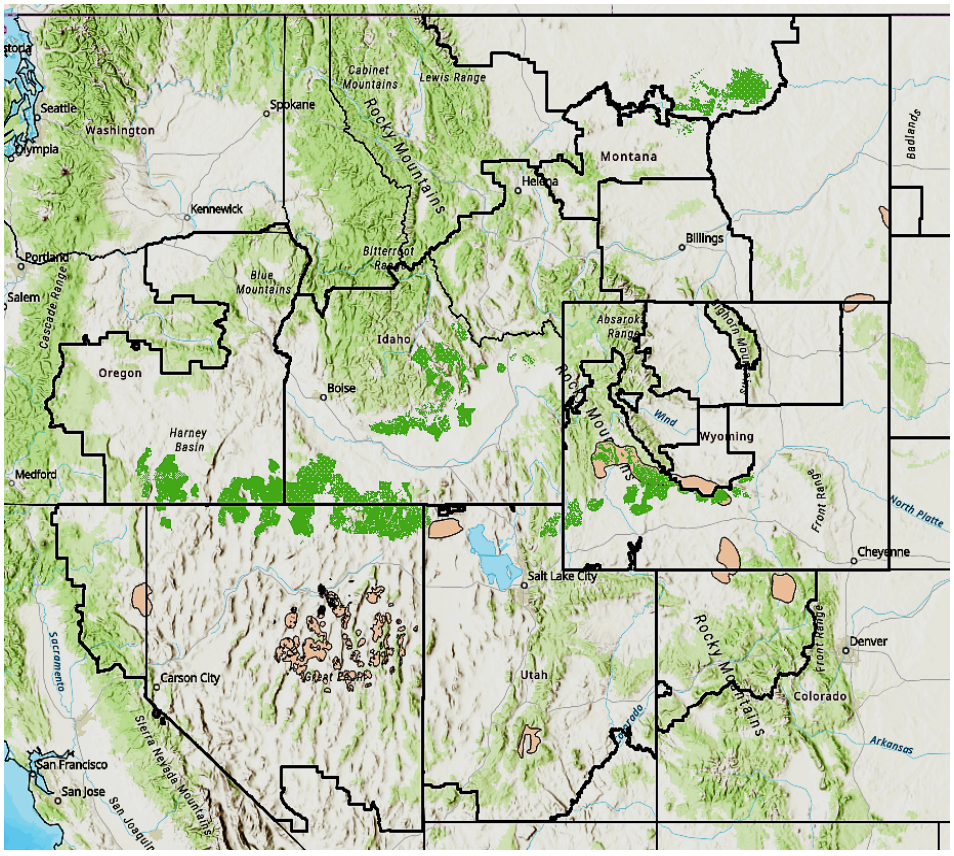
- Coates et al., 2021. Range-wide Greater sage-grouse Hierarchical Monitoring Framework, Implications for Defining Population Boundaries, Trend Estimation, and a Targeted Annual Warning System (https://doi.org/10.3133/ofr20201154);
- Cross et al., 2018. The genetic network of greater sage-grouse: Range-wide identification of keystone hubs of connectivity (https://onlinelibrary.wiley.com/doi/full/10.1002/ece3.4056)
- Doherty et al. 2016. Importance of regional variation in conservation planning: a range-wide example of the Greater Sage-Grouse (https://esajournals.onlinelibrary.wiley.com/doi/full/10.1002/ecs2.1462)
- Oyler-McCance et al., 2022. New strategies for characterizing genetic structure in wide ranging, continuously distributed species: lessons learned from Greater Sage-grouse (https://doi.org/10.1371/journal.pone.0274189)
- Row et al., 2018. Quantifying functional connectivity: the role of breeding habitat, abundance, and landscape features on range-wide gene flow in sage-grouse (https://onlinelibrary.wiley.com/doi/full/10.1111/eva.12627)
- Palmquist et al., 2021. Divergent climate change effects on widespread dryland plant communities driven by climatic and ecohydrological gradients (https://onlinelibrary.wiley.com/doi/full/10.1111/gcb.15776)

- Rigge et al. 2021. Projected change in rangeland fractional component cover across the sagebrush biome under climate change through 2085 (https://esajournals.onlinelibrary.wiley.com/doi/full/10.1002/ecs2.3538)
- Cross et al. 2022. The ties that bind the sagebrush biome: integrating genetic connectivity into range-wide conservation of greater sage-grouse

***Areas Identified from Rangewide Review***

**Figure 5-2** show the areas that were identified through the rangewide review, as well as the designated SFAs from the 2015 planning process.

**Figure 5-2: Rangewide Review Areas (light orange) and SFAs (light green areas)**




The following list summarizes the areas identified through the rangewide review, organized by state. Bullets that are bolded indicated the most influential considerations in identifying areas for further consideration.

*Colorado*

- North Park
  - Most of the area is PHMA
  - High relative abundance
  - Entire area is modeled breeding habitats
  - High habitat connectivity for genetics.

  - Climate change models predict 5-25% sagebrush cover into the future, with moderate increase in sagebrush biomass.
  - Area anchored by NWR
  - **Few current threats**
  - **Appears to be an isolated population on the "edge" of the range**
- WY/CO border
  - Areas within PHMA in CO, and mostly PHMA in WY
  - High relative abundance
  - Modeled breeding habitats cover entire area in CO, most of the area in WY
  - Many genetic nodes, including an important node in CO. **Genetic movement between these areas suggest extensive population movements**
  - **High habitat connectivity for genetics within and between the areas**
  - Climate change models predict 5-25% sagebrush cover into the future and a mix of mostly increasing sagebrush biomass

*Montana/Dakotas*

- Area bordering ND
  - GHMA in MT, PHMA in ND
  - High relative abundance
  - Several connected genetic nodes
  - **May provide the only refuge for the ND birds; important for that genetic subpopulation**
  - Future sagebrush cover models suggest 0-4%, but that is not atypical for this area.
  - Future sagebrush biomass to increase
- Area bordering WY
  - RHMA in MT, mostly GHMA in WY
  - High relative abundance
  - lots of modeled breeding habitat
  - contains an important genetic node (maybe hub?); **may provide a connection with the GRSG in the DKs, and SE MT.**
  - Future sagebrush cover models suggest 0-4%, but that is not atypical for this area
  - Future sagebrush biomass to increase in PHMA and RHMA, but decrease in GHMA

*Nevada/California*

- Central Nevada (Areas that are currently PHMA and high abundance only)
  - **High relative abundance**
  - High modeled breeding habitats
  - **High connectivity within the PHMA areas**
  - Two key genetic nodes and many other genetic nodes
  - Overlaps two genetic subpopulations
  - Climate change models predict 5-25% sagebrush cover, but decreasing biomass in most areas
- East-central CA
  - Area is PHMA
  - **High relative abundance – likely the greatest number of males in CA**

  - Breeding habitat mimics relative abundance
  - **Few genetic nodes but those indicate connection to the north (OR) and SE into NV**
  - Medium connectivity (combined models)
  - Climate change models predict reduction in sagebrush biomass, but sagebrush cover at 5-25%

*Utah*

- NW UT
  - Area is PHMA
  - Some areas of high relative abundance – should consider additional protections in those areas
  - Breeding habitat model are in the same area of high relative abundance
  - Habitat connectivity for genetic is high throughout the area
  - **Area has two key genetic nodes and several others. The key nodes are connected with populations in ID and eastern NV, while other nodes are connected with southern UT populations and NE UT**
  - **3 subpopulations overlap this area – may indicate value for maintaining connectivity.**
  - Climate change models predict 5-25% sagebrush cover into the future and increasing sagebrush biomass
  - **Looking at wintering habitat – breeding habitat is on private ground**
- Parker Mountain
  - Area is currently PHMA
  - High relative abundance
  - Area is modeled breeding habitat
  - **Contains one key genetic node and a few other nodes – appears to be connected both to the north and the west**
  - Habitat connectivity high within the outlined area
  - Climate change models predict 5-25% sagebrush cover and increase in sagebrush biomass.
  - **Likely has the largest population of GRSG in the subpopulation**

*Wyoming*

- WY/CO border
  - Areas within PHMA in CO, and mostly PHMA in WY, but some GHMA along the western edge of the PHMA.
  - High relative abundance
  - Modeled breeding habitats cover entire area in CO, most of the area in WY
  - Many genetic nodes, including an important node in CO. **Genetic movement between these areas suggest extensive population movements**
  - **High habitat connectivity for genetics within and between the areas**
  - Climate change models predict 5-25% sagebrush cover and a mix of mostly increasing sagebrush biomass, but some areas of decreases.
- WY Pinedale and Atlantic City area
  - Most of the area is PHMA, some in original SFA
  - **High relative abundance – likely the largest number of GRSG in the entire range**
  - Entire area modeled breeding habitat

  - Many genetic nodes including two important nodes
  - High habitat genetic connectivity
  - Climate change models project 5-25% sagebrush cover into the future and an increase in sagebrush biomass.
  - **Area of high risk for continued development**
  - Northern end of Green River watershed is mostly private land.
- Area bordering WY – RHMA in MT, mostly GHMA in WY – Note this area overlaps with the area identified in MT
  - High relative abundance,
  - lots of modeled breeding habitat
  - contains an important genetic node (maybe hub?); **may provide a connection with the GRSG in the DKs, and SE MT.**
  - Future sagebrush cover models suggest 0-4%, but that is not atypical for this area
  - Future sagebrush biomass to increase in PHMA and RHMA, but decrease in GHMA

The rangewide review did not identify any areas in Idaho or Oregon outside the SFAs.

### 5.4.4 State Specific Evaluations

The results of the rangewide review were shared with staff from each BLM State Office, with discussions reviewing the rationale behind the identification. Offices reviewed the areas from the rangewide evaluation, the SFAs, and any other areas the local staff may be familiar with as having characteristics that could meet the importance criteria. Based on the combined evaluations, areas outside the SFAs or rangewide evaluation areas were determined to not meet importance criteria, as the data indicated they lacked the characteristics that made them more than locally significant. The remainder of the areas were evaluated in detail.

Through the rangewide and state specific evaluations, no areas met the importance criteria related to safety/public welfare concerns or posing a significant threat. As such, those criteria will not be discussed further in this evaluation.

The following sections summary the evaluation efforts associated with state specific evaluations, organized by state (alphabetically).

#### *Colorado*

BLM Colorado considered the previous ACEC evaluation from the 2015 FEIS and discussed whether there was new information or resource values making any of the populations and subpopulations (Colorado Management Zones) eligible for ACEC nomination. BLM Colorado also considered two areas highlighted by the range-wide planning team. The two highlighted areas were the North Great Divide and Fly Creek portions of the Northwest Colorado GRSG population and the North Park GRSG population. The North Great Divide and Fly Creek areas have contiguous habitat connecting north into the Wyoming Basin in Wyoming. BLM Colorado and BLM Wyoming coordinated during review of these areas, but separate determinations were made by the respective interdisciplinary teams.

BLM Colorado also coordinated with BLM Utah regarding the functional connectivity on the cross-border Blue Mountain habitat area. Row et al. (2018) demonstrates high connectivity between GRSG populations in CO and UT which is supported by bird collar location data (unpublished CPW data). However, Row et al. (2018) does not model a known connectivity area in the Diamond Mountain or Cold Springs Mountain

areas to the north. For these reasons, the Blue Mountain connectivity area was not considered to be more than locally significant and was not carried forward for additional evaluation.

*North Great Divide and Fly Creek*

North Great Divide and Fly Creek are situated within the northeast extent of the Northwest Colorado GRSG population. These areas include high quality sagebrush with relatively low disturbance except for the Highway 13 designated corridor, which bisects the areas. North Great Divide and Fly Creek provide breeding, nesting, brood-rearing, and winter habitat for GRSG and include several active leks.

The North Great Divide and Fly Creek areas were highlighted by the range wide planning team because of the genetic and functional genetic connectivity between the Northwest Colorado population and the Wyoming Basin population (Cross et al. 2018, Row et al. 2018) and high likelihood of lek persistence (Wann et al. 2022). The area contains many genetic nodes, or leks that are important to maintaining gene flow in a population, including an important node in Great Divide (Cross et al. 2018). Important nodes maintain gene flow between populations in the species range (Cross et al. 2018). Genetic movement between these areas suggest that the habitat has previously supported population movements within and between populations. Row et al. (2018) and Cross et al. (2023) modeled high habitat connectivity for genetics between these areas and the Wyoming Basin.

Genetic and functional connectivity between Northwest Colorado and the Wyoming Basin are modeled in other portions of the Northwest Colorado population as well. Row et al. (2018) modeled connectivity areas between Northwest Colorado and the Wyoming Basin occurring in the Sand Wash/Powder Wash area and in the Cold Springs area. Sand Wash also contains a genetically important node (Cross et al. 2018). Strong population genetics between the Northwest Colorado and Wyoming Basin do not indicate that there is a risk of the populations becoming genetically distinct (Oyler-McCance et al. 2022).

The North Great Divide and Fly Creek areas provide valuable GRSG habitat that is well-connected to the Wyoming Basin, but several other areas in the Northwest Colorado Population also demonstrate habitat and genetic connectivity. For this reason, BLM Colorado determined that the area does not have more than local significance and is not recommended to move forward as a potential ACEC.

*North Park*

North Park is a large basin bounded by Medicine Bow Range on the east and by the Park Range on the west. The Rabbit Ears Range separates North Park from Middle Park to the south. BLM Colorado discussed all areas of North Park for values important to GRSG. North Park provides well connected lekking, nesting, brood-rearing, and winter habitat for GRSG. A large majority of seasonal habitats for GRSG in North Park are suitable (North Park HAF Site-Scale Report, 2022). North Park has genetic connections to the Middle Park population to the south and a narrow connection north to the Wyoming Basin but is otherwise disjunct from the Northwest Colorado population (Cross et al. 2018; Row et al. 2018; Cross et al. 2023). The BLM Kremmling Field Office is implementing treatments to increase the value of GRSG habitat, particularly the extent of available mesic habitats.

*Case Flats*

BLM Colorado highlighted the Case Flats area, which is a known winter concentration area. CPW staff discovered the Case Flats winter concentration area while conducting GRSG research in the North Park Basin. For unknown reasons, GRSG from the entire basin congregate in large numbers at this location each year during late winter/early spring prior to lekking (CPW Wildlife Mitigation Plan, 2021). The area has been highlighted in conversations with Colorado Parks and Wildlife and outlined as a resource for concern in the

CPW Wildlife Mitigation Plan with the local operator but has not been otherwise recognized for specific management by the BLM.

Case Flats includes unitized fluid mineral leases and is in proximity to active oil & gas development, Highway 14, and ex-urban development. The likelihood of lease development is high, which could have direct and indirect impacts on GRSG and winter concentration in the area.

Due to the unique nature of the winter concentration area, population-wide importance, and likelihood of lease development, BLM Colorado evaluated the area as a potential ACEC. This nominated area meets relevance and importance criteria for wildlife and a natural process or system as presented in the table below.

**Colorado GRSG ACEC Importance Evaluation:**
**Case Flats Proposed ACEC**

| Importance Consideration | Yes/No | Rationale for Determination |
|---|---|---|
| More than locally significant qualities, especially compared to any similar resource, that give it:<br>• Special worth:<br>• Consequence<br>• Meaning<br>• Distinctiveness<br>• Cause for concern | Yes | The area contains unique GRSG winter concentration areas, providing special worth to the North Park GRSG population. |
| Qualities or circumstances that make it:<br>• Fragile<br>• Sensitive<br>• Rare<br>• Irreplaceable:<br>• Exemplary<br>• Unique:<br>• Endangered<br>• Threatened<br>• Vulnerable to adverse change | Yes | Case Flats provides a unique winter concentration area for a BLM sensitive status species. The habitat provides for unique GRSG congregating behavior which may be irreplaceable because it is not known why GRSG concentrate in this area and may not be replicable in other habitats. The area contains several unitized oil and gas leases and could be adversely impacted by development. |
| Has been recognized as warranting protection in order to satisfy national priority concerns or to carry out the mandates of FLPMA | Yes | The area is within Greater Sage-Grouse Priority Habitat Management Areas which have been at the focus of national planning efforts, and state and local land use plans. |
| **Other Items** | | |
| Boundaries | South of Walden, bound by Highways 14 and 125, Bordering Arapaho Wildlife Refuge. | |
| **Conclusion** | | |
| This internally nominated area meets both relevance and importance criteria for a fish and wildlife resource. Because Case Flats meets relevance and importance as a fish and wildlife resource, it is recommended to move forward for analysis in at least one alternative of the current range-wide planning effort. | | |

| Colorado GRSG ACEC Importance Evaluation: North Great Divide/Fly Creek Proposed ACEC | | |
|---|---|---|
| **Importance Consideration** | **Yes/No** | **Rationale for Determination** |
| More than locally significant qualities, especially compared to any similar resource, that give it:<br>• Special worth:<br>• Consequence<br>• Meaning<br>• Distinctiveness<br>• Cause for concern | No | The areas are modeled as having high genetic and functional genetic connectivity between the Northwest Colorado population and the Wyoming Basin (Cross et al. 2018; Row et al. 2018; Cross et al. 2023) and high likelihood of lek persistence (Wann et al. 2022). The area contains many genetic nodes, including an important node in Great Divide (Cross et al. 2018).<br><br>However, genetic and functional connectivity between Northwest Colorado and the Wyoming Basin are modeled in other portions of the Northwest Colorado population as well. Row et al. (2018) modeled connectivity areas between Northwest Colorado and the Wyoming Basin occurring in the Sand Wash/Powder Wash area and in the Cold Springs area. Sand Wash also contains a genetically important node (Cross et al. 2018). Strong population genetics between the Northwest Colorado and Wyoming Basin do not indicate that there is a risk of them becoming genetically distinct (Oyler-McCance et al. 2022).<br>Because there are multiple points of connection cross-state between the populations and, this area is not more than locally significant. |
| Qualities or circumstances that make it:<br>• Fragile<br>• Sensitive<br>• Rare<br>• Irreplaceable:<br>• Exemplary<br>• Unique:<br>• Endangered<br>• Threatened<br>• Vulnerable to adverse change | No | Because there are multiple points of connection cross-state between the populations, this area is not unique, rare, or irreplaceable. |
| Has been recognized as warranting protection in order to satisfy national priority concerns or to carry out the mandates of FLPMA | No | The area is within Greater Sage-Grouse Priority Habitat Management Areas which have been at the focus of national planning efforts, and state and local land use plans. However, this area contains only a small portion of the PHMA within Colorado and of the Western US and the area has not been specifically addressed as a national priority. |
| **Other Items** | | |
| Boundaries | Great Divide is bound by the Little Snake River to the west and Highway 13 to the east, and the Wyoming border to the north and Highway 40 to the south. Fly Creek is bound by the Elkhead Mountains to the south and connected sagebrush habitat moving north into Wyoming. Highway 13 bisects the areas. | |
| **Conclusion** | | |
| The nominated area meets relevance criteria but does not meet importance criteria. Therefore, it is not recommended that the area be considered a potential ACEC for GRSG for analysis in the current range-wide planning effort. | | |

***Idaho***

The ACEC evaluation in Idaho had several unique aspects. Even though the rangewide evaluation did not identify any additional areas beyond the SFAs, the rangewide evaluation did include areas within the 2015 SFAs. The ACEC evaluation process at the Idaho State Office overlapped with the mapping effort of Idaho's three-tiered system of habitat management areas. . At the state level, the Idaho State Office evaluated the following local datasets to help identify and delineate areas that meet the importance criteria:

- Local scale data: Idaho BLM developed a Landscape Importance Model (LIM) in 2015 to prioritize areas of Low to Highest Importance related to GRSG. The LIM model incorporates 3 orthogonal datasets related to GRSG: State level BBD, State level Lek Kernel Density, and Lek Persistence (related to amount of sagebrush within a 5-km window). These datasets are recalculated every year. Individual datasets are scored 1-10 and the resulting combined dataset is Categorized 1 (lowest) to 5 (Highest). For ACEC delineation we used the 2022 LIM – moderate to highest values (3,4,5) to extract our base ACEC polygon, focusing on the top two values.
- Local scale data: Idaho contains a significant proportion of the estimated GRSG population in the Great Basin (excluding WY); therefore, the current (2022) state-level BBD data was used, with the top 25$^{th}$ percentile of the population selected as indicating areas that had high levels of importance. These leks were then buffered 10K and the resulting polygon was added to the ACEC base.
- Regional scale data: Recently published regional GRSG data (BBD, Lek Persistence, and Priority Genetic Pathways) was used to inform regional importance. These data were combined (i.e. 25% and 50% BBD; medium or high lek persistence; >90 or >95% Priority Genetic Pathways) to provide an overall score of 0-6, from which a subset was included only using values 4 – 6. The resulting polygon was added to the ACEC base.

In some areas, moderate LIM values or top 50$^{th}$ percentile of the population (from the BBD data) were added to polygons in order to connect the delineated areas identified above.

The following table summarizes the areas that were identified through the state-level modeling effort, as well as the recommendations related to whether the area met the importance criteria.

**Idaho GRSG ACEC Evaluation: Importance Criteria**

| Identifier | Geographic Reference | Importance | Recommendation |
|---|---|---|---|
| N/A | Whiskey Mountain | N/A. SW Idaho area. Poor habitat on OR side, per discussion with Oregon SO; Medusa, cheatgrass threats. Not in 25% BBD on ID or OR side. | Remove. Not recommended for potential ACEC. |
| N/A | South Mountain | N/A. Poor habitat on OR side per discussion with Oregon SO; small proportion high genetic connectivity on east side of polygon; Medusahead, cheatgrass threats. Not in 25% BBD on ID or OR side. Boulder Creek ACEC occupies high value regional genetic pathway. | Remove. Not recommended for potential ACEC. |
| I | Triangle | Good habitat; high Resistance and Resilience; BBD 25%, and 50%; High value in Combined model. Genetic hub and keystone. Adjoins Castle Creek Canyon Lands With Wilderness Characteristics. | Keep. Recommended for potential ACEC. |

| Idaho GRSG ACEC Evaluation: Importance Criteria | | | |
|---|---|---|---|
| **Identifier** | **Geographic Reference** | **Importance** | **Recommendation** |
| 2 | Owyhee-Shoshone Basin | Significant representation of the 25% BBD in Idaho (i.e., contains 28 of the 77 leks comprising the 25% BBD in Idaho); Adjacent to NV Priority and Priority+ HMA; Significant contribution value from new regional datasets; High amount of genetic connections/nodes; Also represents a large area of contiguous BLM administered lands. | Keep. Recommended for potential ACEC. |
| 3 | Camas-Laidlaw | Significant representation of the 25% BBD in Idaho (i.e., contains 9 of the 77 leks comprising the 25% BBD in Idaho); Several genetic nodes constituting linkage to NV and UT; High value priority genetic pathways; In the top 25% of the MZ IV GRSG population; Large area of contiguous BLM administered lands; Adjacent to a major regional genetic node. | Keep. Recommended for potential ACEC. |
| 4 | Big Desert | Significant representation of the 25% BBD in Idaho (i.e., contains 6 of the 77 leks comprising the 25% BBD in Idaho); Adjacent to a major regional genetic node; contains several genetic nodes with Sand Creek/Upper Snake, Mountain Valles/Salmon, Craters Monument, and Utah. | Keep. Recommended for potential ACEC. |
| 5 | Antelope Valley | Smaller, distinct area of 25% BBD; Relatively low anthropogenic disturbance; | Keep. Recommended for potential ACEC. |
| 6 | Mountain Valley Complex | 25-50% BBD; Middle section has large existing ACEC (Donkey Hills); relatively low threats; High potential as a refugia for future climate change effects; relatively low anthropogenic disturbance; NW polygon, per Arkle et al, shows a lek cluster with increasing Lambda (+ pop growth). | Keep. Recommended for potential ACEC. |
| 7 | Upper Snake Complex | Significant representation of the 25% BBD in Idaho (i.e., contains 18 of the 77 leks comprising the 25% BBD in Idaho); Contains a major regional genetic node; contains several genetic nodes with the Mountain Valleys, Snake River Plain and Montana. Good habitat/ high Resistance and Resilience. Captures Table Butte, a known important GRSG winter concentration area; Area provides significant movement connectivity corridor (based on telemetry) with the proposed Big Desert ACEC. | Keep. Recommended for potential ACEC. |
| N/A | Bear Lake | BLM lands not in 25% BBD; No adjacency with ACEC proposals with WY or UT. No important genetic nodes. | Remove. Not recommended for potential ACEC. |

***Montana/Dakotas***

The Montana/Dakotas State Office considered new information or resource values making any of the habitat areas eligible for ACEC nomination. Montana/Dakotas considered three areas highlighted by the range-wide planning team based on a review of new science and an evaluation of Sagebrush Focal Areas from the 2015 plans. The three highlighted areas are the South-Valley-Phillips (Sagebrush Focal Area), Cedar Creek and Carter-Crook proposed ACECs. Evaluations of those proposals are evaluated below.

Nominations were evaluated for habitat supporting 25-50% relative abundance and associated seasonal habitats, high lek persistence, key genetic nodes and/or concentration of genetic nodes and existing or potential land uses that would be a concern for persistence of GRSG.

While the scoping period closed on February 8, 2022, on July 21, 2023, BLM received an external ACEC submission for consideration of four additional ACECs in Montana. These nominations included expansion of two existing ACECs, the Powderville Expansion ACEC and the Frenchman Breaks Expansion ACEC. Two new areas were nominated, including the Musselshell Breaks ACEC and the North of Charles M. Russel National Wildlife Refuge (CMR) ACEC. The nominations contained potential relevant and important values for these four proposed ACECs and suggestions for expanded, existing ACECs.

In addition to values related specifically to GRSG, the nominations contained potentially relevant values for grassland bird/mid-grass prairie habitat, ecological connectivity, intactness, paleontological resources and climate stability that are separate from purpose and need of this planning effort focused on amending GRGS management. Other potentially relevant and important values such as paleontology, intactness or grasslands are outside the scope of this planning effort and would need to be considered in a subsequent ACEC evaluation.

The BLM did consider the four proposed ACECs and focused on the relevance and importance values specific to GRSG. As for the internal nominations we considered multiple lines of evidence to determine if the values, GRSG habitat in this instance – had "more than local significance and special worth, consequence, meaning, distinctiveness, or cause for concern." Those values are present primarily in portions of the proposed North of the CMR ACEC which overlaps the internally developed South Valley-Phillips proposed ACEC, and therefore this area is evaluated below. The Frenchman Breaks Expansion ACEC nomination presents important connectivity values for GRSG, that are locally unique. However, the density of the GRSG population, genetic uniqueness, lek persistence, sagebrush conservation design, and other lines of evidence to identify "substantial significance" were not determined by the BLM to rise to the level of importance needed to move forward for evaluation in the alternatives of this RMP amendment. However, see other HMA actions such as PHMA and CHMA that are implemented to conserve GRSG values for this area. The Musselshell Breaks ACEC and Powderville Expansion ACEC nominations fall primarily outside of GRSG PHMA, with some overlap with GHMA. The BLM determined that while these areas are adjacent to priority GRSG habitat they did not meet the relevance criteria for GRSG (the nominations are primarily for other values) and would not move forward for evaluation in the alternatives of this RMP amendment.

| Montana GRSG ACEC Importance Evaluation: Cedar Creek Anticline GRSG Habitat Proposed ACEC | | |
|---|---|---|
| **Importance Consideration** | **Yes/No** | **Rationale for Determination** |
| More than locally significant qualities, especially compared to any similar resource, that give it:<br>• Special worth:<br>• Consequence<br>• Meaning<br>• Distinctiveness<br>• Cause for concern | No | Greater sage-grouse are distributed throughout the western United States. The portion of the distribution in Montana, Wyoming, North Dakota, South Dakota, Alberta, and Saskatchewan are designated as Management Zone I (Stiver et al. 2006). Management zones are delineations of greater sage-grouse populations and subpopulations within floristic zones with similar management issues. Within Management Zone I Montana, Wyoming, North Dakota, and South Dakota have designated core areas, and in 2015 BLM designated Priority, General, and Restoration Habitats.<br><br>Since the 2015 BLM plans, new science addressing GRSG density and habitats has provided additional information about the locations of areas that may contain special worth, consequence, or distinctiveness. While higher density areas and genetic connectivity are considered important to greater sage-grouse conservation, areas with similar characteristics to the Cedar Creek area are dispersed throughout the region and are not significantly unique to a specific region or planning unit. In addition, greater sage-grouse habitat in the Cedar Creek area is owned by a number of different entities and habitat on BLM-administered lands is not distinct from habitat managed by other ownerships. While a portion of the area contains high relative abundance (Doherty et al. 2016), the size of the area is not distinct compared to other areas. Most leks have seen decreased counts since the 2010-14 period used to calculate relative density (e.g., FA-38: 34 males in 2010, now 0; FA-004A: 14 males in 2010 to 9 now; FA-013: 24 in 2011 to 6 now.<br><br>In addition, this area is close to the small fringe population in North Dakota, However the Cedar Creek Anticline represents only a small portion of the lager population as defined by recent genetic work (Oyler-McCance 2022). Therefore, this area is not particularly distinct or critical to maintaining unique genetics for the SE Montana and Dakotas area relative to other PHMA.<br><br>The Cedar Creek Anticline is a unitized oil and gas field that is predominantly leased, mostly developed, with a high level of anthropogenic activity. Additional substantial activity or development relative to current level is unlikely. |
| Qualities or circumstances that make it:<br>• Fragile<br>• Sensitive<br>• Rare<br>• Irreplaceable:<br>• Exemplary<br>• Unique:<br>• Endangered<br>• Threatened<br>• Vulnerable to adverse change | No | The area is not particularly fragile or sensitive to change as compared to other sites in the Montana-Dakotas region. The area does not contain key or cluster of genetic nodes and represents a fringe population with genetic nodes as terminal sites (Cross et al 2018). Ongoing disturbance is high, including a high density of O&G wells, and is predominantly already leased. The area is found to have only a small area of core sagebrush as identified in Doherty (2022) Sagebrush Conservation Design and has only a small proportion as core relative to other areas in the region. Similarly, the MT GRSG Conservation Program's Habitat Quantification Tool identifies much of the area as low habitat value, with only a small portion providing high modeled habitat quality values. |

| Montana GRSG ACEC Importance Evaluation: Cedar Creek Anticline GRSG Habitat Proposed ACEC | | |
|---|---|---|
| **Importance Consideration** | **Yes/No** | **Rationale for Determination** |
| Has been recognized as warranting protection in order to satisfy national priority concerns or to carry out the mandates of FLPMA | No | The BLM 2015, 2019, and current initiatives to conserve, enhance, and restore greater sage-grouse habitat is the result of the March 2010, US Fish and Wildlife Service (USFWS) 12 Month Finding for Petitions to List the Greater Sage-grouse (Centrocercus urophasianus) as Threatened or Endangered. In that finding, the USFWS concluded that greater sage grouse was "warranted, but precluded" for listing as a threatened or endangered species.<br><br>However, in the 2015 listing decision, the USFWS concluded in part that existing regulatory mechanisms, (i.e., "specific direction regarding sage grouse habitat, conservation, or management") in the BLM's Land Use Plans, were adequate to protect the species.<br><br>Without multiple lines of evidence, including reasonably foreseeable development, valid existing rights, land ownership, crucial GRSG habitat characteristics from multiple science-based models, on-the-ground conditions/evidence this area does not have protection requirements beyond the standard approaches to implemented FLPMA and national priorities. |
| **Other Items** | | |
| Boundaries | No proposed changes to the boundary. | |
| Additional Notes | This area is a unitized oil and gas field, largely leased and developed, and with limited ability for the BLM to enhance GRSG habitat in the short term. The delineation as a RHMA is reflective of these challenges, the focus here is on longer-term objectives of the BLM to manage the area to maintain GRSG habitat and conduct restoration to provide for higher quality habitat (to support past bird density) in the future. | |
| **Conclusion** | | |
| Due to current habitat conditions and limited evidence for the Cedar Creek Anticline to qualify as more distinct or critical than other HMAs, the BLM MT-Dak does not find the Cedar Creek anticline to meet relevance and importance for an ACEC nomination. While the area is part of a larger population with ND (and beyond) there are other areas within the population that are more likely to maintain any local genetics and be a source population for North Dakota. We do not recommend moving this area forward to identify and consider unique management. | | |

| Montana GRSG ACEC Importance Evaluation: Carter Crook GRSG Connectivity Proposed ACEC | | |
|---|---|---|
| **Importance Consideration** | **Yes/No** | **Rationale for Determination** |
| More than locally significant qualities, especially compared to any similar resource, that give it:<br>• Special worth:<br>• Consequence<br>• Meaning<br>• Distinctiveness<br>• Cause for concern | Yes | Greater sage-grouse are distributed throughout the western United States. The portion of the distribution in Montana, Wyoming, North Dakota, South Dakota, Alberta, and Saskatchewan are designated as Management Zone I (Stiver et al. 2006). Management zones are delineations of greater sage-grouse populations and subpopulations within floristic zones with similar management issues. Within Management Zone I Montana, Wyoming, North Dakota, and South Dakota have designated core areas, and in 2015 BLM designated Priority, General, and Restoration Habitats.<br><br>Since the 2015 BLM plans, new science addressing GRSG density and habitats has provided additional information about the locations of areas that may contain special worth, consequence, or distinctiveness. A portion of the area contains high relative abundance (Doherty et al. 2016), a factor considered important to greater sage-grouse conservation. However these higher density areas in the Carter-Crook area are similar to other areas dispersed throughout the region and are not significantly unique to this unit. Greater sage-grouse habitat in the Carter-Crook area is owned by a number of different entities and habitat on BLM-administered lands is not distinct from habitat managed by other ownerships.<br><br>While a limited portion of the Carter-Crook boundary contains high relative abundance (Doherty et al. 2016), the area has evidence it is a consequential genetic connection. Chiefly, it encompasses a keystone genetic node (Cross et al. 2018), and a potential corridor where genetic connections between the northern and southern portions of management Zone 1 are constricted (Row et al 2018, Cross et al. 2023). This area of genetic connectivity may provide the most likely link between GRSG in Montana-Dakotas and Wyoming. |
| Qualities or circumstances that make it:<br>• Fragile<br>• Sensitive<br>• Rare<br>• Irreplaceable:<br>• Exemplary<br>• Unique:<br>• Endangered<br>• Threatened<br>• Vulnerable to adverse change | Yes | The area is not particularly fragile or sensitive to change as compared to other sites in the Montana-Dakotas region. However, due to the key genetic node (Cross et al 2018), and constricted habitat, this area is the primary connectivity link between populations in northern portions of MZ1 with populations throughout the rest of the species' range. As such, loss of this area could isolate populations in the NE from populations in the rest of the range, which could have relatively dramatic impacts on populations in MT and the Dakotas.<br><br>Ongoing disturbance in isolated portions nearby (see boundary discussion below) the area are high, primarily in a unitized oil and gas field in Wyoming and on Bentonite producing areas in Montana. Much of the area is core sagebrush as identified in Doherty (2022) Sagebrush Conservation Design with proportionally large core relative to other areas in the region. Similarly, the MT GRSG Conservation Program's Habitat Quantification Tool identifies much of the area in Montana as higher habitat value, with only a small portion providing low modeled habitat quality values due to development. |

| Montana GRSG ACEC Importance Evaluation: Carter Crook GRSG Connectivity Proposed ACEC | | |
|---|---|---|
| **Importance Consideration** | **Yes/No** | **Rationale for Determination** |
| Has been recognized as warranting protection in order to satisfy national priority concerns or to carry out the mandates of FLPMA | Yes | The BLM 2015, 2019, and current initiatives to conserve, enhance, and restore greater sage-grouse habitat is the result of the March 2010, US Fish and Wildlife Service (USFWS) 12 Month Finding for Petitions to List the Greater Sage-grouse (Centrocercus urophasianus) as Threatened or Endangered. In that finding, the USFWS concluded that greater sage grouse was "warranted, but precluded" for listing as a threatened or endangered species.<br><br>However, in the 2015 listing decision, the USFWS concluded in part that existing regulatory mechanisms, (i.e., "specific direction regarding sage grouse habitat, conservation, or management") in the BLM's Land Use Plans, were adequate to protect the species, therefore, areas that meet national priority concerns or specific FLPMA mandates require multiple lines of evidence supporting more than local priorities and conservation value.<br><br>The proposed Carter-Crook ACEC includes multiple lines of evidence, identifying the area as highly valuable GRSG habitat, especially for genetic connectivity. Therefore, this area likely provides a key connection between GRSG populations in multiple states. In addition, conserving habitat connectivity is a national priority for managing bureau sensitive status species (Manual 6840 and IM 2023-005). |
| **Other Items** | | |
| Boundaries | The boundary for this ACEC began by considering the HQ proposal. To better reflect local information and concentrate on where the most likely, high-value, GRSG corridor falls, the boundaries were adjusted.<br><br>In Montana this focused on removing active areas of bentonite development and adjusting the boundary to the north to capture key GRSG leks that would "supply" birds that would migrate through the corridor to Wyoming leks. In addition, the ID Team considered GRSG relative density models, the MT HCP Habitat Quantification Tool, Sagebrush Conservation Design Core Areas, and other models along with on-the-ground experiences and conditions. Adjustments to the WY portion of the ACEC included analysis of cheatgrass and other habitat conditions (wee Wyoming analysis). To avoid inconsistencies across jurisdictional boundaries, the MT-Dak and WY BLM State Offices met to edge map the revised boundaries produced by each state in cooperation with Cooperating Agencies and Field Offices.<br><br>The ACEC boundary reflects an area focused on the area with the highest likelihood of facilitating long-distance (e.g., lek moving) GRSG dispersal and the and high-quality sagebrush habitat supporting leks in the area of the corridor. | |
| Additional Notes | Part of this original area is identified in an area that is one of the larger bentonite producing areas in the US. There are active claims, proposed additional projects, and a large amount of existing proven claims. | |
| **Conclusion** | | |
| Due to meeting R&I this area, with a revised boundary from original proposal, should move forward to be considered as a potential ACEC in at least one alternative. This will allow an analysis to consider if special management is needed to preserve the qualities of the area (i.e., beyond PHMA management actions). | | |

| Montana GRSG ACEC Importance Evaluation: South Valley Phillips GRSG Habitat Proposed ACEC | | |
|---|---|---|
| **Importance Consideration** | **Yes/No** | **Rationale for Determination** |
| More than locally significant qualities, especially compared to any similar resource, that give it:<br>• Special worth:<br>• Consequence<br>• Meaning<br>• Distinctiveness<br>• Cause for concern | Yes | Greater sage-grouse are distributed throughout the western United States. The portion of the distribution in Montana, Wyoming, North Dakota, South Dakota, Alberta, and Saskatchewan are designated as Management Zone I (Stiver et al. 2006). Management zones are delineations of greater sage-grouse populations and subpopulations within floristic zones with similar management issues. Within Management Zone I Montana, Wyoming, North Dakota, and South Dakota have designated core areas, and in 2015 BLM designated Priority, General, and Restoration Habitats.<br><br>Since the 2015 BLM plans, new science addressing GRSG density and habitats has provided additional information about the locations areas that may contain special worth, consequence, or distinctiveness. Higher density areas and genetic connectivity are considered important to greater sage-grouse conservation, and small areas or lek clusters with limited connectivity are dispersed throughout the region.<br><br>However, the greater sage-grouse habitat in the South-Valley Phillips area is owned predominantly by BLM and the state of Montana. The majority of the area contains high relative abundance, representing the largest high-density area in Management Zone I (Doherty et al. 2016). There are well connected genetic nodes (Cross et al. 2018) within the area, and to surrounding areas. |
| Qualities or circumstances that make it:<br>• Fragile<br>• Sensitive<br>• Rare<br>• Irreplaceable:<br>• Exemplary<br>• Unique:<br>• Endangered<br>• Threatened<br>• Vulnerable to adverse change | Yes | The area is not particularly fragile or sensitive to change as compared to other sites in the Montana-Dakotas region. Ongoing disturbance in the area is limited to a few Bentonite mined area. The area is mostly core sagebrush as identified in Doherty (2022) Sagebrush Conservation Design with proportionally large core relative to other areas in the region. Similarly, the MT GRSG Conservation Program's Habitat Quantification Tool identifies much of the area as higher habitat value.<br><br>Furthermore, this area contains the wintering area for a unique GRSG population that exhibits long distance migration in the spring and fall (Newton et al. 2017, Tack et al. 2019) |

| Montana GRSG ACEC Importance Evaluation: South Valley Phillips GRSG Habitat Proposed ACEC | | |
|---|---|---|
| **Importance Consideration** | **Yes/No** | **Rationale for Determination** |
| Has been recognized as warranting protection in order to satisfy national priority concerns or to carry out the mandates of FLPMA | Yes | The BLM 2015, 2019, and current initiatives to conserve, enhance, and restore greater sage-grouse habitat is the result of the March 2010, US Fish and Wildlife Service (USFWS) 12 Month Finding for Petitions to List the Greater Sage-grouse (Centrocercus urophasianus) as Threatened or Endangered. In that finding, the USFWS concluded that greater sage grouse was "warranted, but precluded" for listing as a threatened or endangered species.<br><br>However, in the 2015 listing decision, the USFWS concluded in part that existing regulatory mechanisms, (i.e., "specific direction regarding sage grouse habitat, conservation, or management") in the BLM's Land Use Plans, were adequate to protect the species.<br><br>With multiple lines of evidence, including land ownership, highly valuable GRSG habitat characteristics from multiple science based models, and supporting on-the-ground conditions and evidence, this area may provide habitat key to meeting national GRSG conservation goals. |
| **Other Items** | | |
| Boundaries | The boundary for this ACEC began by considering the SFA in the area from the 2015 GRSG Planning Effort. To better reflect new information and GRSG habitat with the highest conservation value, the boundaries were adjusted. For example, isolated BLM parcels that fall in predominantly agricultural areas and lower value GRSG habitat were removed (e.g., areas south of the Missouri River). In addition, the ID Team considered GRSG relative density models, the MT HCP Habitat Quantification Tool, Sagebrush Conservation Design Core Areas, and other models along with on-the-ground experiences and conditions. Finally, a portion of this area is already designated as the Mountain Plover ACEC. To avoid duplicative, conflicting, or overlapping management, this existing ACEC was removed from the boundary. The ACEC boundary reflects an area focused on the highest density of GRSG, contiguous BLM lands, and high-quality sagebrush habitat. | |
| Additional Notes | None. | |
| **Conclusion** | | |
| Due to meeting R&I this area should move forward to be considered as a potential ACEC in at least one alternative. This will allow an analysis to consider if special management is needed to preserve the qualities of the area (i.e., beyond PHMA management actions). | | |

***Nevada/California***

NV-BLM received areas proposed for ACEC designation through the rangewide preliminary evaluation and from the Nevada Department of Wildlife. The draft polygons were reviewed and refined in coordination with preliminary input from federal, state, and county Cooperating Agencies. This initial review was conducted with the stated objective to the cooperating agencies of erring on the side of being inclusive, as opposed to removing areas, prior to public review of the DEIS. The BLM will update the ACEC evaluations, including potentially revising potential ACEC boundaries, based on input from the Cooperating Agencies, public, and other new information (e.g., Coates et al., 2024 – in review) and incorporating the updated areas in the Final EIS. The relevance and importance determinations were informed by combined evaluation of both State- and Regional-level information/priority to identify ACEC spatial extent.

The following datasets were used to help delineate the draft ACECs.

- Local scale data: Draft NV/CA Habitat Management Area Map (USGS in preparation) – GRSG habitat mapping in Nevada and northeastern California: updates to abundance and space use indices and an example of combining space use, habitat selection, and survival to help inform habitat management areas
- Regional scale data: Recently published regional GRSG data (BBD, Lek Persistence, Priority Genetic Pathways, genetic nodes, R&R, probability of breeding habitat, TAWS ) was used to inform regional importance.

**Nevada GRSG ACEC Evaluation: Importance Criteria**

| Identifier | Geographic Reference | Importance | Recommendation |
|---|---|---|---|
| 1 | Warm Springs | Greater than 60% core habitat, remainder is growth; low to medium Resistance and Resilience; ~50% of area in 50% to 25% BBD; 1 neighborhood cluster with declining population (<0.95) and active pop warning; About 90% PHMA with some PHMA+; High to Medium lek persistence; Includes Warm Springs LWC; Partially includes and adjoins East Fork High Rock Canyon Wilderness; adjoins North Black Rock Range Wilderness; Low genetic connectivity; no nodes. | Recommended for inclusion in draft EIS as a potential ACEC. Solid habitat that includes LWC and Wilderness. Population center but warning triggered for NC and population is in decline. |
| 2 | Montana Mountains | Strong representation of the 25% BBD in NV; Connects with OR population; High lek persistence; intersects three neighborhood clusters, primary neighborhood cluster shows population growth (lambda > 1.03), adjacent NCs nearly stable to declining (lambda = 0.99-0.95); Low R&R; mostly Growth area for sagebrush; about 10% of area includes Disaster Peak WSA. | Recommended for inclusion in draft EIS as a potential ACEC. Source population likely supporting connection between OR/NV and ID/NV populations. Includes Disaster Peak WSA. |
| 3 | Owyhee West | Supports two separate population centers; provides regionally important genetic connectivity with eastern NV and ID to OR populations; Several genetic nodes including a Keystone node; Large area of contiguous BLM administered lands; includes North Fork Little Humboldt River and Little Humboldt River WSA; High value area for LCT | Recommended for inclusion in draft EIS as a potential ACEC. Regionally important genetic connectivity, includes two WSA, and provides important LCT habitat. |

| Nevada GRSG ACEC Evaluation: Importance Criteria | | | |
|---|---|---|---|
| **Identifier** | **Geographic Reference** | **Importance** | **Recommendation** |
| 4 | Owyhee East | Concentration of active leks and high lek persistence; near stable to growing population trend; provides regionally important genetic connectivity between ID and northeast NV to the remainder of NV populations; five genetic nodes; ~ 40% of the area is Core sagebrush and ~ 50% sagebrush Growth; Medium R&R | Recommended for inclusion in draft EIS as a potential ACEC. Regionally important genetic connectivity, supports population centers and large tract of Core sagebrush. |
| 5 | North Fork Oneil | Adjoins ID proposed ACEC; provides regionally important genetic connectivity between ID and NV; population center with stable to growing trend; large area of contiguous BLM administered lands that is mostly Core and Growth sagebrush, PHMA and PHMA +; Medium R&R; includes Bad Lands WSA; Bisected by Proposed Designated Utility Corridor (possibly split ACEC into two separated by corridor). | Recommended for inclusion in draft EIS as a potential ACEC. |
| 6 | South Fork Dixie Flats | Stepping-stone population between northern and southern NV; medium to high regional genetic connectivity; comprised of 25% and 50% BBD; high to medium lek persistence; about 40% of area in checkerboard private ownership or BLM administration; important high elevation brood rearing habitat (PHMA+); population declining (lambda = 0.97-0.99) but no warnings; L-M R&R; adjacent to Cedar Ridge and Red Spring WSA; proposed designated corridor bisects northeast corner. | Recommended for inclusion in draft EIS as a potential ACEC. |
| 7 | Butte Long Valley | Provides regionally important genetic connectivity between northern and southeastern NV; adjacent to a keystone lek; supports three population centers; supports 5 NCs – 1 with increasing population trend and remaining 4 declining; H-M lek persistence; proposed designated utility corridor bisects southeastern quarter; adjacent to Goshute Canyon and Bristlecone Wilderness. | Recommended for inclusion in draft EIS as a potential ACEC. |
| 8 | Little Butte Long Valley | Includes keystone genetic node; medium genetic connectivity; mostly 75% BBD; bisected by Hwy 93; 75% of area in proposed designated utility corridor. | Recommended for inclusion in draft EIS as a potential ACEC. |
| 9 | Eureka North and South | High genetic connectivity between northern and southern NV; high elevation brood-rearing habitat; ~30% of northern area in PHMA+; 6 miles east of genetic node that is both a keystone and hub; northern area bisected by large proposed designated corridor and HWY 50 runs between north and south; supports three population centers across the entire area. | Recommended for inclusion in draft EIS as a potential ACEC. |

| Nevada GRSG ACEC Evaluation: Importance Criteria | | | |
|---|---|---|---|
| **Identifier** | **Geographic Reference** | **Importance** | **Recommendation** |
| 10 | Grass-Kobeh Valley | Regionally important genetic connectivity between north and central NV; 4 genetic nodes; supports three 25% population centers and four 50% population centers; about 20% of area is PHMA+; H-M lek persistence; includes 5 NCs – 2 NCs have positive growth trend, remaining in decline; 2 NCs (about 15% of area) with active warnings; bounded on three sides by HWYs 395 (western side), 50 (south side), and 278 (eastern side); eastern side includes large proposed designated energy corridor; includes Simpson Park and Roberts Mountain WSA. | Recommended for inclusion in draft EIS as a potential ACEC. |
| 11 | Monitor Valley | Supports three population centers (25-50% BBD) that are important to the southern portion of range in NV; provides genetic connectivity to central and northern NV; includes two genetic nodes; primarily core and growth sagebrush and PHMA; bordered by and supporting USFS GRSG populations/habitat; bisected by proposed designated utility corridor. | Recommended for inclusion in draft EIS as a potential ACEC. |
| 12 | Reese River | Supports two population centers (25-50% BBD) that are important to the southern portion of range in NV; provides genetic connectivity to central and northern NV; includes two genetic nodes; primarily core and growth sagebrush and PHMA; bordered by and supporting USFS GRSG populations/habitat. | Recommended for inclusion in draft EIS as a potential ACEC. |
| 13 | Hayes Canyon | Stepping-stone population connecting the northern portion of MZ V (OR & NV) to the southern portion (CA); about 70% of area in 25%-50% BBD; one NC that is declining and has tripped an active warning; most of area is PHMA with about 25% of total area being PHMA+; primarily Growth with some Core sagebrush; M-H lek persistence; M-L R&R; bisected by proposed designated corridor (that includes an existing transmission line) | Recommended for inclusion in draft EIS as a potential ACEC. |
| 14-17 | 4 ID or UT border | Provides continuity of habitat and population connectivity with neighboring states that have proposed ACEC areas. | Recommended for inclusion in draft EIS as a potential ACEC |
| N/A | Vya/Massacre | See description in the "California GRSG ACEC Evaluation: Importance Criteria" below. | Recommended for inclusion in draft EIS as a potential ACEC |

| California GRSG ACEC Importance Evaluation: Buffalo Skedaddle Proposed ACEC | | |
|---|---|---|
| **Importance Consideration** | **Yes/No** | **Rationale for Determination** |
| More than locally significant qualities, especially compared to any similar resource, that give it:<br>• Special worth:<br>• Consequence<br>• Meaning<br>• Distinctiveness<br>• Cause for concern | Yes | BLM CA included designated GRSG Priority, General, and Other Habitat Management Areas in the 2015 GRSG Plan Amendment. In 2022, updates to the GRSG Habitat Management Areas were initiated based on the best available science. These updates identified Priority Plus areas. Priority Plus are areas that are most productive to GRSG populations within Priority Habitat Management Areas (PHMA). PHMA plus includes modeled population performance, specifically survival of nests and broods and is informed by selection models and areas of increased survival. PHMA plus are considered "source" habitats.<br><br>In addition to PHMA plus, other new science has emerged since the 2015 plans related to GRSG density, habitats, population trends, and genetic exchange among populations which has provided information on areas that may contain special worth, consequence, or distinctiveness within CA BLM managed lands. |
| Qualities or circumstances that make it:<br>• Fragile<br>• Sensitive<br>• Rare<br>• Irreplaceable:<br>• Exemplary<br>• Unique:<br>• Endangered<br>• Threatened<br>• Vulnerable to adverse change | Yes | The area is not particularly fragile or sensitive to change as compared to other areas on CA BLM managed lands. However, the area has been undergoing intensive restoration efforts due to the Rush Fire over 10 years ago. In addition, this area is on the western fringe of GRSG populations in California with documented genetic exchange with populations in Nevada. |
| Has been recognized as warranting protection in order to satisfy national priority concerns or to carry out the mandates of FLPMA | Yes | The March 2010, US Fish and Wildlife Service (USFWS) 12 Month Finding for Petitions to List the Greater Sage-grouse as Threatened or Endangered concluded that GRSG was "warranted, but precluded" for listing as a threatened or endangered species.<br><br>However, in the 2015 listing decision, the USFWS concluded in part that existing regulatory mechanisms, (i.e., "specific direction regarding sage grouse habitat, conservation, or management") in the BLM's Land Use Plans, were adequate to protect the species, therefore, areas that meet national priority concerns or specific FLPMA mandates require multiple lines of evidence supporting more than local priorities and conservation value.<br><br>The proposed Buffalo Skedaddle ACEC identifies the area as highly valuable for GRSG habitat and population persistence in northeastern California. |

| **Other Items** | |
|---|---|
| Boundaries | The boundary for this ACEC was initially delineated using the Population Management Unit (PMU) for the Buffalo Skedaddle PMU. The boundary was then refined to focus on the revised GRSG Habitat Management Area delineations, areas that have been successful in habitat restoration efforts since the Rush Fire and genetic exchange between CA and NV GRSG populations based on new science. |
| Additional Notes | — |

**Conclusion**

Due to meeting the Relevance and Importance criteria, this area should be considered a potential ACEC in at least one alternative. This will allow an analysis to consider if special management is needed to preserve the qualities of the area (i.e., above Management Decisions for PHMA).

**California GRSG ACEC Importance Evaluation:**
**Vya/Massacre GRSG Proposed ACEC**

| Importance Consideration | Yes/No | Rationale for Determination |
|---|---|---|
| More than locally significant qualities, especially compared to any similar resource, that give it:<br>• Special worth:<br>• Consequence<br>• Meaning<br>• Distinctiveness<br>• Cause for concern | Yes | BLM CA and NV included designated GRSG Priority, General, and Other Habitat Management Areas in the 2015 GRSG Plan Amendment. In 2022, updates to the GRSG Habitat Management Areas were initiated based on the best available science. These updates identified Priority Plus areas. Priority Plus are areas that are most productive to GRSG populations within Priority Habitat Management Areas (PHMA). PHMA plus includes modeled population performance, specifically survival of nests and broods and are informed by selection models and areas of increased survival. PHMA plus are considered "source" habitats.<br><br>In addition to PHMA plus, other new science has emerged since the 2015 plans related to GRSG density, habitats, population trends, and genetic exchange among populations which has provided information on areas that may contain special worth, consequence, or distinctiveness within CA BLM managed lands. |
| Qualities or circumstances that make it:<br>• Fragile<br>• Sensitive<br>• Rare<br>• Irreplaceable:<br>• Exemplary<br>• Unique:<br>• Endangered<br>• Threatened<br>• Vulnerable to adverse change | Yes | The area is not particularly fragile or sensitive to change as compared to other areas on CA BLM managed lands. However, Bitner Ranch provides key brood-rearing habitat to GRSG in CA and connectivity between populations in NV, including the Sheldon Hart Refuge. |

| California GRSG ACEC Importance Evaluation: Vya/Massacre GRSG Proposed ACEC | | |
|---|---|---|
| **Importance Consideration** | **Yes/No** | **Rationale for Determination** |
| Has been recognized as warranting protection in order to satisfy national priority concerns or to carry out the mandates of FLPMA | Yes | The March 2010, US Fish and Wildlife Service (USFWS) 12 Month Finding for Petitions to List the Greater Sage-grouse as Threatened or Endangered concluded that GRSG was "warranted, but precluded" for listing as a threatened or endangered species.<br><br>However, in the 2015 listing decision, the USFWS concluded in part that existing regulatory mechanisms, (i.e., "specific direction regarding sage grouse habitat, conservation, or management") in the BLM's Land Use Plans, were adequate to protect the species, therefore, areas that meet national priority concerns or specific FLPMA mandates require multiple lines of evidence supporting more than local priorities and conservation value.<br><br>The proposed Vya-Massacre ACEC includes multiple lines of evidence, identifying the area as highly valuable GRSG habitat providing key brood-rearing habitat and connectivity among multiple states. In addition, conserving habitat connectivity is a national priority for managing bureau sensitive status species (Manual 6840 and IM 2023-005). |
| **Other Items** | | |
| Boundaries | The boundary for this ACEC was initially delineated combining the Population Management Units (PMU) for Vya and Massacre PMUs. The boundaries were then refined to focus on the revised GRSG Habitat Area delineations, key brood-rearing habitat and additional new science. | |
| Additional Notes | — | |
| **Conclusion** | | |
| Due to meeting the Relevance and Importance criteria, this area should be considered a potential ACEC in at least one alternative. This will allow an analysis to consider if special management is needed to preserve the qualities of the area (i.e., above Management Decisions for PHMA). | | |

***Oregon***

Similar to Idaho, the BLM's evaluation of rangewide datasets did not result in the identification of any areas that raised to more than local significance outside the 2015 SFAs. In addition, Oregon is unique compared to the other states in that there are several existing ACECs and Research Natural Areas (RNA – which is a type of ACEC) that were already designated inside the 2013 PACs and 2015 SFAs. These areas were designated as part of the RMP development that pre-dated the 2015 or 2019 GRSG amendment efforts. The following 2 ACECs and 5 RNAs are located in PHMA where the relevant and important values that were identified in the RMP designation included GRSG and GRSG plant communities:

- High Lakes ACEC,
- Red Knoll ACEC,
- Lake Ridge RNA,
- North Ridge Bully Creek RNA,
- Rahilly-Gravelly RNA,
- South Ridge Bully Creek RNA, and
- Toppin Creek Butte RNA.

These existing designations are not being considered for amendment in this process.

Beyond the existing ACECs and RNAs, the BLM Oregon state office (OSO) staff examined the remainder of the SFA areas. Smaller areas within the SFAs were identified for further/closer examination, which the majority of the SFAs were determined to not contain multiple lines of evidence supporting a conclusion that the habitat was of more than local significance. The BLM state and district staff coordinated with Oregon Division of Fish and Wildlife staff to identify characteristics that may meet the importance criteria. New genetic information and lek density clusters were important considerations in the evaluation.

| Oregon GRSG ACEC Importance Evaluation: Soldier Creek Proposed ACEC | | |
|---|---|---|
| **Importance Consideration** | **Yes/No** | **Rationale for Determination** |
| More than locally significant qualities, especially compared to any similar resource, that give it:<br>• Special worth:<br>• Consequence<br>• Meaning<br>• Distinctiveness<br>• Cause for concern | No | Greater sage-grouse are distributed throughout appropriate habitat in the western United States. This portion of the distribution located in Oregon (and Idaho) is designated as Management Zone IV (Stiver et al. 2006). Management zones are delineations of greater sage-grouse populations and subpopulations within floristic zones. Within Management Zone IV, Oregon has designated core areas, and in 2015 BLM designated Priority and General Habitat Management Areas.<br><br>Since the 2015 BLM plans, new science addressing GRSG genetics, density, and habitats has provided additional information about areas that may contain special worth, consequence, or distinctiveness.<br><br>OSO staff examined the genetic pathways data and connectivity (i.e., >80% cumulative connectivity) with GRSG priority areas for conservation in Idaho and that overlap with the very high lek density areas. In the Soldier Creek area south of Jordan Valley/Hwy 95, the Ecostate GIS shows fairly intact habitat and there are multiple areas of overlapping lek density. It's approximately 15 miles to a >95% genetic cumulative connectivity pathway in Idaho. The Soldier Creek area is mostly in the 80 to 85% cumulative connectivity genetic pathway range (Cross et al., 2023) and is similar to cumulative connectivity of the surrounding area (e.g. Cow Lakes) in Oregon.<br><br>While high density lek/population areas and genetic connectivity are considered important to greater sage-grouse conservation, the connectivity areas are dispersed throughout Oregon and are not substantially unique to one specific region or planning unit. Greater sage-grouse habitat in the Soldier Creek area is not substantially distinct from habitat managed by other nearby BLM lands that have similar cumulative genetic connectivity values.<br><br>Although a portion of the area contains medium relative abundance (Doherty et al. 2016), the size of the area is smaller than and not substantially distinct compared to other areas in Management Zone IV (e.g. Cow Lakes). There is a much larger, higher relative lek abundance area south and east (in Idaho) of the Soldier Creek area. See background notes and maps below. |

| Oregon GRSG ACEC Importance Evaluation: Soldier Creek Proposed ACEC | | |
|---|---|---|
| **Importance Consideration** | **Yes/No** | **Rationale for Determination** |
| Qualities or circumstances that make it:<br>• Fragile<br>• Sensitive<br>• Rare<br>• Irreplaceable:<br>• Exemplary<br>• Unique:<br>• Endangered<br>• Threatened<br>• Vulnerable to adverse change | No | The area is not particularly fragile or sensitive to change when compared to other similar sites in the Oregon-Idaho region. The habitat is not rare, irreplaceable, exemplary, or unique. The area is vulnerable to adverse change, particularly wildfire and invasive annual grasses, but not more so than the surrounding habitat. The habitat is neither threatened or endangered.<br><br>Cumulative connectivity pathways mapped in the Soldier Creek potential ACEC are thresholded below 85%, indicating low impedances to sage-grouse movements (Cross et al., 2023). Higher connectivity pathways are mapped >10 miles east of the Oregon border.<br><br>The area does not contain key or clusters of genetic nodes,. |
| Has been recognized as warranting protection in order to satisfy national priority concerns or to carry out the mandates of FLPMA | No | The BLM 2015, 2019, and current initiatives to conserve, enhance, and restore greater sage-grouse habitat is the result of the March 2010, US Fish and Wildlife Service (USFWS) 12 Month Finding for Petitions to List the Greater Sage-grouse (Centrocercus urophasianus) as Threatened or Endangered. In that 2010 finding, the USFWS concluded that greater sage grouse was "warranted, but precluded" for listing as a threatened or endangered species.<br><br>However, in the 2015 listing decision, the USFWS concluded in part that existing regulatory mechanisms, (i.e., "specific direction regarding sage grouse habitat, conservation, or management") in the BLM's Land Use Plans, were adequate to protect the species.<br><br>Without multiple lines of evidence, including reasonably foreseeable development, valid existing rights, land ownership, and crucial GRSG habitat characteristics from multiple science-based models, on-the-ground conditions/evidence for this area does not currently need protection requirements beyond the standard approaches to implemented FLPMA and national priorities. In addition, the area currently has Priority Habitat Management Area designation and management under the 2015 ARMPA. Habitat loss and degradation due to wildfires and invasive annual grasses are primary threats to sage-grouse in this area. Significant amounts of high quality habitat in Oregon and Idaho has burned near this area. |
| **Other Items** | | |
| Boundaries | Nomination boundaries have been provided to the NOC (see also notes below). | |
| Additional Notes | We reviewed and then ruled out the Cow Lakes PAC area due to the high proportion of private lands mixed in with BLM lands, low amount of suitable habitat, and degraded seasonal habitat, as shown in the 2019-2021 Ecostate spatial data provided by SageCon/INR and reported in the Cow Lakes Habitat Assessment Framework Summary. | |
| **Conclusion** | | |
| This potential ACEC provides important lekking, nesting, and early brood-rearing habitat for a high abundance of sage-grouse. However, the habitat, density of birds, and connectivity to sage-grouse priority habitat is not unique. Multiple pathways of potential gene flow connecting sage-grouse priority areas for conservation in southeast Oregon and southwest Idaho coalesce approximately 10 miles east of the Oregon border to form the high concentration gene flow pathway depicted in Cross et al. (2023 figure 4). Cumulative connectivity pathways | | |

| **Conclusion** |
| --- |
| coalesce here due to cultivation and tree cover impeding sage-grouse movements (Cross et al 2013 figure 7b). These impendences decrease approaching the Oregon state border, and once inside Oregon, the cumulative connectivity pathways are more diffuse and non-distinct. In other words, the proposed ACEC does not appear to be vital to maintenance of range-wide connectivity. Moreover, the habitat is not unique, rare, irreplaceable, or exemplary. There are many areas of similar sage-grouse habitat in SE Oregon with similar genetic pathways depicted in Cross et al. 2023 intersecting areas of high lek density. BLM is actively managing juniper encroachment and other threats to GRSG in Oregon (e.g., fire, and invasive annual grasses). Thus, the Soldier Creek potential ACEC does not meet the criteria for special worth or importance with more than locally significant qualities of consequence, meaning, distinctiveness, or cause for concern due to its similarity, proximity, and connectedness with similar habitat, lek density areas, and modeled genetic pathways.<br><br>References<br>Cross TB, Schwartz MK, Naugle DE, Fedy BC, Row JR, Oyler-McCance SJ. 2018 The genetic network of greater sage-grouse: range-wide identification of keystone hubs of connectivity. Ecol. Evol. 8, 5394–5412.<br><br>Cross TB, Tack JD, Naugle DE, Schwartz MK, Doherty KE, Oyler-McCance SJ, Pritchert RD, Fedy BC. 2023 The ties that bind the sagebrush biome: integrating genetic connectivity into range-wide conservation of greater sage-grouse. R. Soc. Open Sci. 10:220437. |

| Oregon GRSG ACEC Importance Evaluation: Upper West Little Owyhee Proposed ACEC | | |
|---|---|---|
| **Importance Consideration** | **Yes/No** | **Rationale for Determination** |
| More than locally significant qualities, especially compared to any similar resource, that give it:<br>• Special worth:<br>• Consequence<br>• Meaning<br>• Distinctiveness<br>• Cause for concern | No | Greater sage-grouse are distributed throughout the western United States. This portion of the distribution located in Oregon (and Idaho) is designated as Management Zone IV (Stiver et al. 2006). Management zones are delineations of greater sage-grouse populations and subpopulations within floristic zones with similar management issues. Within Management Zone IV, Oregon has designated core areas, and in 2015 BLM designated Priority and General Habitat Management Areas.<br><br>Since the 2015 BLM plans, new science addressing GRSG genetics, density, and habitats has provided additional information about the locations that may contain special worth, consequence, or distinctiveness.<br><br>OSO staff examined the genetic pathways data and connectivity (i.e., >80% cumulative connectivity) with GRSG populations in Nevada and that overlap with the high lek density areas.<br><br>Greater sage-grouse habitat in the Upper West Little Owyhee area is not substantially distinct from habitat managed by other nearby BLM lands that have similar cumulative connectivity pathway values (Cross et al. 2013).<br><br>Although a portion of the area contains medium relative abundance (Doherty et al. 2016), the area is not substantially distinct compared to other areas in Management Zone IV and does not show strong nodes/networks to other areas (Cross 2018). In addition, the area shows a "very low" relative abundance (Doherty 2015, T25) breeding population index.<br><br>While higher density areas and genetic connectivity are considered important to greater sage-grouse conservation, the areas are dispersed throughout the region and are not significantly unique to a specific region or planning unit; not to this potential ACEC nomination area. |
| Qualities or circumstances that make it:<br>• Fragile<br>• Sensitive<br>• Rare<br>• Irreplaceable:<br>• Exemplary<br>• Unique:<br>• Endangered<br>• Threatened<br>• Vulnerable to adverse change | No | The area is no more fragile or sensitive to change than other sites in southeast Oregon. The area does not contain a key genetic node nor strong networks (Cross et al 2018). Similarly the area does not show substantially important cumulative connectivity pathways to other PHMA areas in Oregon and Nevada.<br><br>The area is similar to much of the intact GRSG habitat in the area and has the same vulnerability to change as the surrounding area. The habitat is not irreplaceable, exemplary, unique, rare, endangered, threatened, nor vulnerable to adverse change when compared to other intact GRSG habitat in southeast Oregon. |

| Oregon GRSG ACEC Importance Evaluation: Upper West Little Owyhee Proposed ACEC | | |
|---|---|---|
| **Importance Consideration** | **Yes/No** | **Rationale for Determination** |
| Has been recognized as warranting protection in order to satisfy national priority concerns or to carry out the mandates of FLPMA | No | The BLM 2015, 2019, and current initiatives to conserve, enhance, and restore greater sage-grouse habitat is the result of the March 2010, US Fish and Wildlife Service (USFWS) 12 Month Finding for Petitions to List the Greater Sage-grouse (Centrocercus urophasianus) as Threatened or Endangered. In that 2010 finding, the USFWS concluded that greater sage grouse was "warranted, but precluded" for listing as a threatened or endangered species.<br><br>However, in the 2015 listing decision, the USFWS concluded in part that existing regulatory mechanisms, (i.e., "specific direction regarding sage grouse habitat, conservation, or management") in the BLM's Land Use Plans, were adequate to protect the species.<br><br>Without multiple lines of evidence, including reasonably foreseeable development, valid existing rights, land ownership, and crucial GRSG habitat characteristics from multiple science based models, on-the-ground conditions/evidence this area has not been identified for protection to implement FLPMA and national priorities. |
| **Other Items** | | |
| Boundaries | Contiguous with a Nevada potential ACEC. An area of genetic connectivity to the north is disconnected from the Upper West Little Owyhee potential ACEC by lower quality habitat and that the southern area, contiguous with Nevada to the south, had more connectivity, although threshold cumulative values are moderate. | |
| Additional Notes | — | |
| **Conclusion** | | |
| This potential ACEC provides important lekking, nesting, and early brood-rearing habitat for a high abundance of GRSG. However, the habitat, bird density, and connectivity to GRSG priority areas of conservation are not unique in Oregon. The thresholded cumulative connectivity pathways in the potential ACEC are between 75 and 80 percent (Cross et al. 2013). GRSG movements are not impeded by tree cover or cultivation within the potential ACEC and in the surrounding landscape. There are no distinctive cumulative connectivity pathways intersecting areas of high lek density in this area. In other words, the proposed ACEC does not appear to be vital to maintenance of range-wide connectivity. Thus, the Upper West Little Owyhee potential ACEC does not meet the criteria for special worth or importance with more than locally significant qualities of consequence, meaning, distinctiveness, or cause for concern due to its similarity, proximity, and connectedness with similar habitat, lek density areas, and genetic considerations.<br><br>References<br>Cross TB, Schwartz MK, Naugle DE, Fedy BC, Row JR, Oyler-McCance SJ. 2018 The genetic network of greater sage-grouse: range-wide identification of keystone hubs of connectivity. Ecol. Evol. 8, 5394–5412.<br><br>Cross TB, Tack JD, Naugle DE, Schwartz MK, Doherty KE, Oyler-McCance SJ, Pritchert RD, Fedy BC. 2023 The ties that bind the sagebrush biome: integrating genetic connectivity into range-wide conservation of greater sage-grouse. R. Soc. Open Sci. 10:220437. | | |

***Utah***

The 2015 GRSG ARMPA designated two SFAs in northern Utah, one on the eastern side of the state in Rich County bordering Wyoming and one of the western side of the state in Box Elder County, bordering with Nevada. Both those areas were evaluated by the Utah State office. In addition, the rangewide evaluation identified Parker Mountain as an area with characteristics that could result in meeting the importance criteria.

The Rich County area provides habitat for GRSG, a BLM sensitive species, and the area has also been identified as Sage-Grouse Management Area (SGMA) in the State of Utah's state plan. The Rich population area is one of the strongholds for GRSG populations in Utah and is one of the largest populations in Utah connecting with larger populations in Idaho and Wyoming. The area also meets the criterion for a natural system or process because of the sagebrush habitat condition in the area. The majority of intact sagebrush habitat is within a core area (Doherty et al. 2022). The Rich population area includes some of the largest core sagebrush habitat in Utah, which is why this area was identified as a focal landscape area.

The area in Box Elder County has also been identified as an SGMA by the State of Utah. The Box Elder population area is one of the largest of the GRSG populations in Utah connecting with larger populations in Idaho and Nevada. It is part of the Northern Great Basin sub-population (Utah, Idaho, and Nevada).

The Parker Mountain area is in Central Utah, and provides one of the strongholds for GRSG populations in Utah and is one of the largest populations in the Great Basin. The area has also been identified as a SGMA by the State of Utah. The majority of the area is intact sagebrush habitat within a core area (USGS SEI) with minimal development.

| Utah GRSG ACEC Importance Evaluation: Rich GRSG Habitat Proposed ACEC | | |
|---|---|---|
| **Importance Consideration** | **Yes/No** | **Rationale for Determination** |
| More than locally significant qualities, especially compared to any similar resource, that give it:<br>• Special worth:<br>• Consequence<br>• Meaning<br>• Distinctiveness<br>• Cause for concern | Yes | Since the 2015 GRSG ARMPA, new science addressing GRSG density and habitats has provided additional information about the locations areas that may contain special worth, consequence, or distinctiveness. The area is not particularly fragile or sensitive to change as compared to other sites in the State of Utah. It consists of a largely intact contiguous mid to high elevation sagebrush habitat with large mesic meadow complexes. The area is largely undeveloped and threats from development are low. Oil and gas development is low, as well as other minor infrastructure for roads, pipelines, and transmission lines. Primary land uses are livestock grazing, agriculture, and recreation. Mechanical sagebrush treatments that have occurred to promote livestock grazing have reduced the quantity of winter sagebrush habitat. The area is mostly core and growth opportunity areas within the sagebrush (Doherty 2022) Sagebrush Conservation Design with a significantly large core relative to other areas in the state. Much of the core habitat including diverse mesic habitat occurs on private lands with a mix of BLM jurisdiction. Similarly, the USU seasonal habitat model identifies much of the area as summer, winter, and nesting habitat. There are two key genetic nodes and other nodes (Cross et al. 2018), and the area covers an area where genetic connections exist between the northern (into Idaho) and western (into Wyoming) portions of management Zone II (Stiver et al 2006). There is a key genetic node to the south of the Rich population area in Morgan-Summit; however, no detailed telemetry studies are available in the Morgan-Summit area to understand sage-grouse movements and connectivity in this area. Climate change models (Palmquist 2021) show that the Rich population area has the highest value for retention of sagebrush biomass. |
| Qualities or circumstances that make it:<br>• Fragile<br>• Sensitive<br>• Rare<br>• Irreplaceable:<br>• Exemplary<br>• Unique:<br>• Endangered<br>• Threatened<br>• Vulnerable to adverse change | Yes | The Upper Bear River Watershed has been identified as a focal landscape area in Utah with a goal of improving the ecological health in the region. Bear Lake and the Bear River are large contributors to the Great Salt Lake. The area is largely undeveloped and threats from development are low, including oil and gas. The area is mostly core sagebrush (Doherty 2022) with a proportionally large core relative to other areas in the state. Much of the core habitat occurs on private lands and BLM jurisdiction within the core is fairly limited to the periphery. Similarly, the USU seasonal habitat model identifies much of the area as summer, winter, and nesting habitat. Climate change models (Palmquist 2021) show that the Rich population area has the highest value for retention of sagebrush biomass. |

| Utah GRSG ACEC Importance Evaluation: Rich GRSG Habitat Proposed ACEC | | |
|---|---|---|
| **Importance Consideration** | **Yes/No** | **Rationale for Determination** |
| Has been recognized as warranting protection in order to satisfy national priority concerns or to carry out the mandates of FLPMA | Yes | The Upper Bear River Watershed has been identified as a focal landscape area in Utah with a goal of improving the ecological health in the region. Bear Lake and the Bear River are large contributors to the Great Salt Lake.<br><br>The BLM 2015, 2019, and current land use planning initiatives to conserve, enhance, and restore GRSG habitat is the result of the March 2010, US Fish and Wildlife Service (USFWS) 12 Month Finding for Petitions to List the Greater Sage-grouse (Centrocercus urophasianus) as Threatened or Endangered. In that finding, the USFWS concluded that GRSG was "warranted, but precluded" for listing as a threatened or endangered species.<br><br>However, in the 2015 listing decision, the USFWS concluded in part that existing regulatory mechanisms, (i.e., "specific direction regarding sage grouse habitat, conservation, or management") in the BLM's Land Use Plans, were adequate to protect the species.<br><br>The identification of the Upper Bear River Watershed as a focal landscape area acknowledges at least in part the importance of this area and recognition as a national priority. |
| **Other Items** | | |
| Boundaries | Focus boundaries on the core, connectivity, genetic nodes, climate in relation to the BLM jurisdiction. Consider the Dingell Act Exchange and transfer of BLM lands. Also considered the existing Laketown ACEC in the boundary. | |
| Additional Notes | Connectivity is with the larger subpopulations within Wyoming and Idaho. Since the 2015 GRSG ARMPA Utah BLM's PHMA has not lined up with PHMA in Wyoming as their populations are generally GHMA along the border as these areas are not part of their core.<br><br>The Sagebrush Focal Area (SFA) boundary in the Rich population area included portions of the relevant and important values; consider the potential for an ACEC to include portions of this area which overlaps with the new science. Boundary adjustments would need to remove large portions of non-habitat on Monte Cristo.<br><br>Other genetic nodes in checkerboarded land jurisdiction in the southern portion (south of Neponset Reservoir) were excluded from the boundary. This area is highly checkerboarded (BLM/private land jurisdictions) and the majority of the BLM parcels have authorized leases and were part of the Dingell Act Exchange. | |
| **Conclusion** | | |
| With boundary adjustments the area meets to criteria to move forward to consider needs for special management as a potential ACEC in at least one alternative in the Draft EIS, focusing boundaries on BLM jurisdiction, core, probability of breeding habitat, and climate sagebrush biomass. Items listed above provide multiple lines of evidence that these areas are more than locally significant to Utah and may provide importance to Management Zone II. Data most influential justifying the consideration as an ACEC and having more than local significance: high density breeding (Doherty et al. 2016); genetic connectivity (Cross et al. 2023); and genetic mixing (i.e., important area for connectivity well beyond the region being considered; Oyler-McCance et al. 2022). | | |

| Utah GRSG ACEC Importance Evaluation: Box Elder GRSG Habitat Proposed ACEC | | |
|---|---|---|
| **Importance Consideration** | **Yes/No** | **Rationale for Determination** |
| More than locally significant qualities, especially compared to any similar resource, that give it:<br>• Special worth:<br>• Consequence<br>• Meaning<br>• Distinctiveness<br>• Cause for concern | Yes | Since the 2015 GRSG ARMPA, new science addressing GRSG density and habitats has provided additional information about the locations areas that may contain special worth, consequence, or distinctiveness. The area has experienced a relatively large wildfire since the 2015 ARMPA (Goose Creek Fire, 2018) increasing cheatgrass risk and sagebrush loss within the sagebrush habitat making it somewhat fragile or sensitive to change as compared to other sites in the State of Utah. Fire within management zone IV has been a significant threat in Idaho and Nevada. It boasts a relatively large diverse low elevation salt desert shrub to high elevation mountain sagebrush, mountain mahogany and aspen habitat. The Box Elder Population Area supports the southeastern extent of a larger population that extends beyond state boundaries into Nevada and Idaho and is primarily influenced by fire risk, especially in dry, dense juniper areas or in areas dominated by nonnatives. The area is largely undeveloped and threats from development are low. Oil and gas development is low, as well as other minor infrastructure for rock quarries, roads and transmission lines. Primary land uses are livestock grazing, agriculture, and recreation. The area largely contains core sagebrush with growth opportunity areas as identified in Doherty (2022) Sagebrush Conservation Design. Much of the core habitat occurs on private lands with a mix of BLM jurisdiction. Similarly, the USU seasonal habitat model identifies much of the area as summer, winter, and nesting habitat. There are two key genetic nodes and other minor nodes (Cross et al. 2018), and the area covers an area where genetic connections exist between the northern and western portions of management zone IV connecting to populations to the west in Nevada and north into Idaho. Climate change models (Palmquist 2021) show that the Box Elder population area has the highest value for retention of sagebrush biomass especially in the higher elevations. Box Elder has been a source population for greater sage-grouse translocations within the state and neighboring states. This source population may be attributing to some of the importance that shows up in the genetic connectivity models based on the new science. |
| Qualities or circumstances that make it:<br>• Fragile<br>• Sensitive<br>• Rare<br>• Irreplaceable:<br>• Exemplary<br>• Unique:<br>• Endangered<br>• Threatened<br>• Vulnerable to adverse change | Yes | The area is largely undeveloped and threats from development are low. Ongoing disturbance in portions of the area are primarily due to livestock grazing infrastructure for wells and pipelines, rock quarries, and railroads. Similarly, the USU seasonal habitat model identifies much of the area as summer, winter, and nesting. Climate change models (Palmquist 2021) show that the population area has the highest value for retention of sagebrush biomass. Area has two key genetic nodes and several others. The key nodes are connected with populations in Idaho and eastern NV, while other nodes are connected with southern UT populations and NE UT. |

| Utah GRSG ACEC Importance Evaluation: Box Elder GRSG Habitat Proposed ACEC | | |
|---|---|---|
| **Importance Consideration** | **Yes/No** | **Rationale for Determination** |
| Has been recognized as warranting protection in order to satisfy national priority concerns or to carry out the mandates of FLPMA | No | The BLM 2015, 2019, and current land use planning initiatives to conserve, enhance, and restore GRSG habitat is the result of the March 2010, US Fish and Wildlife Service (USFWS) 12 Month Finding for Petitions to List the Greater Sage-grouse (Centrocercus urophasianus) as Threatened or Endangered. In that finding, the USFWS concluded that GRSG was "warranted, but precluded" for listing as a threatened or endangered species.<br><br>However, in the 2015 listing decision, the USFWS concluded in part that existing regulatory mechanisms, (i.e., "specific direction regarding sage grouse habitat, conservation, or management") in the BLM's Land Use Plans, were adequate to protect the species.<br><br>Without multiple lines of evidence, including reasonably foreseeable development, valid existing rights, land ownership, crucial GRSG habitat characteristics from multiple science-based models, and on-the-ground conditions provide evidence this area has not been identified as warranting protection beyond the standard approaches to implemented FLPMA and national priorities. |
| **Other Items** | | |
| Boundaries | Focus boundaries on the core, connectivity, genetic nodes, climate in relation to the BLM jurisdiction. | |
| Additional Notes | Connectivity is with the larger subpopulations within Nevada and Idaho. Utah since the 2015 GRSG ARMPA has not lined up with PHMA in Nevada as their populations are generally Other Habitat Management Area (OHMA)/GHMA along the border as these areas are not part of their core. PHMA in Utah lines up fairly well with PHMA in Idaho.<br><br>The SFA boundary in the Box Elder population area included portions of the relevant and important values; consider the potential for an ACEC to include portions of this area which overlaps with the new science. Boundary adjustments would need to include other relevant/important values based on the new science within BLM jurisdiction. | |
| **Conclusion** | | |
| With boundary adjustments the area meets the criteria to move forward to consider needs for special management as a potential ACEC in at least one alternative in the Draft EIS, focusing boundaries on BLM jurisdiction, genetic nodes, core, probability of breeding habitat, and climate sagebrush biomass. Items listed above provide multiple lines of evidence that these areas are important in review of the new science/data sets. From BLM Headquarters' proposed boundary, consider larger tracts of BLM land jurisdiction within the northwestern portion of the PHMA area largely lining up with the 2015 SFA boundaries. Items listed above provide multiple lines of evidence that these areas are more than locally significant to Utah and may provide importance to Management Zone IV. Data most influential justifying the consideration as an ACEC and having more than local significance: high density breeding (Doherty et al. 2016); genetic connectivity (Cross et al. 2023); and genetic mixing (i.e., important area for connectivity well beyond the region being considered; Oyler-McCance et al. 2022). | | |

| Utah GRSG ACEC Importance Evaluation: Parker Mountain Proposed ACEC | | |
|---|---|---|
| **Importance Consideration** | **Yes/No** | **Rationale for Determination** |
| More than locally significant qualities, especially compared to any similar resource, that give it:<br>• Special worth:<br>• Consequence<br>• Meaning<br>• Distinctiveness<br>• Cause for concern | No | Since the 2015 GRSG ARMPA, new science addressing GRSG density and habitats has provided additional information about the locations areas that may contain special worth, consequence, or distinctiveness. A portion of the area contains high relative abundance (Doherty et al. 2016), there is a key genetic node (Cross et al. 2018), and the area covers an area where genetic connections between the northern and western portions of management Zone III may be constricted (Row et al 2018, Cross et al. 2023). Based on further coordination and review of the new science, the Parker Mountain Population has been a source population for translocations throughout Utah; therefore, the genetic connectivity may not demonstrate that this population is more than locally significant and that these are natural dispersals. Per conversations with the State of Utah, they have indicated that natural dispersal may be limited based on the nature of the habitat in the area and that the genetic connectivity may be more likely attributed to the translocations. |
| Qualities or circumstances that make it:<br>• Fragile<br>• Sensitive<br>• Rare<br>• Irreplaceable:<br>• Exemplary<br>• Unique:<br>• Endangered<br>• Threatened<br>• Vulnerable to adverse change | No | The area is not particularly fragile or sensitive to change and threats from land uses/authorizations are low as compared to other sites in the State of Utah, providing opportunity for retention of a relatively large expanse of intact sagebrush habitat. The area is largely undeveloped and threats from development are low. Oil and gas potential is low. Ongoing disturbance in the area is limited to a few minor rights-of-way (i.e., roads and small transmission lines), livestock grazing, and recreation. The area is mostly core sagebrush as identified in Doherty (2022) Sagebrush Conservation Design with a proportionally large core relative to other areas in the state. Much of the core habitat occurs on School and Institutional Trust Lands Administration (SITLA) lands and BLM jurisdiction within the core is fairly limited to the periphery. Similarly, the USU seasonal habitat model identifies much of the area as summer, winter, and nesting habitat. The core has a high probability of lek persistence; however, the majority of occupied leks are on SITLA administered lands. Uncertainty on SITLA administered lands could make the population vulnerable to adverse changes should SITLA management priorities change. Parker Mountain has been a source population for GRSG translocations within the state. This source population may be attributing to some of the importance that shows up in the genetic connectivity models based on the new science. The nature of the habitat in the area may limit natural dispersal to the north and west of the area. This area contains one of the largest populations of GRSG within the southernmost extent of the GRSG range and although it provides importance to those smaller populations that surround it, its importance to the larger overall range of GRSG within Management Zone III is relatively minor and therefore not more than locally significant. |

| Utah GRSG ACEC Importance Evaluation: Parker Mountain Proposed ACEC | | |
|---|---|---|
| **Importance Consideration** | **Yes/No** | **Rationale for Determination** |
| Has been recognized as warranting protection in order to satisfy national priority concerns or to carry out the mandates of FLPMA | No | The BLM 2015, 2019, and current land use planning initiatives to conserve, enhance, and restore GRSG habitat is the result of the March 2010, US Fish and Wildlife Service (USFWS) 12 Month Finding for Petitions to List the Greater Sage-grouse (Centrocercus urophasianus) as Threatened or Endangered. In that finding, the USFWS concluded that GRSG was "warranted, but precluded" for listing as a threatened or endangered species.<br><br>However, in the 2015 listing decision, the USFWS concluded in part that existing regulatory mechanisms, (i.e., "specific direction regarding sage grouse habitat, conservation, or management") in the BLM's Land Use Plans, were adequate to protect the species.<br><br>Without multiple lines of evidence, including reasonably foreseeable development, valid existing rights, land ownership, crucial GRSG habitat characteristics from multiple science-based models, on-the-ground conditions/evidence this area has not been identified for protection beyond those implemented through FLPMA and national priorities. |
| **Other Items** | | |
| Boundaries | No proposed changes to boundaries. | |
| Additional Notes | No maps provided due to no ACEC boundary identified. | |
| **Conclusion** | | |
| The area meets relevance criteria but does not meet importance criteria. Items in bold listed above provide some lines of evidence that warranted a closer review of these areas to determine if Parker Mountain may be important and more than locally significant. In our review of the new science/data sets and coordination with the State of Utah, the lack of information particularly with the genetic connectivity suggests this area is not more than locally significant and does not have greater than local importance to the greater sage-grouse population within Management Zone III. | | |

### *Wyoming*

| Wyoming GRSG ACEC Importance Evaluation: Carbon-Moffat GRSG Connectivity Proposed ACEC | | |
|---|---|---|
| **Importance Consideration** | **Yes/No** | **Rationale for Determination** |
| More than locally significant qualities, especially compared to any similar resource, that give it:<br>• Special worth:<br>• Consequence<br>• Meaning<br>• Distinctiveness<br>• Cause for concern | No | • The nominated area provides a genetic linkage between GRSG populations in NW CO with populations in central and western portions of the species' range (Cross et al. 2023).<br>• However, models of potential movement among PHMA throughout the range of GRSG suggest additional movement pathways from CO populations in this region to population strongholds in WY (Crist et al. 2017; Oyler-McCance et al. 2022; Cross et al. 2023).<br>• The nominated area contains several genetic nodes (i.e., leks most important to the overall genetic connectivity of GRSG populations across their range; Fig. 6; Cross et al. 2018 and 2023).<br>• GRSG population density is high in much of the nominated area with portions of the nominated area modeled as having the highest densities of breeding GRSG in WAFWA MZ 2; MZ 2 has the highest proportion of breeding GRSG in the range of the species (Doherty et al. 2016).<br>• Lek densities are higher in this area than most other areas in WY, although many of the documented leks are currently unoccupied (as defined by the WGFD; Whitford and Bish 2022), especially those more closely associated with energy development.<br><br>The data most likely to suggest the nominated area has more than locally significant qualities are the genetic linkage data. These data suggest the nominated area is a likely corridor for the functional movement of GRSG from habitats in NW CO to the rest of the species' range via population strongholds in WY. But the preponderance of evidence suggests other movement corridors between CO and WY likely exist (see Crist et al. 2017; Oyler-McCance et al. 2022) suggesting the nominated area does not have greater than local-level significance. |
| Qualities or circumstances that make it:<br>• Fragile<br>• Sensitive<br>• Rare<br>• Irreplaceable:<br>• Exemplary<br>• Unique:<br>• Endangered<br>• Threatened<br>• Vulnerable to adverse change | No | GRSG population linkage (i.e., the functional movement of individuals between CO and WY) in this area may establish the area as being more than locally significant to the sustainability of GRSG populations in the broader region. However, other likely corridors exist allowing movement of individual GRSG between WY and CO so the nominated area is not unique, rare or irreplaceable. |

| Wyoming GRSG ACEC Importance Evaluation: Carbon-Moffat GRSG Connectivity Proposed ACEC | | |
|---|---|---|
| **Importance Consideration** | **Yes/No** | **Rationale for Determination** |
| Has been recognized as warranting protection in order to satisfy national priority concerns or to carry out the mandates of FLPMA | No | The nominated area meets relevance criteria but does not meet importance criteria. Therefore, it is not recommended that the nominated area as nominated nor as modified be considered a potential ACEC for GRSG for analysis in the Draft EIS in the current range-wide planning effort. |

| Wyoming GRSG ACEC Importance Evaluation: Little Sandy Proposed ACEC | | |
|---|---|---|
| **Importance Consideration** | **Yes/No** | **Rationale for Determination** |
| More than locally significant qualities, especially compared to any similar resource, that give it:<br>• Special worth:<br>• Consequence<br>• Meaning<br>• Distinctiveness<br>• Cause for concern | Yes | • GRSG population density is very high especially in northern portions of the nominated area with most of the nominated area modeled as having the highest densities of breeding GRSG in WAFWA MZ 2; MZ 2 has the highest proportion of breeding GRSG in the range of the species (Doherty et al. 2016).<br>• The nominated area contains a genetic node (i.e., leks most important to the overall genetic connectivity of GRSG populations across their range) and includes portions of the most likely genetic linkage between GRSG populations in eastern and central WY with populations in southwestern portions of the State (Fig. 6; Cross et al. 2023).<br>• However, models of potential movement among PHMA throughout the range of GRSG suggest east-west movement pathways are more likely to occur across southern portions of the State (Crist et al. 2017).<br><br>The data most likely to suggest the nominated area has more than locally significant qualities are the GRSG breeding density data. These data suggest the nominated area, especially northern portions of the area, has some of the highest densities of breeding GRSG in the range of the species establishing the nominated area is more than locally important with special worth and is distinctive. |
| Qualities or circumstances that make it:<br>• Fragile<br>• Sensitive<br>• Rare<br>• Irreplaceable:<br>• Exemplary<br>• Unique:<br>• Endangered<br>• Threatened<br>• Vulnerable to adverse change | Yes | High densities of breeding GRSG relative to the rest of the species' range establish the area as exemplary, rare, unique, and irreplaceable. The potential expansion of liquid and renewable energy development in the nominated area establishes the area as vulnerable to adverse change. |

**Wyoming GRSG ACEC Importance Evaluation:**
**Little Sandy Proposed ACEC**

| Importance Consideration | Yes/No | Rationale for Determination |
|---|---|---|
| Has been recognized as warranting protection in order to satisfy national priority concerns or to carry out the mandates of FLPMA | No | The proposed ACEC includes multiple lines of evidence identifying the area as valuable for the long-term population sustainability of GRSG. Because (1) the area has relatively (compared to the rest of the species' range) robust populations, (2) includes portions of the most likely genetic corridor between populations to the east and west of this region, (3) the loss of the ability of GRSG to move through this area could isolate GRSG populations in eastern and western portions of the species' range and the isolation of populations increases the probability of regional-level extirpation (Knick et al. 2013) and conserving habitat connectivity is a national priority for managing bureau sensitive status species (Manual 6840 and IM 2023-005), and (4) the area has high potential for energy development in the future, it is recommended that the nominated area as modified be considered a potential ACEC for GRSG for analysis under at least one alternative in the current range-wide planning effort. |

**Wyoming GRSG ACEC Importance Evaluation:**
**Carter-Cook GRSG Connectivity Proposed ACEC**

| Importance Consideration | Yes/No | Rationale for Determination |
|---|---|---|
| More than locally significant qualities, especially compared to any similar resource, that give it:<br>• Special worth:<br>• Consequence<br>• Meaning<br>• Distinctiveness<br>• Cause for concern | Yes | • The nominated area provides the primary genetic linkage between GRSG populations in the entirety of northeastern portions of the species' range with populations in central and western portions of the species' range (Crist et al. 2017; Oyler- McCance et al. 2022; Cross et al. 2023).<br>• The nominated area contains at least 2 genetic nodes (i.e., leks most important to the overall genetic connectivity of GRSG populations across their range; Cross et al. 2018 and 2023).<br><br>The data most likely to suggest the nominated area has more than locally significant qualities are the genetic linkage data. The nominated area is the most likely corridor and a bottleneck to functional movement of GRSG from habitats in most of Management Zone 1 to the rest of the species' range establishing that the nominated area is more than locally important with special worth and is distinctive. |
| Qualities or circumstances that make it:<br>• Fragile<br>• Sensitive<br>• Rare<br>• Irreplaceable:<br>• Exemplary<br>• Unique:<br>• Endangered<br>• Threatened<br>• Vulnerable to adverse change | Yes | Potential genetic bottleneck of the most likely movement corridor between populations in northeastern portions of the GRSG range and the rest of the species' range establish the area as rare, unique, and irreplaceable. Energy development and mining (and the likely expansion of bentonite mining in the area) and invasive annual grass (and the increased risk of fire eliminating the sagebrush overstory) establishes the area as vulnerable to adverse change. |

| Wyoming GRSG ACEC Importance Evaluation: Carter-Cook GRSG Connectivity Proposed ACEC | | |
|---|---|---|
| **Importance Consideration** | **Yes/No** | **Rationale for Determination** |
| Has been recognized as warranting protection in order to satisfy national priority concerns or to carry out the mandates of FLPMA | No | The proposed ACEC includes multiple lines of evidence identifying the area as valuable for the long-term population sustainability of GRSG, especially populations in MZ 1. Because (1) the area is the most likely genetic corridor between populations in eastern portions of the species range, (2) the loss of the ability of GRSG to move through this area could isolate MZ 1 populations, (3) the isolation of populations increases the probability of regional-level extirpation (Knick et al. 2013), and (4) conserving habitat connectivity is a national priority for managing bureau sensitive status species (Manual 6840 and IM 2023-005), it is recommended that the nominated area as modified be considered a potential ACEC for GRSG for analysis under at least one alternative in the current range-wide planning effort. |
| **Other Items** | | |
| Additional Notes | While the New Castle FO (NFO) agrees with the premise of the rationale of regional-level extirpation (Knicks et al. 2013), the NFO believes that the added protection of an ACEC is not necessary to meet goals of the area. The NFO believes that goals can be met with the current Core Area strategy as the proposed ACEC area is located in a PHMA Connectivity Area. The protections include a 5% disturbance density threshold and associated NSOs and TLSs, which should allow existing GRSG populations to persist and maintain genetic connectivity between populations. | |

| Wyoming GRSG ACEC Importance Evaluation: Red Desert Proposed ACEC | | |
|---|---|---|
| **Importance Consideration** | **Yes/No** | **Rationale for Determination** |
| More than locally significant qualities, especially compared to any similar resource, that give it:<br>• Special worth:<br>• Consequence<br>• Meaning<br>• Distinctiveness<br>• Cause for concern | No | • The nominated area does not contain high density GRSG populations, and only portions of the area provide suitable habitats for the species.<br>• The nominated area is not important for genetic connectivity.<br><br>Data suggest the nominated area does not have more than locally significant qualities for GRSG. |
| Qualities or circumstances that make it:<br>• Fragile<br>• Sensitive<br>• Rare<br>• Irreplaceable:<br>• Exemplary<br>• Unique:<br>• Endangered<br>• Threatened<br>• Vulnerable to adverse change | No | None of the data considered establish the nominated area as having rare, unique, or irreplaceable values for GRSG. Energy development (and the likely expansion of this development in the area) establishes the area as vulnerable to adverse change, but these potential threats are not likely to directly impact substantial numbers of GRSG. |

| Wyoming GRSG ACEC Importance Evaluation: Red Desert Proposed ACEC | | |
|---|---|---|
| **Importance Consideration** | **Yes/No** | **Rationale for Determination** |
| Has been recognized as warranting protection in order to satisfy national priority concerns or to carry out the mandates of FLPMA | No | The proposed ACEC does not include habitat conditions that meet relevance and importance criteria for GRSG. Therefore, it is not recommended that the nominated area be considered a potential ACEC for GRSG for analysis in the Draft EIS for the current range-wide planning effort. |

| Wyoming GRSG ACEC Importance Evaluation: Sagebrush Focal Areas in South-Central and Southwestern Wyoming Proposed ACEC | | |
|---|---|---|
| **Importance Consideration** | **Yes/No** | **Rationale for Determination** |
| More than locally significant qualities, especially compared to any similar resource, that give it:<br>• Special worth:<br>• Consequence<br>• Meaning<br>• Distinctiveness<br>• Cause for concern | Yes | • GRSG population density is high in far western and far eastern portions of the SFA area with these areas modeled as having the highest densities of breeding GRSG in WAFWA MZ 2; MZ 2 has the highest proportion of breeding GRSG in the range of the species (Doherty et al. 2016).<br>• The SFA area contains several genetic nodes (i.e., leks most important to the overall genetic connectivity of GRSG populations across their range; Fig. 6; Cross et al. 2018 and 2023).<br>• The general area in far western portions of the SFA area additionally appears to be a genetic mixing zone for populations farther to the south in UT, populations in CO and southern WY, and populations in eastern ID (Oyler-McCance et al. 2022).<br>• The SFA area includes portions of the most likely genetic linkage between GRSG populations in eastern and central WY with populations in southwestern portions of the State (Cross et al. 2023).<br>• However, models of potential movement among PHMA throughout the range of GRSG suggest east-west movement pathways are more likely to occur across southern portions of the State (Crist et al. 2017).<br>• Models of climate impacts on sagebrush habitat integrity suggest that some of the habitats throughout the SFA area will not maintain high value conditions for GRSG into the near future (2030-2060; Doherty et al. 2022).<br><br>The data most likely to suggest the SFA-designated area being considered has more than locally significant qualities are the GRSG breeding density data, the genetic mixing data, and the genetic connectivity data. These data suggest far western portions of the SFA area are more than locally important with special worth and are distinctive. |

| Wyoming GRSG ACEC Importance Evaluation: Sagebrush Focal Areas in South-Central and Southwestern Wyoming Proposed ACEC | | |
|---|---|---|
| **Importance Consideration** | **Yes/No** | **Rationale for Determination** |
| Qualities or circumstances that make it:<br>• Fragile<br>• Sensitive<br>• Rare<br>• Irreplaceable:<br>• Exemplary<br>• Unique:<br>• Endangered<br>• Threatened<br>• Vulnerable to adverse change | Yes | High densities of breeding GRSG relative to the rest of the species' range, GRSG population linkage (i.e., the functional movement of individuals between UT and WY), and genetic mixing which appears to be relatively unique to the species' range establish far western portions of the SFA area as exemplary, rare, unique, and irreplaceable. Models of habitat response to climate change in the far western region establish the area as vulnerable to adverse change. |
| Has been recognized as warranting protection in order to satisfy national priority concerns or to carry out the mandates of FLPMA | N/A | Far western portions of the SFA-designated area being considered includes multiple lines of evidence identifying the area as valuable for the long-term population sustainability of GRSG. Because (1) the area has relatively (compared to the rest of the species' range) robust populations, (2) is the most likely genetic corridor between populations to the east and west of this region, (3) the loss of the ability of GRSG to move through this area could isolate GRSG populations in eastern and western portions of the species' range and the isolation of populations increases the probability of regional-level extirpation (Knick et al. 2013), and (4) conserving habitat connectivity is a national priority for managing bureau sensitive status species (Manual 6840 and IM 2023-005), it is recommended that the SFA- designated area being considered as modified be considered a potential ACEC for GRSG for analysis under at least one alternative in the current range-wide planning effort. |

| Wyoming GRSG ACEC Importance Evaluation: Greater South Pass and Upper Green River Basin GRSG Proposed ACEC | | |
|---|---|---|
| **Importance Consideration** | **Yes/No** | **Rationale for Determination** |
| More than locally significant qualities, especially compared to any similar resource, that give it:<br>• Special worth:<br>• Consequence<br>• Meaning<br>• Distinctiveness<br>• Cause for concern | Yes | • GRSG population density is very high especially in western portions of the nominated area with most of the nominated area modeled as having the highest densities of breeding GRSG in WAFWA MZ 2; MZ 2 has the highest proportion of breeding GRSG in the range of the species (Doherty et al. 2016).<br>• The nominated area contains several genetic nodes (i.e., leks most important to the overall genetic connectivity of GRSG populations across their range; Cross et al. 2018 and 2023).<br>• The nominated area provides the most likely genetic linkage between GRSG populations in eastern and central WY with populations in southwestern portions of the State (Cross et al. 2023).<br>• However, models of potential movement among PHMA throughout the range of GRSG suggest east-west movement pathways are more likely to occur across southern portions of the State (Crist et al. 2017).<br><br>The data most likely to suggest the nominated area has more than locally significant qualities are the GRSG breeding density data. These data suggest the nominated area, especially central and western portions of the area, has the highest densities of breeding GRSG in the range of the species establishing the nominated area is more than locally important with special worth and is distinctive. |
| Qualities or circumstances that make it:<br>• Fragile<br>• Sensitive<br>• Rare<br>• Irreplaceable:<br>• Exemplary<br>• Unique:<br>• Endangered<br>• Threatened<br>• Vulnerable to adverse change | Yes | High densities of breeding GRSG relative to the rest of the species' range establish the area as exemplary, rare, unique, and irreplaceable. Energy development (and the potential expansion of liquid and renewable energy development in the nominated area) establishes the area as vulnerable to adverse change. |
| Has been recognized as warranting protection in order to satisfy national priority concerns or to carry out the mandates of FLPMA | No | The proposed ACEC includes multiple lines of evidence identifying the area as valuable for the long-term population sustainability of GRSG. Because (1) the area has relatively (compared to the rest of the species' range) robust populations, (2) is the most likely genetic corridor between populations to the east and west of this region, (3) the loss of the ability of GRSG to move through this area could isolate GRSG populations in eastern and western portions of the species' range and the isolation of populations increases the probability of regional- level extirpation (Knick et al. 2013), and conserving habitat connectivity is a national priority for managing bureau sensitive status species (Manual 6840 and IM 2023-005), it is recommended that the nominated area as modified be considered a potential ACEC for GRSG for analysis under at least one alternative 4 in the current range-wide planning effort. |

### 5.4.5 Summary Results of Evaluation Process

As a result of the ACEC evaluation process, the following acres were identified as meeting the relevance and importance criteria and have been considered in Alternatives 3 and 6 in the Draft EIS.

| Summary of Potential GRSG ACECs by State | |
|---|---|
| **State** | **Acres of Potential ACEC** |
| Colorado | 4,547 |
| Idaho | 3,438,307 |
| Montana/Dakotas | 726,062 |
| Nevada/California | 5,766,150 |
| Utah | 365,181 |
| Wyoming | 839,225 |
| Total | 11,139,472 |

**Figure 5-3** depicts these areas in relation to the Alternative 3 habitat management area boundaries. **Figure 5-4** depicts these areas in relation to the Alternative 5 and 6 habitat management area boundaries.

**Figure 5-3: Potential ACECs in relation to Alternative 3 Habitat Management Areas**

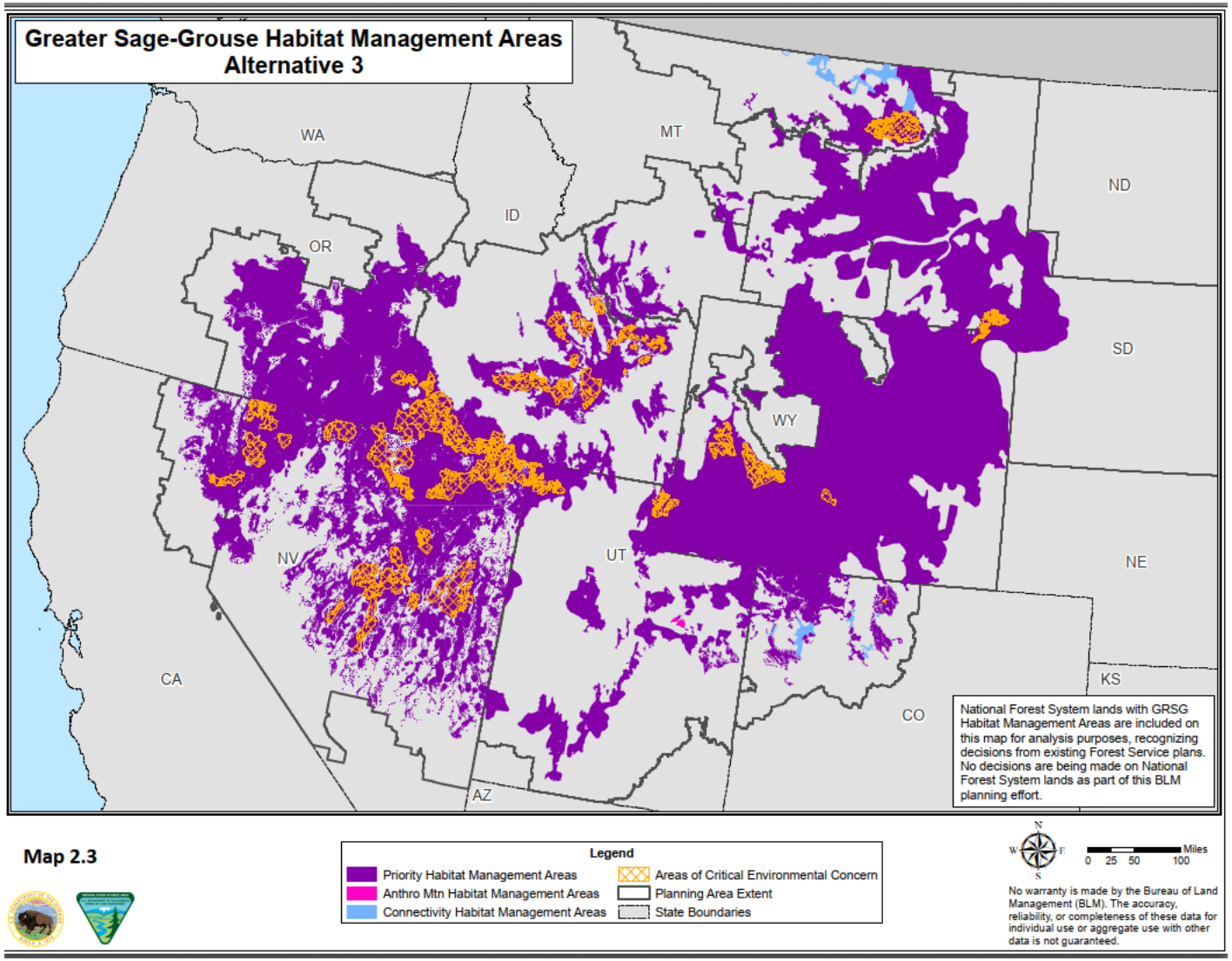
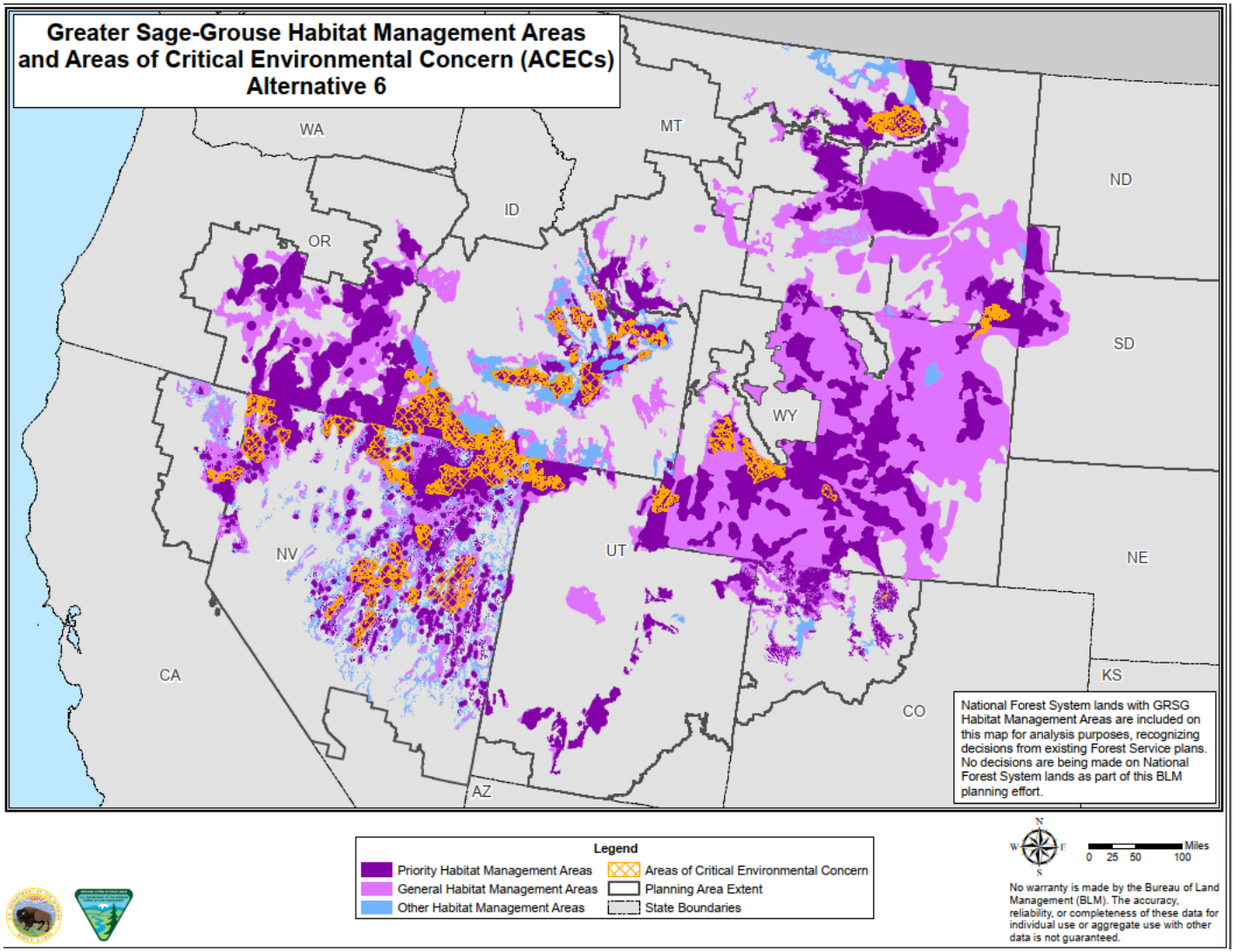


**Figure 5-4: Potential ACECs in relation to Alternative 5 and 6 Habitat Management Areas**



The BLM will continue to review information that could help inform these draft ACEC evaluations. After the public comment period, the BLM will review the evaluations again to determine if any new information received should result in adjustments to the evaluation findings.

## 5.5 SPECIAL MANAGEMENT

As noted in **Section 5.2** above, the presence of an area that meets relevance and importance criteria does not mean that an ACEC is needed. The third component of an ACEC is that the area requires special management to protect and prevent irreparable damage to the given values. Such management would not be present in the absence of the designation.

The relevance and importance criteria were used to evaluate all GRSG habitat, meaning all areas that met the relevance criteria. This evaluation included the applicable (i.e., relevant) portions of the nominated ACECs. All potential ACECs that met both the relevance and importance criteria and for which special management attention has been identified have been carried forward as potential ACECs, and they are considered for designation and management in the Draft RMPA/EIS. See the ACEC section in Chapter 2 for the special management being considered for the ACECs under Alternative 3 and Alternative 6.

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# Appendix 6

## NTT, COT, and USGS Science Incorporation

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*This appendix outlines how the NTT and COT and reports factored into the prior GRSG planning processes, and how NTT, COT, and USGS science was incorporated into those efforts.*

# Appendix 6. NTT, COT, and USGS Science Incorporation

In 2010, the US Fish and Wildlife Service (USFWS) determined that greater sage-grouse (GRSG) warranted listing under the Endangered Species Act, but was precluded from listing due to other priorities. In response to this determination, the BLM initiated a land use planning process in 2011. To help inform that process the BLM assembled a "National Technical Team" (NTT), comprising state and federal resource specialists and scientists to review the scientific literature available at that time. On December 21, 2011 the NTT finalized a document entitled *A Report on National Greater Sage-Grouse Conservation Measures*, also known as the National Technical Team Report (NTT Report). The report was developed to summarize "the latest science and best biological judgement" from the available literature (NTT Report, Introduction, page 5). Though the NTT Report used the best science available at that time to inform the conservation measures for BLM decision-makers to consider through the land use planning and NEPA process.

On December 27, 2011, the BLM issued policy in Instruction Memorandum 2012-044 requiring BLM offices to "consider all applicable conservation measures when revising or amending its RMPs in Greater Sage Grouse habitat" (IM-2012-44, Policy/Action). The IM clarified a distinction between "all applicable conservation measures" and those included in the NTT Report by stating "the conservation measures developed by the NTT…must be considered and analyzed, as appropriate, through the land use planning process" (ibid). Each BLM planning effort complied with this policy by including an alternative based entirely on the conservation measures identified by the NTT. Through this alternative and corresponding analysis, the BLM complied with its policy for considering the conservation measures in the NTT Report.

It is critical to clarify that neither the NTT nor the BLM's policy intended that the conservation measures in the NTT Report were to be automatically applied across the range without intervening consideration through detailed land use planning and NEPA analysis. In the same paragraph that directs the BLM to "consider all applicable conservation measures" from the NTT Report, IM-2012-044 also notes that "while these conservation measures are range-wide in scale, it is expected that at the regional and sub-regional planning scales there may be some adjustments of these conservation measures in order to address local ecological site variability." Moreover, the NTT understood that the measures in its report would be evaluated alongside competing land use planning considerations and with follow-up environmental analysis relating to the conservation efficacy of its measures. As the NTT Report described, the conservation measures are not themselves management decisions but rather have been prepared "to assist [the BLM] in making management decisions." (NTT Report, Introduction, page 5.) In other words, "the conservation measures described in [the] report *are not an end point* but, rather, *a starting point* to be used in the BLM's planning processes" (ibid, page 5) (emphasis added).

The principle of local adaptation of scientific results and recommended conservation measures derived from them is present in other documents with GRSG conservation recommendations. In 2014, three years after the NTT Report, the Department of the Interior requested the US Geological Survey (USGS) prepare a report that compiled and summarized published scientific studies regarding buffer distances around GRSG habitats. In the report titled *Conservation Buffer Distance Estimates for Greater Sage-Grouse – A Review* (Open

File Report 2014-1239), USGS scientists note that "responses of individual birds and populations, coupled with variability in land-use patterns and habitat conditions, add variation in research results. This variability presents a challenge for land managers and planners seeking to use research results to guide management and plan for GRSG conservation measures. Variability between GRSG populations and their responses to different types of infrastructure can be substantial across the species' range. Logical and scientifically justifiable departures from the 'typical response,' based on local data and other factors, may be warranted when implementing buffer protections or density limits in parts of the species' range" (USGS Open File Report 2014-1239, page 2). A simple statement from the USGS report indicates this variability, where the USGS scientists noted that "there is no single distance that is an appropriate buffer for all populations and habitats across the sage-grouse range" (ibid, pg. 2).

Further, the BLM's policy requiring consideration of the conservation measures in the NTT Report allowed for individual planning efforts to make adjustments to the report's conservation measures. IM-2012-044 states that "the NTT-developed conservation measures were derived from goals and objectives developed by the NTT" and that "these goals and objectives are a *guiding philosophy* that should *inform* the goals and objectives developed for individual land use plans. However, *it is anticipated that individual plans may develop goals and objectives that differ and are specific to individual planning areas*" (emphasis added). The anticipation for variability across the range is even more explicit when the IM notes that "while [the NTT Report's] conservation measures are range-wide in scale, *it is expected* that at the regional and sub-regional planning scales there may be some adjustments of these conservation measures in order *to address local ecological site variability*" (emphasis added). With specific consideration of this variability, each BLM planning and NEPA effort as part of the 2015 amendment efforts developed and analyzed a range of alternative approaches for GRSG habitat management in each sub-region/state. Through this process, the BLM considered local and regional differences, analyzing the effect of each alternative approach locally and cumulatively.

Beyond the issue of variability across the range, as the NTT developed its conservation measure recommendations, it did not take into consideration other legal and regulatory requirements associated with land use planning and NEPA. For example, the NTT's range-wide conservation measures did not take into account State or local GRSG conservation efforts – especially those that have be completed or updated since 2015. Further, the NTT Report's conservation measure that recommends that priority GRSG habitat areas be designated as unsuitable for all surface mining of coal entirely overlooks the specific process to determine unsuitability prescribed in 43 Code of Federal Regulations (CFR) 3461. Elsewhere the NTT Report states that "a 4-mile [no surface occupancy (NSO) stipulation] likely would not be practical given most leases are not large enough to accommodate a buffer of this size, and lek spacing within priority habitats is such that lek-based buffers may overlap and preclude all development" (NTT Report, page 21) and therefore presents a conservation measure to close priority GRSG habitat areas to fluid mineral leasing. This is not consistent with BLM planning guidance directing planning teams that "when applying leasing restrictions, the least restrictive constraint to meet the resource protection objective should be used" (BLM-H-1601 Appendix C page 24); whether or not a lease is large enough to accommodate a large NSO should not be a consideration if NSO provides the necessary protection.

In recognition of instances where the NTT Report's conservation measures were not consistent with law, regulation, or policy, the BLM's policy direction in IM-2012-044 directs that "when considering the [NTT Report's] conservation measures…BLM offices should ensure that implementation of any of the measures is consistent with applicable statute and regulation. Where inconsistencies arise, BLM offices should consider the conservation measure(s) to the fullest extent consistent with such statute and regulation."

Each BLM 2015 planning effort fully considered the broad, range-wide recommendations from the NTT Report through the required NEPA process. This consideration was accomplished, as directed by Congress, using a "systematic interdisciplinary approach to achieve integrated consideration of physical, biological, economic, and other sciences" (FLPMA Section 202(c)(2)). Through careful consideration of the NTT's conservation measures, as well as local expertise, monitoring, partnerships, and other resource and land uses, the BLM developed GRSG management goals, objectives, and management actions that accounted for the variability of habitat and resources across the range. Through the combination of the 2015 and 2019 planning processes, the BLM complied with the statutory requirement that the BLM resolve, "to the extent practical, inconsistencies between Federal and non-Federal Government plans" (FLPMA Sec. 202(c)(9)). Through these efforts, the BLM has met its statutory and regulatory responsibilities related to its consideration of the conservation measures contained in the NTT Report.

What the NTT Report and its Conservation Measures Are:

- The NTT Report included science-based management considerations for GRSG to promote sustainable GRSG populations.
- The conservation measures were to be considered and analyzed through the BLM's land use planning process.
- The conservation measures are range-wide in scale, not accounting for local variability.
- The conservation measures were a starting point to be used in the BLM's planning process.
- The NTT Report was developed by a team of resource specialists and scientists familiar with GRSG literature.

What the NTT Report and its Conservation Measures Are Not:

- Unlike FLPMA's requirement that the BLM develop and modify Land Use Plans in coordination with state and local plans and policies, the NTT Report was not developed with input from or consideration of plans, policies, or programs of State, Tribal, or local government agencies.
- The conservation measures were not developed using a systematic interdisciplinary approach, as required by FLPMA for land use plans.
- The NTT Report presented conservation measures that would provide food and habitat for one species of wildlife, but did not consider other FLPMA requirements for BLM to manage for other species and resources while also recognizing the need for sources of minerals, food, timber and fiber from public lands.
- The NTT Report is not a land use plan, or an amendment or revision to a land use plan.
- The conservation measures were based on best available science at the time and do not provide for future updates in scientific knowledge or technological advancements.
- When preparing the NTT Report, the NTT did not complete a NEPA analysis on its conservation measures. Instead, the BLM completed NEPA and land use planning processes in 2015 and 2019 to assess the environmental consequences of the NTT Report's conservation measures, as well as alternatives to those measures—and to account for competing land management considerations.

## 6.1 US FISH AND WILDLIFE CONSERVATION OBJECTIVES TEAM REPORT (2013)

In 2012 the director of the USFWS convened a Conservation Objectives Team (COT) of state and USFWS representatives. The team developed a peer-reviewed report (COT Report) that delineated objectives based on the "best scientific and commercial data available at the time of its release" (COT Report, page ii). The COT Report, released in March 2013, identifies conservation objectives, measures, and options for each of

the GRSG threats assessed. The COT Report also identified Priority Areas for Conservation (PACs) which were identified as "the most important areas needed for maintaining GRSG representation, redundancy, and resilience across the landscape" (ibid, page 13). Unique compared to the NTT Report, the COT Report identified threats to each PAC, recognizing that threats vary across the range, and therefore corresponding management should vary to address those threats. The preface to the report is clear that the COT report "is guidance only" and that the "identification of conservation objectives and measures does not create a legal obligation beyond existing legal requirements" (ibid, page ii). Further, the preface notes that the objectives "are subject to modification as dictated by new findings, changes in species' status, and the completion of conservation actions" (ibid, page ii).

The COT Report clearly identifies the necessity to adapt GRSG conservation goals, objectives, and measures due to variability across the range. The COT noted that "due to the variability in ecological conditions and the nature of the threats across the range of the sage-grouse, *developing detailed, prescriptive species or habitat actions is not possible at the range-wide scale*" (emphasis added) (COT Report, Section 5- Conservation Objectives, page 31). The COT Report summarizes the relationship between its range-wide conservation goals, objectives, and measures and the state-specific planning efforts, noting that "specific strategies or actions necessary to achieve the following conservation objectives must be developed and implemented at the state or local level, with the involvement of all stakeholders" (ibid).

The BLM received the COT Report when developing its 2013 Draft EIS and fully considered it prior to Draft EIS publication, providing for public review of the BLM's evaluation. Upon receipt of the Report the BLM evaluated the range of alternatives and determined that the threats addressed by the COT Report were all addressed in the range of alternatives of those Draft EISs. The BLM also evaluated the impacts to GRSG from the alternatives and determined that the COT Report objectives were all addressed within the range of alternatives.

Following public comments and development of the 2015 Proposed Plans, the Final EISs updated the crosswalk between the USFWS threats and the BLM program areas, showing that all the threats for which the BLM has discretion were addressed. The EISs note that all conservation measures and objectives identified in the COT report were considered within the 2015 Final EIS range of alternatives. Finally, a table was added to the 2015 Final EISs Executive Summary that showed the management actions from the 2015 Proposed Plans that addressed the COT Report threats.

On October 2, 2015, the USFWS determined that "listing the sage-grouse as a threatened or endangered species is not warranted…" (Federal Register Vol. 80, No. 191, 59936). One of the rationale for this determination was that "the new Federal land-management paradigm is established in 98 amended Federal Plans that reduce and minimize threats to the species in the most important habitat for the species" (ibid). Through this language, it is clear that the 2015 planning efforts incorporated the recommendations from the COT Report to a degree that met the report's goal of "long-term conservation of sage-grouse and healthy sagebrush shrub and native perennial grass and forb communities by maintaining viable, connected, and well-distributed populations and habitats across their range, through threat amelioration, conservation of key habitats, and restoration activities" (COT Report, page 13).

What the COT Report and its Objectives, Measures and Options Are:

- The COT Report is a compilation of reasonable objectives, based upon the best scientific and commercial data available at the time of its release, for the conservation and survival of GRSG.

- The COT Report is guidance to federal land management agencies, state GRSG teams, and others developing efforts to achieve conservation for GRSG.
- The COT Report was clear that its objectives were subject to modification based on new findings, changes in species' status, and the completion of conservation actions.
- The COT Report was developed by a team of state and USFWS representatives selected by their respective state or agency.

What the COT Report and its Objectives, Measures and Options Are Not:

- The COT Report is not a recovery plan, conservation strategy, or conservation agreement.
- The COT Report did not include input from BLM biologists or BLM field staff familiar with local habitat conditions and threats.
- The COT Report was not developed with input from the BLM, its managers, planners, wildlife program leads, or field biologists and as such includes objectives, measures and options that do not consider the BLM's statutory, regulatory, or policy requirements.
- When preparing the COT Report, the USFWS did not complete a NEPA analysis on its conservation objectives, measures, and options. Instead, the BLM completed NEPA and land use planning processes in 2015 and 2019 to assess the environmental consequences of the COT Report conservation objectives, measures, and options, as well as alternatives to those objectives, measures, options—as they applied to the development of affected BLM land use planning decisions. BLM conducted these efforts while accounting for the wide variety of laws, regulations, and policies which the BLM must consider for the myriad resources and uses it must consider and comply with when fulfilling its Congressional mission.

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# Appendix 7

## Greater Sage-grouse Monitoring Framework

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# APPENDIX 7. GREATER SAGE-GROUSE MONITORING FRAMEWORK

October 20, 2023

Bureau of Land Management

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# Appendix 7. Greater Sage-grouse Monitoring Framework

## 7.1 FORWARD

The revised BLM Greater Sage-Grouse (GRSG) Monitoring Framework was developed after five years of implementing the 2015 BLM and USFS GRSG Monitoring Framework which culminated in the 2020 Greater Sage-Grouse Five-year Monitoring Report. Since implementing the monitoring efforts described in the original Monitoring Framework, new data has become available and new approaches to analyzing these data have been developed. This update maintains the existing measures included in the original document and expands upon them to include this new science. Measures for monitoring are identified at two scales: the rangewide scale and land use plan scale. The former will provide insight into habitat conditions and BLM management actions across jurisdictional boundaries which will, in turn, provide context to the smaller scale land use plan monitoring described herein. For each scale of monitoring a suite of 6 measures are identified and a methodology which the BLM will utilize to collect information informing each measure is described. Importantly, specific datasets and analysis approaches may be modified through the implementation of this monitoring framework so that BLM can adapt to new information as it becomes available. The data collected and analyzed for each of the measures described at both scales will vary in spatial extent. For example, measures leveraging remotely sensed data can and will be examined across all habitat management areas within the planning area as well as the BLM managed subset of these habitats. Other measures will apply specifically to BLM managed habitats or subsets thereof (i.e. disturbance and density caps). Further, land use plan decisions may identify specific spatial extents at which some measures are analyzed and tracked, such as to inform adaptive management threshold status. As such, during the implementation of this monitoring framework, the spatial extent of all monitoring and analyses addressing the identified measures will be documented and communicated during effectiveness evaluation efforts.

This Monitoring Framework is related to several other pieces of larger land use plans and associated management direction they provide. The GRSG Monitoring Framework leverages data, information, and assessments to monitor land use plan implementation. Appendix 8 of this Land Use Plan (LUP) establishes GRSG habitat objectives, indicators, and benchmarks. These indicators and benchmarks are utilized in the Habitat Assessment Framework (HAF). The results of these habitat assessments inform the wildlife and/or sensitive species component of the Land Health Standards evaluation process (LHS, 43 CFR 4180.2). The GRSG Monitoring Framework provides a consistent format for reporting if the LUP objectives are being met or making progress to being met, based on the results of these assessment and planning tools.

**Table 7-1. Relationships of LUPs, HAF, LHS, and MF**

| Land Use Plan (LUP) | GRSG Habitat Assessment Framework (HAF) | Land Health Standards Evaluation (LHS) | GRSG Monitoring Framework (MF) |
|---|---|---|---|
| Sets GRSG habitat objective(s) and identifies the GRSG habitat indicators and benchmarks from best available science for evaluating progress toward meeting the objective. | Provides methods to assess GRSG habitats at multiple scales, using the indicators and benchmarks from the applicable LUP Habitat Indicators appendix. | Evaluates if the sage-grouse portion of the Special Status Species Land Health Standard is achieved or significant progress towards achievement is made. These evaluations utilize HAF results along with other data. | Provides framework for reporting progress toward achieving the objective(s) of the LUP, including habitat suitability. |

## 7.2 SECTION I: RANGEWIDE MONITORING

### 7.2.1 Introduction

This rangewide monitoring section of the BLM Revised Greater Sage-Grouse (GRSG) Monitoring Framework is an update from the original BLM and USFS GRSG Monitoring Framework (2015) expands and clarifies the BLM's GRSG rangewide habitat condition monitoring and reporting. Described here are the six measures (**Table 7-2**), and associated updated methodologies, incorporating the original monitoring measures from 2015 (habitat condition and habitat degradation) with additional measures (land cover, habitat indicators, habitat suitability and population trend) that guide the BLM's GRSG monitoring and reporting.

The information gathered from monitoring and reporting on the six rangewide measures (**Table 7-2**) is intended to inform an evaluation of BLM's effectiveness (Section III of this BLM Revised GRSG Monitoring Framework) toward meeting the BLM's overarching goal for greater sage-grouse: *to conserve and manage greater sage-grouse habitats to support persistent, healthy populations, consistent with BLM's sensitive species policy and in cooperation with other conservation partners. Conservation and management should maintain existing connectivity between GRSG populations.*

**Table 7-2. The Six Rangewide Monitoring Measures, Associated Sub-Measures, Monitoring Questions and Data Sources for BLM Monitoring of GRSG Habitat Conditions and Population Trends**

| Measures | Monitoring Questions | Data |
|---|---|---|
| **Measure 1: Vegetation Availability and Condition** | | |
| Measure 1a: Vegetation Condition and trend | What is the status and trend of the habitat indicators describing habitat characteristics important to GRSG as well as ecological threats to GRSG (e.g., annual invasive grasses, bare ground) on BLM lands? | AIM |
| Measure 1b: Current and Historical Amounts of Sagebrush | What is the current versus historical extent of sagebrush within GRSG habitat? How have recent disturbances (fires and treatments) affected the extent of sagebrush? | LANDFIRE |
| Measure 1c: Percent Sagebrush Cover and Trend | What is the percent cover of sagebrush and trend in sagebrush percent cover? | RCMAP |
| Measure 1d: Percent Annual Herbaceous Cover and Trend | What is the percent cover and trend of annual herbaceous cover? | RCMAP |

| Measures | Monitoring Questions | Data |
|---|---|---|
| Measure 1e: Percent Tree Cover within Sagebrush | What is the percent cover and trend of tree cover in sagebrush communities? | RCMAP |
| **Measure 2: Habitat Degradation and Development Intensity in GRSG Habitat** | | |
| Measure 2a: Habitat degradation | What is the estimated amount of habitat degradation rangewide and the estimated change in the amount? | Geospatial analysis using datasets representing anthropogenic development |
| Measure 2b: Intensity of degradation | What is the estimated density of energy development activities and the change in the estimated density? | Geospatial analysis using datasets representing anthropogenic development |
| Measure 2c: Degradation cap compliance | Were any disturbance or density caps above project scale exceeded? | Geospatial analysis using datasets representing anthropogenic development |
| Measure 2d: Reclamation | What is the amount of reclaimed energy-related degradation on BLM lands and the change in the amount? | Geospatial analysis using datasets representing reclamation on BLM-managed lands |
| **Measure 3: GRSG Habitat Suitability** | | |
| Measure 3a: Habitat assessment status | What is the status of GRSG habitat assessments at the mid- and fine-scales across the range? | BLM's Habitat Assessment Framework (HAF) tracking system |
| Measure 3b: Habitat suitability at mid and fine scales | What is the suitability of GRSG habitats at mid and fine spatial scales across the range? | BLM's HAF tracking system |
| **Measure 4: Achievement of Land Health Standards in GRSG Habitat** | | |
| Measure 4a: Status of land health evaluations | How many acres were evaluated for achievement of the SSS/Wildlife Habitat Land Health Standard in GRSG habitat across the range? | BLM's Land Health Standards Database |
| Measure 4b: Status of land health standards | For areas that have been evaluated in GRSG habitat, what is the status of land health and what are the causes of non-achievement (as applicable)? | BLM's Land Health Standards Database |
| **Measure 5: BLM On-The-Ground Conservation and Restoration Efforts for GRSG** | | |
| Measure 5a: Summary of conservation efforts | How many acres/miles were conserved or restored by treatment or action type in GRSG habitat across the range? | NFPORS/VMAP, Other BLM Project Tracking |
| **Measure 6: GRSG Population Trend Rangewide** | | |
| Measure 6a: Annual Range-wide Trend | What is the rangewide average annual population trend? | USGS Rangewide Population Trend Analysis for Greater Sage-Grouse |
| Measure 6b: Cumulative Range-wide Trend | What is the rangewide cumulative population trend? | USGS Rangewide Population Trend Analysis for Greater Sage-Grouse |

### 7.2.2 Methods

The datasets used, and the land ownerships included in the data, vary by monitoring type. For example, the monitoring of habitat indicators uses on-the-ground data and information from BLM lands only. Conversely, the rangewide monitoring of landcover, sagebrush availability and disturbance use geospatial data covering all land ownerships. The population trend monitoring uses state wildlife agencies' data that also covers all land ownership in GRSG habitat. Best available datasets outlined here will be used to analyze the monitoring measures and for reporting on GRSG habitat however BLM reserves the right to change data and analysis methods as it deems appropriate.

***Measure 1. Vegetation Availability and Condition***

Sagebrush availability and vegetation condition analyses are analyzed rangewide for GRSG, excluding the Bi-State Distinct Population Segment and the Columbia Basin population. Analyses differ in the timeframe and type of data used (remotely sensed products vs collected on the ground), the lands to which the analyses apply (all lands vs BLM-managed lands), and in GRSG habitat.

Datasets selected for monitoring must meet key criteria to ensure consistent and accurate monitoring:

- The dataset must be consistent rangewide
- There must be a known accuracy level or level of confidence for the dataset
- The dataset must be based in peer-reviewed science
- The dataset must be maintained and have a known update plan
- The dataset must be readily available
- Consistent methodology must have been used to derive datasets that are compared; different datasets may be used to calculate different measures.

The following datasets, which meet the key criteria, should be analyzed for Measure 1; however, additional data and analyses may also be considered, if justified and documented:

1. BLM Assessment Inventory & Monitoring (AIM) for 1a,
2. LANDFIRE (Picotte et al. 2016) for 1b and
3. Rangeland Condition Monitoring Assessment and Projection (RCMAP; Rigge, 2020) for 1c, 1d, and 1e.

We considered three types of fractional datasets for calculating Measures 1c, 1d, and 1e. Fractional datasets contain pixels or cells that represent areas on the ground which may each contain vegetation cover types such as sagebrush, trees, or herbaceous. A fractional dataset represents the percentage of one vegetation cover type that is present in each pixel (e.g., 50 percent sagebrush, 25 percent trees, or 25 percent herbaceous). The three datasets considered, that are new since the 2015 BLM/USFS GRSG Monitoring Framework, are:

- Landscape Cover Analysis and Reporting Tools (LandCART; Zhou et al 2020),
- Rangeland Analysis Program (RAP; Allred et al 2021), and
- RCMAP.

Accuracies and applicability for the three types of datasets are similar but mixed. BLM Tech Note 456, which compares these datasets, recommends that users consider their individual data needs and uses when selecting from them (Savage et al 2022). **Table 7-3** summarizes some characteristics of the datasets specifically considered for this BLM Revised GRSG Monitoring Framework and, although not comprehensive, reflects the intent to use RCMAP. RAP does not have a sagebrush dataset and it is currently difficult to obtain rangewide data from LandCART but improvements are in progress. Importantly, BLM partners with USGS to fund RCMAP, ensuring the reliability of readily available data, regular updates and maintenance, and data suited for use in this BLM Revised GRSG Monitoring Framework. See **Appendix B, Table B2** for the RCMAP Accuracy Assessment. We recommend using only one data type (for 1c, 1d, & 1e) such that data can be overlaid or compared without concern for different methods that created the data. If additional fractional datasets become available and fit the key criteria above, they may be considered for use in calculating the Measures 1c, 1d, and 1e.

**Table 7-3. Dataset Characteristics For Measure 1c, 1d, And 1e**

| Dataset Characteristics | LandCART | RAP | RCMAP |
|---|---|---|---|
| Annual herbaceous | Y | Y | Y |
| Sagebrush | Y | N | Y |
| Tree cover | Y | Y | Y |
| Rangewide extent | Difficult | Y | Y |
| Trend | Y | User calculates | Y |

*Measure 1a: What is the status and trend of the habitat indicators and threats to GRSG (e.g., non-native invasive grasses, bare ground) on BLM lands?*

The vegetation condition monitoring is based on estimates for 6 greater sage-grouse habitat indicators (e.g., sagebrush cover) and estimates of 7 threat indicators (e.g., invasive species) (Herrick et al. 2017). These estimates will be based on field data collected through the BLM's national monitoring efforts on BLM-managed rangeland ecosystems. These data are part of the Assessment, Inventory, and Monitoring (AIM) program including the National AIM Survey (also known as the Landscape Monitoring Framework (LMF), Yu Li et al. 2020 and generally described in Karl et al. 2016). The AIM estimates provide consistent and standardized data about vegetation conditions broadly across the range.

The 6 GRSG habitat indicators are:

1. Percent cover of sagebrush
2. Mean sagebrush species height
3. Proportion of sagebrush that is spreading shaped
4. Percent cover of perennial grasses and perennial forbs
5. Mean herbaceous plant species height
6. Percent of lands where native plants make up 95% or more of vegetation cover

The 7 threat indicators are:

1. Proportion of sagebrush that is columnar shaped
2. Percent cover of bare ground
3. Proportion of nonnative invasive species present
4. Proportion where ≥5% of foliar cover is comprised of nonnative invasive species

5. Proportion of vegetation composed of annual grasses
6. Proportion of vegetation composed of nonnative invasive plant species
7. Percent of lands with >3% cover of pinion – juniper.

The vegetation condition summary is reported for BLM-managed GRSG habitats. Also of importance is that the data is collected in areas that retain rangeland vegetation and exclude areas physically converted to agriculture or disturbance from development.

The estimates combine indicator data from all sampling locations collected within a given year. An analysis for trend will be performed for each of these indicators. Analysis details will be included in monitoring reports.

*Measure 1b: What is the current versus historical extent of sagebrush within the range of greater sage-grouse? How have recent disturbances affected the extent of sagebrush?*

Measure 1b estimates both historic and current extent of sagebrush. The datasets to calculate these metrics are the most recent LANDFIRE Biophysical Setting (BpS), Existing Vegetation Type (EVT), Existing Vegetation Cover (EVC), and Existing Vegetation Height (EVH). EVT will be adjusted for recent fires and BpS will be adjusted for Sagebrush areas in EVT (see below for details). LANDFIRE data meets the key criteria defined above and has ample thematic resolution with several different sagebrush vegetation classes. For the 2015 Monitoring Framework, vegetation classes from LANDFIRE EVT and BpS were selected to use in the sagebrush and sagebrush potential or historic layers by identifying the classes that include sagebrush species and that could provide suitable seasonal habitat for greater sage-grouse (See **Appendix A, Table A1**). In these classes, sagebrush may not be the dominant species, but it is an attempt to include the maximum likely geographic extent and some of the uncertainty on the ground captured by products derived from remotely sensed data (see **Appendix B, Table B1** for Agreement Assessment details). The sagebrush layer used for reporting will be created using these selected classes from EVT. The following two metrics will be reported for each year:

1) 1.b.1. The amount of sagebrush in GRSG habitat compared with the amount of sagebrush that GRSG habitat could historically support without disturbance, that is, the existing sagebrush versus the potential sagebrush. The measure will be calculated as [the existing area of sagebrush] divided by [the potential area of sagebrush expected pre-Euro American settlement]. The data will be summarized including a histogram, mean and standard deviation, and median and quartiles for GRSG habitat.
2) 1.b.2. Recent vegetation treatments (NFPORS and VMAP data) are integrated into some LANDFIRE data causing changes in EVH and EVC datasets but these changes are not reflected in EVT for now, although this may change (personal communication Daryn Dockter, Brian Tolk, May 2023). BLM will use EVH and EVC with EVT to determine how recent treatments affect the extent of sagebrush using the guidelines:
    a. If EVT = sagebrush but EVH or EVC = 0 for shrubs, then disturbance has likely removed the sagebrush. These pixels will be removed from the EVT dataset annually.
    b. If EVT = sagebrush and EVH = grass < 1.0 m, past disturbance has likely removed the sagebrush and grass or forbs are growing. These pixels will be removed from the EVT dataset annually.
    c. If EVT = sagebrush and EVH = shrub 1-3 m then there is likely sagebrush here. These pixels will be retained in the EVT dataset annually.
    d. These changes will be summarized across GRSG habitat.

LANDFIRE EVT includes fires burned up to the end of the previous fiscal year so updates will be needed for more recent fires and can be made using NIFC WFIGS *yyyy*, Interagency Fire Perimeters to Date (where *yyyy* is the current year). LANDFIRE processes postfire change detection using satellite imagery and MTBS. See below for LANDFIRE data accuracy and update details.

In EVT there are small areas that show sagebrush and sagebrush associated classes which are not matched in the BpS dataset. Based on the assumption that sagebrush is unlikely to expand in the short term, we assume that BpS is in error and these classes in BpS need to be adjusted to the classes shown in EVT. This adjustment supports the simple division of existing by potential sagebrush that is described above.

Because of concerns over the thematic accuracy of individual classes mapped by LANDFIRE, all ecological systems listed in **Appendix A, Table A1** will be aggregated into three groups that represent sagebrush, sagebrush associated, and other vegetation types. With all ecological systems aggregated, the combined accuracy, measured as an agreement assessment, of the sagebrush base layer (EVT) will be much greater than if all categories were treated separately (LANDFIRE 2016 Remap EVT Agreement Assessment). We used the Southwest (AZ, CA, NV, UT, west CO, and west NM) and Northwest GeoAreas (ID, MT, OR, WA, and WY) to estimate sagebrush assessment agreements where sagebrush, sagebrush associated, and other field data are assigned autokeys and these are compared to LANDFIRE EVT (**Appendix B, Table B1**). The Southwest GeoArea agreement assessments were 55% for sagebrush, and 50% for sagebrush associated. The Northwest GeoArea agreement assessments were 69% for sagebrush and 57% for sagebrush associated.

LANDFIRE maintains a substantial disturbance spatial database using agency and other data; refinements to the process were made in 2020 with plans to update annually. LANDFIRE also uses National Landcover Database (NLCD) roads and urban classes, Monitoring Trends in Burn Severity (MTBS), Burned Area Reflectance Classification (BARC), and Rapid Assessment of Vegetation Condition after Wildfire (RAVG) to apply changes to the data on a yearly basis. LANDFIRE uses a change algorithm to account for fires and models postfire vegetation recovery. While LANDFIRE intends to update annually, refinements may still be made to the EVT data for more recent changes due to wildfire (see above) and anthropogenic disturbances such as agriculture and urban, using the processes and datasets recommended below.

LANDFIRE uses the National Land Cover Database (NLCD) (Fry et al. 2011) to make urban adjustments including imperviousness dataset, high, medium, and low development, roads, open space, and broad vegetation types. NLCD is prioritized over other datasets if there is a discrepancy in land cover. NLCD impervious data has a roads description including primary, secondary, and tertiary; two track roads are not included. NLCD obtains building footprints from Microsoft data and USGS processing. NLCD data are generated on a 5-year cycle and are specifically designed to support monitoring efforts but the lag in NLCD may limit LANDFIRE data. To determine agricultural areas and types, LANDFIRE uses the annually updated National Agricultural Statistics Service (NASS) Cropland Data Layer (CDL). The LANDFIRE disturbance processing will also pick up agricultural expansion and treatments when they are reported.

*Measure 1c: What is the percent cover of sagebrush and trend in sagebrush percent cover?*

Sagebrush fractional cover data will be used to estimate the current proportion of sagebrush in GRSG habitat. The most recent RCMAP fractional sagebrush cover will be used to calculate this measure (Rigge et al. 2022).

For each year of monitoring, the statistical distribution of percent sagebrush cover will be calculated and reported including a histogram, mean and standard deviation, and median and quartiles at spatial scales

relevant to BLM land use plan decisions and management, for example, Habitat Assessment Fine-scale extents. If updated literature suggests levels of percent sagebrush cover that are more appropriate to GRSG, these thresholds will be applied in addition to the standards described above. For example, if less than x% sagebrush is determined to be unsuitable for GRSG across GRSG habitat, assessment of the area of and distribution that is above and below this x% cover threshold will be conducted.

Shi et al (2022) modeled time-series trends in RCMAP continuous vegetation using two methods: 1) linear regression and 2) breaks and stable states modeling. We recommend using the linear trends results because, while accuracy was similar between the two modeling versions, linear trend results are more easily interpreted (Shi et al. 2022). For each pixel in the linear trends data, the slope represents the average percent cover change and the p-value is the confidence in the change value for each year. Within GRSG habitat, the trend of sagebrush cover will be monitored using the time-series linear trends data from RCMAP for all years of data to calculate the summary statistics as described above.

*Measure 1d: What is the percent cover and trend of annual herbaceous cover?*

The most recent RCMAP Annual Herbaceous fractional data will be used to estimate the current area, distribution, and proportion of annual forbs and grasses in GRSG habitat. In the Western US, the RCMAP annual herbaceous dataset primarily represents annual invasive species such as Cheatgrass, Medusahead, Red Brome, and annual mustards (MLRC RCMAP website, https://www.mrlc.gov/data/rcmap-annual-herbaceous-cover-1, accessed March 2023). At higher elevations and in California, the annual herbaceous cover dataset may also represent native annual herbaceous vegetation types. (https://www.mrlc.gov/data/rcmap-annual-herbaceous-cover-1, accessed March 2023).

For each year of monitoring, the statistical distribution of percent annual herbaceous cover will be calculated including a histogram, the mean and standard deviation, and median and quartiles at spatial scales relevant to BLM land use plan decisions and management, for example, at Habitat Assessment Fine-scale extents. If updated literature suggests levels of percent annual herbaceous cover that are more appropriate to GRSG, apply these thresholds in addition to the standards described above. For example, if less than x% annual herbaceous cover is determined to be unsuitable for GRSG across GRSG habitat, assessments of and distribution of annual herbaceous cover that is above and below this x% cover threshold will be conducted.

The trend of annual herbaceous cover will be reported for all years of data using the annual time-series linear trends data from RCMAP to calculate the summary statistics described above. The trend of annual herbaceous cover will be compared to the trend in sagebrush cover in GRSG habitat.

*Measure 1e: What is the percent cover and trend of tree cover in sagebrush communities?*

Over the past several decades, many studies have found that GRSG avoid habitat near conifers (Nisbet et al 1983, Doherty et al, 2010; Fedy et al 2014; Doherty et al 2016; Westover et al 2016; Baxter et al 2017; Picardi et al 2020; Roth et al 2022;), survival tends to increase when GRSG inhabit areas further away from conifers (Brussee et al 2022), and that populations have increased when conifers are removed (Olsen et al 2021).

For the purposes of the Monitoring Framework, an upper limit threshold is needed to determine the percent of conifer cover within a certain distance of sagebrush that still provides suitable habitat for GRSG (see **Appendix C, Table C1** for summaries). Peer-reviewed findings are summarized in the following bullets:

- **0%** In NV, GRSG preferred areas with no conifer cover for lekking (Nisbet et al 1983) and for brood rearing to areas with 1 to 10% conifer cover (Brussee et al, 2022).

- **2%** In CA GRSG preferred < 2% conifer cover year-round (Coates et al 2017) and in NV/UT, GRSG preferred areas with < 2% conifer cover for breeding and summer season (Beers at al 2022).
- **3%** In OR and UT < 3% conifer was found to be more suitable for GRSG lekking and nesting within 800m and 1000m (Cook et al 2017), within 560m for lekking (Doherty et al 2021), and within 800m for nesting (Severson et al 2017).
- **4%** In OR, NV, UT, areas with < 4% conifer cover were found to be more suitable for nesting (Sandford et al 2017; Severson et al 2017) or found to be more suitable year-round within 400m and 800m and while there was sagebrush contiguity (Beers et al 2022). Areas with > 4% had no active leks (Baruch-Mordo et al 2013) or were found to be less suitable for lekking (Cook et al 2017).

We examined other work that obtained values outside of this range and determined that they were not useful for our purposes. In CA, large-scale evidence suggested that GRSG avoided areas with >5% conifer cover for brood rearing but 5% was set as a value instead of being determined by the data and the subsequent modeling was inconclusive (Casazza et al 2011). In NV/UT, Beers et al (2022) found that during winter GRSG selected areas with < 11% conifer cover but year-round 4% was a more appropriate threshold. In NV, GRSG avoided areas with > 30% conifer cover and selected areas with 10-30% cover within 1000m; the authors speculated that these unusually high conifer cover values may have been in areas where heterogenous shrub communities thrived and, in the absence of predators, attracted GRSG (Gibson et al 2015).

The range of 0 to 4% of tree canopy cover has been shown to have the lowest impacts on GRSG year-round in several states (**Appendix C, Table C1**). Within GRSG habitat the extent and summary statistics (histogram, mean and standard deviation, and median and quartiles) of tree cover that is within 1000m of sagebrush and 1) less than 4% and 2) greater than 4% will be calculated.

Within GRSG habitat, the trend of tree cover that is greater than 4% and is within 1000m of sagebrush will be calculated and reported for all years of data using the annual time-series linear trends data from RCMAP to calculate the summary statistics described above. The trend of tree cover will be compared to the trend in sagebrush cover in GRSG habitat at spatial scales relevant to BLM land use plan decisions and management, for example, at Habitat Assessment Fine-scale extents.

### *Measure 2. Habitat Degradation and Development Intensity in GRSG Habitat*

*Rangewide disturbance estimates*

The measure of habitat degradation will be calculated by combining estimated footprints of, or the counts of, threats identified in **Table 7-4** within GRSG habitat. Footprints are estimated to be the direct area of influence of "active" energy and infrastructure and, in combination with feature counts, will be used as a surrogate for human activity. Data sources for each threat are found in **Table 7-4**, Geospatial Data Sources for Habitat Degradation and Intensity Calculations (Measure 2) in GRSG Habitat Excluding the Bi-State Distinct Population Segment and the Columbia Basin Population. Specific assumptions (inclusion criteria for data, width/area assumptions for point and line features, etc.) and methodologies are described below. All datasets will be updated annually to monitor changes through time and to inform adaptive management.

**Table 7-4. Geospatial Data Sources for Habitat Degradation and Intensity Calculations (Measure 2) in GRSG Habitat Excluding the Bi-State Distinct Population Segment and the Columbia Basin Population**

| Degradation Type | Subcategory | Data Source | Direct Area of Influence | Area Source |
|---|---|---|---|---|
| **Energy (oil & gas)** | Wells | IHS; BLM (AFMSS) | 5.0ac (2.0ha) | BLM WO-300 |
| | Power Plants | Platts (power plants) | 5.0ac (2.0ha) | BLM WO-300 |
| **Energy (coal)** | Mines | BLM; USFS; Office of Surface Mining Reclamation and Enforcement; USGS Mineral Resources Data System | Polygon area (digitized) | Esri/ Google Imagery |
| | Power Plants | Platts (power plants) | Polygon area (digitized) | Esri Imagery |
| **Energy (wind)** | Wind Turbines | Federal Aviation Administration | 3.0ac (1.2ha) | BLM WO-300 |
| | Power Plants | Platts (power plants) | 3.0ac (1.2ha) | BLM WO-300 |
| **Energy (solar)** | Fields/Power Plants | Platts (power plants) | 7.3ac (3.0ha)/MW | NREL |
| **Energy (geothermal)** | Wells | IHS | 3.0ac (1.2ha) | BLM WO-300 |
| | Power Plants | Platts (power plants) | Polygon area (digitized) | Esri Imagery |
| **Mining** | Locatable Developments | InfoMine | Polygon area (digitized) | Esri Imagery |
| **Infrastructure (roads)** | Surface Streets (Minor Roads) | Esri StreetMap Premium | 40.7ft (12.4m) | USGS |
| | Major Roads | Esri StreetMap Premium | 84.0ft (25.6m) | USGS |
| | Interstate Highways | Esri StreetMap Premium | 240.2ft (73.2m) | USGS |
| **Infrastructure (railroads)** | Active Lines | Federal Railroad Administration | 30.8ft (9.4m) | USGS |
| **Infrastructure (power lines)** | 1-199kV Lines | Platts (transmission lines) | 100ft (30.5m) | BLM WO-300 |
| | 200-399 kV Lines | Platts (transmission lines) | 150ft (45.7m) | BLM WO-300 |
| | 400-699kV Lines | Platts (transmission lines) | 200ft (61.0m) | BLM WO-300 |
| | 700+kV Lines | Platts (transmission lines) | 250ft (76.2m) | BLM WO-300 |
| **Infrastructure (communication)** | Towers | Federal Communications Commission | 2.5ac (1.0ha) | BLM WO-300 |
| **Infrastructure (other vertical structures)** | Tall Structures | Federal Avian Administration | 2.5 acres (1.0ha) | Knick et al 2011 |

*Rangewide Habitat Degradation Datasets and Assumptions*

Energy (Oil and Gas Wells And Development Facilities)

This dataset will compile information from three oil and gas databases: the proprietary IHS database, the BLM Automated Fluid Minerals Support System (AFMSS) database, and the proprietary Platts (a McGraw-Hill Financial Company) GIS (hereafter, Platts) database of power plants.

Point data from wells active within the last 10 years from IHS and producing wells from AFMSS will be considered as a 5-acre (2.0ha) direct area of influence centered on the well point, as recommended by the BLM WO-300 (Minerals and Realty Management). Plugged and abandoned wells will be separated from the active oil and gas well dataset but retained for analysis inclusion if the date of well abandonment was before the first day of the reporting year (i.e., for the 2015 reporting year, a well must have been plugged and abandoned by 12/31/2014 to be removed).

Platts oil and gas power plants data (subset to operational power plants) will also be included as a 5-acre (2.0ha) direct area of influence.

Wells marked as plugged and abandoned within the last 10-years will also be segregated from the "active" and "active within the last 10 years" well data described above. These data attempt to quantify energy-related degradation that may have been reclaimed, but not necessarily fully restored to sage-grouse habitat. Direct area of influence will be considered 3 acres (1.2ha) (J. Perry, personal communication, February 12, 2014) be included in analyses.

Energy (Coal Mines)

Currently, there is no comprehensive dataset available that identifies the footprint of active coal mining across all jurisdictions. Therefore, point and polygon datasets will be used each year to identify coal mining locations. Data sources will be identified and evaluated annually and will include at a minimum: BLM coal lease polygons, U.S. Energy Information Administration mine occurrence points, U.S. Office of Surface Mining Reclamation and Enforcement coal mining permit polygons (as available), and U.S. Geological Survey (USGS) Mineral Resources Data System mine occurrence points. These data will inform where active coal mining may be occurring.

Coal power plant data from Platts power plants database (subset to operational power plants) will be included. Aerial imagery will then be used to digitize manually the active coal mining and coal power plants surface disturbance in or near these known occurrence areas. While the date of aerial imagery varies by scale, the most current data available from Esri and/or Google will be used to digitize (generally at 1:10,000 and below) active coal mine and power plant direct area of influence. Coal mine location data source and imagery date will be documented for each digitized coal polygon at the time of creation. Subsurface facility locations (polygon or point location as available) will also be collected if available, included in density calculations, and added to the active surface activity layer as appropriate (if an actual direct area of influence can be located).

Energy (Wind Energy Facilities)

This dataset will be a subset of the Federal Aviation Administration (FAA) Digital Obstacles point file. Points where attribution indicates the feature is a windmill will be included. The direct area of influence of these point features will be a circular totaling 3 acres (1.2ha) centered on each tower point. See the BLM's "Wind Energy Development Programmatic Environmental Impact Statement" (BLM 2005). Additionally, the Platts power plants database will be used for transformer stations associated with wind energy sites (subset to operational power plants), also with the same 3-acre (1.2ha) direct area of influence.

Energy (Solar Energy Facilities)

This dataset will include solar plants as compiled with the Platts power plants database (subset to operational power plants). This database includes an attribute that indicates the operational capacity of each solar power plant. Total capacity at the power plant was based on ratings of the in-service unit(s), in megawatts. Direct area of influence polygons will be centered over each point feature representing 7.3ac (3.0ha) per megawatt of the stated operational capacity, per the report of the National Renewable Energy Laboratory (NREL), "Land-Use Requirements for Solar Power Plants in the United States" (Ong et al. 2013).

Energy (Geothermal Energy Facilities)

This dataset will include geothermal wells in existence or under construction as compiled with the IHS wells database and power plants as compiled with the Platts database (subset to operational power plants). Direct area of influence of these point features will be measured by converting to a polygon dataset of 3 acres (1.2ha) centered on each well or power plant point.

Mining (Active Developments; Locatable, Leasable, Saleable)

This data theme is notably lacking in a comprehensive source spanning the range of GRSG. Currently, there are no known complete databases available for leasable or saleable mining sites beyond coal mines. Aerial imagery will be used to manually digitize large active mining surface disturbance in or near known occurrence areas originally informed by the proprietary InfoMine database. While the date of aerial imagery varies by scale, the most current data available from Esri and/or Google will be used to digitize (generally at 1:10,000 and below) active mine direct area of influence. Mine location data source and imagery date will be documented for each digitized polygon at the time of creation. Other data sources will be evaluated and used as they are identified or as they become available. Point data may be converted to polygons to represent direct area of influence unless actual surface disturbance is available.

Infrastructure (Roads)

This dataset will be compiled from the proprietary Esri StreetMap Premium for ArcGIS. Dataset features that will be used are: Interstate Highways, Major Roads, and Surface Streets to capture paved and "crowned and ditched" roads. The surface street data have been demonstrated to include some "two-track" and 4-wheel-drive routes. The direct area of influence for roads will be represented by 240.2ft, 84.0ft, and 40.7ft (73.2m, 25.6m, and 12.4m) total widths centered on the line feature for Interstate Highways, Major Roads, and Surface Streets, respectively (Knick et al. 2011).

Infrastructure (Railroads)

This dataset will be a compilation from the Federal Railroad Administration Rail Lines of the USA dataset. Non-abandoned rail lines will be used; abandoned rail lines will not be used. The direct are of influence for railroads will be represented by a 30.8ft (9.4m) total width (Knick et al. 2011) centered on the non-abandoned railroad line feature.

Infrastructure (Power Lines)

This line dataset will be derived from the proprietary Platts transmission lines database. Linear features in the dataset attributed as "buried" will be removed from the disturbance calculation. Only "In Service" lines will be used; "Proposed" lines will not be used. Direct area of influence will be determined by the kV designation: 1–199 kV (100ft/30.5m), 200–399 kV (150ft/45.7m), 400–699 kV (200ft/61.0m), and 700-or greater kV (250ft/76.2m) based on average right-of-way and structure widths, according to BLM WO-300 (Minerals and Realty Management).

Infrastructure (Communication Towers)

This point dataset will be compiled from the Federal Communications Commission (FCC) communication towers point file; all duplicate points will be removed (duplicates within the FCC dataset). Points will be converted to a polygon dataset by using a direct area of influence of 2.5 acres (1.0ha) centered on each communication tower point (Knick et al. 2011).

Infrastructure (Other Vertical Structures)

This point dataset will be compiled from the FAA's Digital Obstacles point file. This dataset generally captures all tall structures over 200 meters, with additional structures below this threshold captured in areas surrounding airports which could pose an aviation risk. For additional information please visit the FAA DOF FAQs site. Points where attribution indicates the feature is a windmill will be removed. Duplicate points from the FCC communication towers point file will be removed. The remaining features will be converted to a polygon dataset using a direct area of influence of 2.5 acres (1.0ha) centered on each vertical structure point (Knick et al. 2011).

Other Developed Rights-Of-Way

Currently, no additional data sources for other developed rights-of-way have been identified. Roads, power lines, railroads, pipelines, and other known linear features are represented in the categories described above. If additional features representing human activities are identified representing developed rights-of ways outside of the themes described above, they will be added to the degradation analyses using similar assumptions to those used with the threats described above.

*Disturbance Inventories*

The BLM has partnered with the USGS and, over the past several years, has begun inventorying existing disturbances via "heads-up" digitization using aerial imagery within current Priority Habitat Management Areas. This inventory includes several disturbance types in addition to those used in the rangewide analyses as outlined in the 2015 land use plan disturbance appendices:

Coalbed Methane and Other Energy-Related Retention Ponds

The footprint boundary will follow the fence line and includes the area within the fence line surrounding the impoundment. If the pond is not fenced, the impoundment itself is the footprint. Other infrastructure associated with the containment ponds (roads, well pads, etc.) will be captured in other disturbance categories.

Meteorological Towers

This feature includes long-term weather monitoring and temporary meteorological towers associated with short-term wind testing. The footprint boundary includes the area underneath the guy wires.

Nuclear Energy Facilities

The footprint boundary includes visible facilities (fence, road, etc.) and undisturbed areas within the facility's perimeter.

Airport Facilities and Infrastructure (Public And Private)

The footprint boundary will follow the boundary of the airport or heliport and includes mowed areas, parking lots, hangers, taxiways, driveways, terminals, maintenance facilities, beacons and related features. Indicators of the boundary, such as distinct land cover changes, fences and perimeter roads, will be used to encompass the entire airport or heliport.

Military Range Facilities and Infrastructure
The footprint boundary will follow the outer edge of the disturbed areas around buildings and includes undisturbed areas within the facility's perimeter.

Hydroelectric Plants
The footprint boundary includes visible facilities (fence, road, etc.) and undisturbed areas within the facility's perimeter.

Recreation Areas and Facilities
This feature includes all sites/facilities larger than 0.25 acres in size. The footprint boundary will include any undisturbed areas within the site/facility.

Where this inventory is complete in GRSG habitat and if the digitization is within an acceptable timeframe (ie. not deemed outdated), these disturbance data will also be used to evaluate the existing disturbance footprint and density of development.

*Rangewide Habitat Degradation and Development Intensity Data Combination and Calculation Approaches*
The threats targeted for measuring human activity (**Table 7-4**) and intensity of activities will be converted to direct area of influence polygons as described for each data source above. These threat polygon layers will be combined to create one overall polygon layer representing footprints of estimated active human activity in GRSG habitat. Individual datasets, however, will be preserved to indicate which types of threats may be contributing to overall habitat degradation. For intensity calculations, source data locations will be preserved with no additional removal beyond the methodology described above. Thus, overlapping inputs will be retained such that the density calculation reflects an overall intensity of development.

More complex disturbance and density estimation approaches may also be implemented, leveraging datasets described above, to facilitate a more complete picture of the level anthropogenic disturbance within GRSG habitat and potential impacts to GRSG habitats. For example, moving window analyses, estimating development density within multiple spatial extents, can facilitate an understanding of potential direct and indirect effects of development on GRSG habitats (e.g., see Decker et al (2014) and Leinwand, I., Carr, N. B., & Wood, D. J. A. (2016)).

*Measure 2a: What is the estimated amount of habitat degradation rangewide and the estimated change in the amount?*
Within GRSG habitats, divide the combined estimated area of the active/direct footprint by the total area of GRSG habitat at spatial scales relevant to BLM land use plan decisions and management, for example, at Habitat Assessment Fine-scale extents. (% disturbance in GRSG habitats).

*Measure 2b: What is the estimated density of energy development activities and the change in the estimated density?*
Within GRSG habitats, divide the total count of energy and mining locations (identified in **Table 7-4**) by the total area of GRSG habitat at spatial scales relevant to BLM land use plan decisions and management, for example, at Habitat Assessment Fine-scale extents. The resulting density will be reported in units of "count per square mile".

*Measure 2c: Were any disturbance or density caps above project scale exceeded?*
Leveraging the outcomes of analyses performed to answer 2a and 2b, summaries of any disturbance or density caps, as articulated in each land use plans, will be created.

*Measure 2d: What is the amount of reclaimed energy-related degradation on BLM lands and the change in the amount?*

Currently no single data repository exists which captures BLM's reclamation accomplishments in a spatial manner. As data becomes available depicting reclamation activities in sage-grouse habitats, they will be summarized.

### *Measure 3: Greater Sage-Grouse Habitat Suitability*

*Measure 3.a. What is the status of GRSG habitat assessments at the mid-, fine- and site scales across the range?*

BLM will provide a rangewide summary of the total number of GRSG habitat assessments at the mid-, and fine-scales that are either completed or underway.

*Measure 3.b. What is the suitability of GRSG habitats at mid and fine spatial scales?*

BLM will summarize the results of the completed mid- and fine-scale assessments across the range of GRSG. Site-scale summaries are addressed in the Land Use Plan section of the BLM Revised GRSG Monitoring Framework.

### *Measure 4: Achievement of Land Health Standards in GRSG Habitat*

*Measure 4.a. How many acres were evaluated for achievement of the SSS/Wildlife Habitat Land Health Standard in GRSG habitat across the range?*

BLM will evaluate Land Health Standards on BLM-managed lands that contain GRSG habitat. Reporting will include the number of acres: evaluated in the reporting period, evaluated prior to the reporting period, and not evaluated.

*Measure 4.b. For areas that have been evaluated in GRSG habitat, what is the status of land health and what are the causes of non-achievement (as applicable)?*

BLM will summarize the results of land health assessments conducted within the reporting period as follows: achieving, making progress towards achieving, or not achieving land health standards. Further, BLM will summarize the causes for not achieving land health when a causal factor analysis has been completed. As available, management responses will also be summarized.

### *Measure 5: BLM On-The-Ground Conservation and Restoration Efforts for GRSG*

*Measure 5.a. How many acres/miles were conserved or restored by treatment or action type in GRSG habitat?*

BLM implements a variety of efforts to conserve and restore GRSG habitat. These efforts range from conifer removal and habitat restoration to riparian exclosures and fence modifications. BLM will use several existing databases to summarize the number of actions and number of acres/miles of conservation efforts by type.

### *Measure 6: GRSG Population Trend Rangewide*

*Measure 6.a. What is the rangewide average annual population trend?*

The BLM will report rangewide population trends for GRSG. For rangewide populations trends, the BLM will report results from the most current version of the *Range-wide Population Trend Analysis for Greater Sage-Grouse (Centrocercus urophasianus)* conducted by the USGS (e.g., Coates et al. 2022). This analysis estimates annual rangewide populations trends using these scales:

- Range-wide average annual trend (e.g., 2.9% average annual decline from 1953-2021)
- Range-wide cumulative trend across three time periods:
  - Short (two oscillations, ~19 years) (e.g., 42.5% decline)
  - Medium (four oscillations, ~35 years) (e.g., 65.6% decline)
  - Long (six oscillations, ~55 years) (e.g., 80.1% decline)

## 7.3 SECTION II: LAND USE PLAN IMPLEMENTATION MONITORING

### 7.3.1 Introduction

One key goal of monitoring BLM land use plan implementation is to produce data and information to inform the GRSG portion of BLM land use plan (LUP) evaluations (as required by 43 CFR 1610.4-9 and the BLM H-1601-1 Land Use Planning Handbook). This section of the GRSG Revised Monitoring Framework describes the monitoring methodology for BLM to implement three types of monitoring and reporting across GRSG planning areas in 10 western states (CA, CO, ID, MT, ND, NV, OR, SD, UT, and WY):

- Land use plan implementation monitoring focuses on the primary cross-cutting GRSG conservation commitments (LUP objectives, decisions, and desired conditions) contained in the BLM 2023 GRSG LUP Amendments.
- Planning area GRSG habitat monitoring focuses on assessing suitability of habitat at the mid-, fine- and site scales. Planning area habitat monitoring also focuses on GRSG habitat availability to determine the status of BLM adaptive management habitat thresholds.
- Planning area population monitoring focuses on GRSG population trends (tracked in partnership with state wildlife agencies and similar entities) to determine the status of BLM adaptive management population thresholds.

This Revised GRSG Monitoring Framework builds on the BLM's experience of annual monitoring and reporting on the first 5 years of GRSG BLM LUP implementation (2016 – 2020) published in the 5-year monitoring report (BLM Rangewide Monitoring Report, Herren et al. 2021). The structure for this section of the framework carries forward the monitoring questions from the Greater Sage-Grouse Monitoring Framework (Interagency Disturbance and Monitoring Subteam, May 2014) that have been modified to reflect the data, methods and information that has become available since 2015. Two additional monitoring questions have been added. The six monitoring questions are summarized in **Table 7-5**.

**Table 7-5. The Six Land Use Plan Monitoring Measures, Associated Sub-Measures, Monitoring Questions and Data Sources for BLM Monitoring of GRSG Habitat Conditions And Population Trends**

| Measures | Monitoring Questions | Data |
|---|---|---|
| **Measure 1: Status of greater sage-grouse habitat suitability within the planning area relative to the LUP objectives** | | |
| Measure 1a: Site-scale Habitat Suitability | What are the seasonal habitat suitability ratings as assessed by the Habitat Assessment Framework (HAF, Stiver et al. 2015, BLM TR 6710-1, as revised) and the combination of site-scale indicators? | State Office and National tracking of completed habitat assessments. |
| Measure 1b: Mid- and Fine-scale Habitat Suitability | What are the mid- and fine-scale suitability ratings for GRSG habitats that overlap with the planning area as assessed by the mid- and fine-scale indicators? | State Office and National tracking of completed habitat assessments. |
| Measure 1c: Status of Habitat Assessments | What is the status of habitat assessments completed within the planning area? | State Office and National tracking of completed habitat assessments. |

| Measures | Monitoring Questions | Data |
|---|---|---|
| **Measure 2: Special Status Species/Wildlife habitat (SSS/WL) standard being achieved, or making progress towards being achieved, in allotments that contain greater sage-grouse habitats where evaluations have been completed since the 2024 ROD within the planning area** | | |
| Measure 2a: Achieving, Making progress towards achieving, or not achieving the SSS/WL standard. | What is the number of allotments evaluated in the planning area and how many are achieving, making progress towards achieving, or not achieving the SSS / WL standard? | State Office and National tracking of completed land health evaluations. |
| Measure 2b: If grazing allotments include areas that are not achieving the standard and current grazing was identified as a significant causal factor. | How many livestock grazing authorizations or allotments had management adjusted and what type of action was taken? | State Office tracking of grazing authorizations. |
| Measure 2c: If grazing allotments include areas that are not achieving the standard and current grazing was identified as a significant causal factor. | How many permits/leases include an adaptive management strategy that incorporates specific thresholds and defined responses? | State Office tracking of grazing authorizations. |
| **Measure 3: BLM LUP disturbance and density measures (e.g., surface disturbance caps)** | | |
| Measure 3a: Disturbance Caps | Were the disturbance caps for BLM authorizations exceeded at any scale in GRSG HMAs in the planning area? If so, which projects that exceeded the disturbance cap were authorized and why? | State office tracking of authorizations requiring a disturbance cap. SDARTT or State managed disturbance databases. |
| Measure 3b: Density Caps | If applicable, were the density caps for BLM authorizations exceeded at any scale in GRSG HMAs in the planning area? If so, which projects that exceeded the density cap were authorized and why? | State office tracking of authorizations requiring a disturbance cap. SDARTT or State managed disturbance databases. |
| **Measure 4: BLM LUP Adaptive Management habitat or population thresholds** | | |
| Measure 4a: Count of tripped thresholds | How many soft or hard BLM LUP adaptive management habitat or population thresholds were tripped in the planning area annually? | State office tracking of adaptive management thresholds. |
| Measure 4b: Count of Untripped / reversed thresholds | How many thresholds were reversed ("untripped") annually in the planning area? | State office tracking of adaptive management thresholds. |
| Measure 4c: Responses to tripped thresholds taken by BLM | In areas where thresholds were tripped or untripped, what responses as described in the BLM LUP were taken initially? Were the response implementation actions modified after a causal factor analysis, if applicable? | State office tracking of responses to adaptive management thresholds being tripped or untripped. |
| Measure 4d: Status of causal factor analyses | What is the status of causal factor analyses? For completed causal factor analyses, what factors were identified as possible causal factors? | State office tracking of causal factor analysis in response to adaptive management thresholds being tripped. |

| Measures | Monitoring Questions | Data |
|---|---|---|
| **Measure 5: Compensatory Mitigation** | | |
| Measure 5a: Use of compensatory mitigation. | How many projects included compensatory mitigation annually? Which projects included compensatory mitigation? | State office tracking of compensatory mitigation. |
| **Measure 6: Use of Waivers, Exceptions or Modifications (WEMs)** | | |
| Measure 6a: Projects where WEMs are granted | Of the stipulations in the land use plan developed for GRSG, which projects had a Waivers, Exceptions or Modification granted? Of these projects, which type of stipulation and in which type of GRSG Habitat Management Area were the WEMs granted? | State office tracking of WEMs associated with authorizations. |

### 7.3.2 Methods

The following methods, datasets and reporting units apply to implementation, habitat and population monitoring across all BLM GRSG planning areas including variations that occur in some BLM GRSG planning areas due to partnerships with the states. Additional monitoring of GRSG conservation commitments may be implemented in BLM planning areas. The following descriptions of monitoring and reporting will be implemented to inform the six measures:

***Measure 1: Status of greater sage-grouse habitat suitability within the planning area relative to the LUP objectives***

Summaries of habitat suitability ratings, as assessed by the Habitat Assessment Framework (HAF, Stiver et al. 2015, BLM TR 6710-1, as revised), will be aggregated from National and State Office tracking mechanisms.

*Measure 1a: What are the seasonal habitat suitability ratings as assessed by the Habitat Assessment Framework (HAF, Stiver et al. 2015, BLM TR 6710-1, as revised) and the combination of site-scale indicators?*

The BLM will summarize the results of site-scale assessment reports that overlap with the planning area, reported in 5-year intervals. Example reporting would be: 50% suitable/ 20% Marginal/ 30% Unsuitable (proportional area estimates) or 50 plots S/ 20 plots M/ 30 plots U (plot counting).

*Measure 1b: What are the mid- and fine-scale suitability ratings for GRSG habitats that overlap with the planning area as assessed by the mid- and fine-scale indicators?*

The BLM will summarize the results of mid and fine-scale assessment reports that overlap the planning area.

*Measure 1c: What is the status of habitat assessments completed within the planning area?*

The BLM will summarize and report on the number of completed habitat assessments that overlap the planning area using the BLM National Operations Center tracking system.

***Measure 2: Special Status Species/Wildlife habitat (SSS/WL) standard being achieved, or making progress towards being achieved, in allotments that contain greater sage-grouse habitats where evaluations have been completed since the 2024 ROD within the planning area.***

Summaries of allotments achieving, making progress towards achieving, or not achieving the SSS/WL standard.

*Measure 2a: What is the number of allotments evaluated in the planning area and how many are achieving, making progress towards achieving, or not achieving the SSS / WL standard?*

The BLM will use the BLM's Land Health Standards database and State Office tracking mechanisms to monitor and report the achievement of the Special Status Species/Wildlife Habitat standard in completed

land health evaluations in GRSG habitat within the planning area and whether livestock grazing was identified as a significant causal factor in non-achievement.

*Measure 2b: For grazing allotments with areas not achieving SSS/Wildlife Habitat standard and livestock grazing is a causal factor, how many livestock grazing authorizations or allotments had management adjusted and what type of action was taken?*

The BLM will use available BLM databases and State Office tracking mechanisms to report on the number of livestock grazing authorizations or allotments that had management actions taken in each planning area. BLM Field, District and State Offices will coordinate to report on the type of actions taken (e.g., changes to season of use or amount of use, changes to infrastructure).

*Measure 2c: For grazing allotments with areas not achieving SSS/Wildlife Habitat standard and livestock grazing is a causal factor, how many permits/leases include an adaptive management strategy that incorporates specific thresholds and defined responses??*

BLM Field, District and State Offices will coordinate to report on the number of permits/leases that were modified to incorporate an adaptive management strategy that includes specific thresholds and defined responses in each planning area.

***Measure 3: BLM LUP disturbance and density measures (e.g. surface disturbance and density caps)***

The BLM field offices will use disturbance tracking databases (e.g., Surface Disturbance and Reclamation Tracking Tool (SDARTT)) or other methods to track the amount of disturbance authorized by the BLM. The BLM State Offices/BLM NOC will compile the results and summaries of habitat disturbance calculations conducted at the project and larger scale management areas within the planning area to include in monitoring reports.

*Measure 3a: Were the disturbance caps for BLM authorizations exceeded at any scale in GRSG HMAs in the planning area? If so, which projects that exceeded the disturbance cap were authorized and why?*

For projects that exceeded the disturbance cap, the BLM SOs will identify those projects, and the reason(s) why the disturbance cap was exceeded using available databases and project records (NEPA etc).

*Measure 3b: If applicable, were the density caps for BLM authorizations exceeded at any scale in GRSG HMAs in the planning area? If so, which projects that exceeded the density cap were authorized and why?*

If the land use plan includes a cap on the density of anthropogenic disturbances, the BLM SOs will identify the projects that were authorized which exceeded the density cap and provide the reason for the exceedance using available databases and project records (NEPA etc).

***Measure 4: BLM LUP Adaptive Management habitat or population thresholds***

BLM State Offices will complete adaptive management threshold and causal factor (as required) analyses annually as described in each land use plan.

*Measure 4a: How many soft or hard BLM LUP adaptive management habitat or population thresholds were tripped in the planning area annually?*

BLM State Offices, in coordination with BLM Field and District Offices, will report on annual calculations and counts of land use plan adaptive management thresholds tripped.

*Measure 4b: How many thresholds were reversed ("untripped") annually in the planning area?*
BLM State Offices, in coordination with BLM Field and District Offices, will report on annual calculations and counts of land use plan adaptive management thresholds reversed / untripped.

*Measure 4c: In areas where thresholds were tripped or untripped, what responses as described in the BLM LUP were taken initially? Were the response implementation actions modified after a causal factor analysis, if applicable?*
The BLM State Office, in coordination with BLM Field and District Offices, will summarize and report on the action(s) taken, as described in the land use plan, in response to each threshold being tripped or reversed.

*Measure 4c: What is the status of causal factor analyses? For completed causal factor analyses, what factors were identified as possible causal factors?*
The BLM State Office, in coordination with BLM Field and District Offices, will summarize the number and status of causal factor analyses required in response to adaptive management thresholds being tripped / untripped as required in the land use plan. For completed causal factor analyses, the BLM State Office, in coordination with BLM Field and District Offices, will also report on the identified causal factors (if known) and the responses or implementation actions taken to address the causal factors if different than those taken in response to a threshold being tripped / untripped (as applicable).

***Measure 5: Compensatory Mitigation***
BLM State Offices will track the implementation of the use of compensatory mitigation for individual authorizations.

*Measure 5a: How many projects included compensatory mitigation annually? Which projects included compensatory mitigation?*
The BLM State Office, in coordination with BLM Field and District Offices, will report on the number of authorized projects that included compensatory mitigation and report on which projects included compensatory mitigation.

***Measure 6: Use of Waivers, Exceptions or Modifications (WEMs)***
BLM State Offices will track the use of Waivers, Exceptions and Modifications (WEMs) in GRSG habitat.

*Measure 6a: Of the stipulations in the land use plan developed for GRSG, which projects had a Waiver, Exception or Modification granted? Of these projects, which type of stipulation and in which type of GRSG Habitat Management Area were the WEMs granted?*
The BLM State Office, in coordination with BLM Field and District Offices, will report on which projects had a Waivers, Exceptions or Modification granted for the stipulations in the land use plan developed for GRSG. Of these projects, the type of stipulation and in which type of GRSG Habitat Management Area the WEMs were granted will also be reported.

**Table 7-6. Example Reporting Structure for WEMs**

| Waivers, Exceptions, Modifications granted by BLM by stipulation type and GRSG Habitat Management Type | | | |
|---|---|---|---|
| **Project NEPA ID** | **Stipulation Type (NSO, CSU, TL)** | **WEM Type (Waiver, Exception, Modification)** | **Habitat Type (PHMA, IHMA, GHMA)** |
| Example: NEPA number | TL | Exception | PHMA |

## 7.4 SECTION III: EVALUATION OF EFFECTIVENESS

The information collected at the rangewide scale will be used by the BLM to provide a cohesive look at conditions across administrative boundaries. Measures which are analyzed across all lands (vegetation availability and condition, disturbance estimates, etc.) will be also analyzed on BLM managed lands so that BLM management influence on each can be inferred. Similarly, trend analyses and monitoring of changes through time for several measures will facilitate an understanding of BLM's influence on sage-grouse habitats. Conceptually, if rangewide monitoring identifies increasing sagebrush availability and improving vegetation conditions, decreasing disturbance, and a stable or increasing, there is evidence that the BLM's goal to conserve and maintain habitats for healthy populations and connectivity of populations have been met. Conversely, where information indicates that sagebrush is decreasing and vegetation conditions are degrading, disturbance in sage-grouse areas is increasing, and/or populations are declining relative to the baseline, there is evidence that the BLM's goal is not being achieved. Given the variety of measures this Framework outlines, the inherent challenges of establishing cause-and-effect relationships in mixed ownership landscapes and the complexity of population dynamics, such straight forward interpretations are expected to be minimal. To the best of the BLM's ability, factors driving observed changes will be identified and discussed when each measure is examined and synthesized with BLM's role in observed change identified (ie. Were changes due to drought or other climactic drives or directly related to BLM's management).

The information collected under the six land use plan questions of this monitoring framework will be leveraged in the broader land use plan effectiveness evaluation required in 43 CFR 1610.4-9 and as described in the BLM Land Use Planning Handbook (BLM H-1601-1, 2005). BLM State Offices will include sage-grouse specific sections in these evaluations of effectiveness for areas where sage-grouse management goals and objectives are applicable. The complexity of these evaluations may be based on the amount of sage-grouse habitats within the area, known issues within sage-grouse habitats or other factors deemed important by the State Office. The sage-grouse specific components of these evaluations will include, at a minimum, the information collected to inform the six land use plan measures. Additional local information that supports or clarifies the conclusions or effectiveness summaries shall also be considered. Information from the range wide effectiveness section of this monitoring framework will be used to inform the effectiveness evaluation at the land use plan level as applicable. This information will also be used to place the field office's effectiveness evaluation conclusions in context with how the implementation of sage-grouse management decisions are supporting the overall BLM's goals to conserve and manage greater sage-grouse habitats to support persistent, healthy populations, consistent with BLM's sensitive species policy and in cooperation with other conservation partners and maintain existing connectivity between sage-grouse populations. The interdisciplinary team will develop and recommend a suite of actions, as appropriate, the BLM can take to address any conclusions made within the sage-grouse portion of the larger effectiveness evaluation. These recommendations may vary from land use plan implementation changes to land use plan revision as described in the Land Use Planning Handbook, section VI.

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## APPENDIX A. LANDFIRE ECOLOGICAL SYSTEMS CAPABLE OF SUPPORTING SAGEBRUSH

**Table A1. Ecological systems in BpS and EVT capable of supporting sagebrush vegetation and capable of providing suitable seasonal habitat for Greater Sage-Grouse.**

| Ecological System | Sagebrush Vegetation that the Ecological System has the Capability of Producing | Sagebrush (SB) or Sagebrush Associated (SBA) |
|---|---|---|
| Colorado Plateau Mixed Low Sagebrush Shrubland | *Artemisia arbuscula* ssp. *longiloba*<br>*Artemisia bigelovii*<br>*Artemisia nova*<br>*Artemisia frigida*<br>*Artemisia tridentata* ssp. *wyomingensis* | SB |
| Columbia Plateau Low Sagebrush Steppe | *Artemisia arbuscula*<br>*Artemisia arbuscula* ssp. *longiloba*<br>*Artemisia nova* | SB |
| Columbia Plateau Scabland Shrubland | *Artemisia rigida* | SBA |
| Columbia Plateau Steppe and Grassland | *Artemisia* spp. | SBA |
| Great Basin Xeric Mixed Sagebrush Shrubland | *Artemisia arbuscula* ssp. *longicaulis*<br>*Artemisia arbuscula* ssp. *longiloba*<br>*Artemisia nova*<br>*Artemisia tridentata* ssp. *wyomingensis* | SB |
| Inter-Mountain Basins Big Sagebrush Shrubland | *Artemisia tridentata* ssp. *tridentata*<br>*Artemisia tridentata* ssp. *xericensis*<br>*Artemisia tridentata* ssp. *vaseyana*<br>*Artemisia tridentata* ssp. *wyomingensis* | SB |
| Inter-Mountain Basins Big Sagebrush Steppe | *Artemisia cana* ssp. *cana*<br>*Artemisia tridentata* ssp. *tridentata*<br>*Artemisia tridentata* ssp. *xericensis*<br>*Artemisia tridentata* ssp. *wyomingensis*<br>*Artemisia tripartita* ssp. *tripartita*<br>*Artemisia frigida* | SB |
| Inter-Mountain Basins Curl-Leaf Mountain Mahogany Woodland | *Artemisia tridentata* ssp. *vaseyana*<br>*Artemisia arbuscula*<br>*Artemisia tridentata* | SBA |
| Inter-Mountain Basins Curl-Leaf Mountain Mahogany Shrubland | *Artemisia tridentata* ssp. *vaseyana*<br>*Artemisia arbuscula*<br>*Artemisia tridentata* | SBA |
| Inter-Mountain Basins Mixed Salt Desert Scrub | *Artemisia tridentata* ssp. *wyomingensis*<br>*Artemisia spinescens* | SBA |
| Inter-Mountain Basins Montane Sagebrush Steppe | *Artemisia tridentata* ssp. *vaseyana*<br>*Artemisia tridentata* ssp. *wyomingensis*<br>*Artemisia nova*<br>*Artemisia arbuscula*<br>*Artemisia tridentata* ssp. *spiciformis* | SB |
| Inter-Mountain Basins Semi-Desert Shrub-Steppe | *Artemisia tridentata*<br>*Artemisia bigelovii*<br>*Artemisia tridentata* ssp. *wyomingensis* | SBA |
| Northwestern Great Plains Mixed Grass Prairie | *Artemisia cana* ssp. *cana*<br>*Artemisia tridentata* ssp. *vaseyana*<br>*Artemisia frigida* | SBA |

| Ecological System | Sagebrush Vegetation that the Ecological System has the Capability of Producing | Sagebrush (SB) or Sagebrush Associated (SBA) |
|---|---|---|
| Northwestern Great Plains Shrubland | *Artemisia cana* ssp. *cana*<br>*Artemisia tridentata* ssp. *tridentata*<br>*Artemisia tridentata* ssp. *wyomingensis* | SBA |
| Rocky Mountain Gambel Oak-Mixed Montane Shrubland | *Artemisia tridentata* | SBA |
| Rocky Mountain Lower Montane-Foothill Shrubland | *Artemisia nova*<br>*Artemisia tridentata*<br>*Artemisia frigida* | SBA |
| Western Great Plains Sand Prairie | *Artemisia cana* ssp. *cana* | SBA |
| Wyoming Basins Dwarf Sagebrush Shrubland and Steppe | *Artemisia arbuscula* ssp. *longiloba*<br>*Artemisia nova*<br>*Artemisia tridentata* ssp. *wyomingensis*<br>*Artemisia tripartita* ssp. *rupicola* | SB |
| *Artemisia tridentata* ssp. *vaseyana* Shrubland Alliance (EVT only) | *Artemisia tridentata* ssp. *vaseyana* | SB |
| *Quercus gambelii* Shrubland Alliance (EVT only) | *Artemisia tridentata* | SB |

## APPENDIX B. DATA ACCURACY ASSESSMENTS FOR LANDFIRE AND RCMAP

### LANDFIRE Agreement Assessment

In the monitoring framework we will use the most recent version of LANDFIRE EVT data (EVT 2.2.0) which currently is based on the 2016 EVT Remap with updates due to disturbances. The 2016 EVT Remap data were reviewed using agreement assessments that compared individual sample field plots with EVT classes for pixels at plot locations using the Auto-Key EVT assignment. The plot data used for the agreement assessment was not used in the 2016 remap process by LANDFIRE so this was formulated as the most independent and robust test possible for the data. More details of this process are here: https://landfire.gov/remapevt_assessment.php.

Agreement assessments of all classes of data in northwest (NW) and southwest (SW) GeoAreas provide overall results of 47% and 42% respectively (**Table B1**). However, for GRSG purposes we also aggregated all classes into sagebrush (SB), sagebrush associated (SBA), or nonhabitat using LANDFIRE's process of collapsing categories. This aggregation caused the agreement assessments to increase substantially for both the NW and SW GeoAreas (**Table B1**).

**Table B1. Agreement assessments of sagebrush (SB), sagebrush associated (SBA), nonhabitat, and overall classes in LANDFIRE EVT data showing the increased accuracy estimated when classes are grouped.**

| GeoAreas | SB | SBA | SB and SBA | Nonhabitat | Overall |
|---|---|---|---|---|---|
| NW | 85% | 49% | 86% | 92% | 47% |
| SW | 75% | 45% | 71% | 92% | 42% |

### RCMAP Accuracy Assessment

Rigge et al (2020) accuracy metrics, using 1860 independent field measurements, are shown in the table under Published. The BLM-conducted accuracy assessment used more than 3,000 data points from the AIM

2.0 database in 2021 and compared them to RCMAP 2020 predictions that used training data to 2019 (Savage and Slyder, 2022).

**Table B2. Results of RCMAP published and BLM-conducted accuracy assessments (Savage and Slyder, 2022). R2 is the coefficient of determination; RMSE is the root mean squared error; and MAE is the mean absolute error.**

| Indicator | Published | | | BLM-conducted | | |
|---|---|---|---|---|---|---|
| | R2 | RMSE | MAE | R2 | RMSE | MAE |
| Annual Herbaceous | 0.58 | 9.8 | - | 0.13 | 14.21 | 7.59 |
| Sagebrush | 0.4 | 7.5 | - | 0.33 | 8.41 | 5.51 |
| Trees | - | - | - | - | - | - |

## APPENDIX C. LITERATURE SUMMARY OF CONIFER EFFECTS ON SAGE-GROUSE

**Table C1. Summary of the literature on the effects of conifer cover on GRSG.**

| Name | % Conifer Cover | Distance /Area | State | Leks | Nesting | Brood Rearing | No Season Given |
|---|---|---|---|---|---|---|---|
| Baruch-Mordo et al 2013 | >4% | - | OR | No active leks | - | - | - |
| Baxter et al 2017 | - | - | UT | - | - | Selected areas far from trees | - |
| Beers et al. 2022 | <2%,<br><11%,<br><4% | 400m,<br>800m | NV<br>UT | Summer & breeding<br>Winter<br>Year-round, selected for sagebrush patch contiguity | | | |
| Brussee et al. 2022 | 0% | - | NV | - | - | Preferred no PJ to 1-10% conifer | - |
| Casazza et al 2011 | <5% (threshold was selected by the scientists based on Miller et al 2005) | 7.9 ha (20 acre, 160m radius); 226.8 ha (560 acre, 850m radius) | CA | - | - | SG avoided PJ at large scale, but models were unsuccessful at explaining this | - |
| Coates et al 2017 | < 2% | - | CA | - | - | - | SG tolerate < 2% but less may be better for survival |
| Cook et al 2017 | 4%<br>>3 % | 1000m<br>800m | UT | Lower suitability | Lower suitability | - | - |
| Doherty et al 2010 | - | 100m | MT, WY | - | Strong avoidance of conifer within | - | - |
| Doherty et al 2016 | | | MZs | Strong neg relationship between SG occurrence and tree canopy cover | | | |

| Name | % Conifer Cover | Distance /Area | State | Leks | Nesting | Brood Rearing | No Season Given |
|---|---|---|---|---|---|---|---|
| Doherty et al 2021 | >3% | 560m | OR | Lower suitability | - | - | - |
| Fedy et al 2014 | - | - | WY | SG avoided forested areas | | | |
| Gibson et al 2015 | >30%, 10-30% | 1000m | NV | - | Avoided 10-30% areas were selected | - | - |
| Nisbet et al 1983 | 0% | - | NV UT | Lek model preference for sites with no conifer | - | - | - |
| Olsen et al 2021 | - | - | OR | SG population increased where conifer was removed, suggest limit to < 10% cover | | | |
| Picardi et al 2020 | - | - | UT | Modeled relationship found that areas with no conifer cover would be selected and areas with high conifer cover would be avoided | | | |
| Roth et al 2022 | - | - | NV | - | SG selected PJ class (1-10%) was below average | - | - |
| Sandford et al 2017 | >4% | - | UT | - | Less suitable for nesting habitat | - | - |
| Severson et al 2017 | > 3%, >4% | 800m | OR | - | Lower suitability, Marginal/unsuitable | - | - |
| Westover et al 2016 | - | - | UT | SG avoided areas with hi % trees<br>SG broods found further from trees | | | |

# Appendix 8

## Greater Sage-Grouse Habitat Indicators and Benchmarks

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# Appendix 8. Greater Sage-Grouse Habitat Indicators and Benchmarks

## 8.1 Incorporating the Best Available Science into the Habitat Assessment Framework Process

The Habitat Assessment Framework (HAF/ BLM TR 6710-1, as revised) provides a standardized, scientifically based methodology to assess sage-grouse habitat suitability at multiple scales (broad, mid, fine, and site-scales, Levels 1, 2, 3 and 4 respectively). Habitat suitability occurs along a gradient ranging from unsuitable to suitable and is rarely uniform within and across the scales. Using multi-scale evaluations is important for assessing GRSG habitat by considering the entire suite of conditions that contribute to high quality habitat, the success of past conservation actions, and prioritizing future land uses and conservation actions. Descriptions of the scales of habitat selection (broad-, mid-, fine-, and site-) and the associated indicators for habitat assessment at each scale are available in the HAF (BLM TR 6710-1, as revised).

## 8.2 Habitat Indicators and Benchmarks for Site-Scale HAF

The vegetation characteristics associated with site-scale habitat suitability varies across the range of GRSG. For example, characteristics (both indicators and benchmarks) in the grasslands of Montana are different than the characteristics in the sagebrush shrublands in the southern Great Basin of Utah and Nevada. The HAF technical reference includes general site-scale forms for the indicators and benchmark values for suitable site scale habitat ratings. The indicators and benchmark values used in these forms at the site scale should be updated to incorporate the best available research related to habitat suitability applicable to the regional and local variability.

The Habitat Indicators Tables (**Tables 8-1.A-G**) provide a list of indicators and benchmarks, derived from local and regional research on GRSG habitat selection, that collectively are used to inform habitat suitability. BLM offices will use the indicators and benchmarks in **the tables below** to assess each monitoring location within seasonal habitats for site-scale suitability, with data collected during the appropriate corresponding seasonal use period, as applicable to address phenological changes. Not all areas within a given habitat management area will be capable of meeting the identified seasonal habitat values in the Habitat Indicators Table due to inherent variation in vegetation communities and ecological potential. Habitat Indicators and Benchmarks are habitat conditions that are based on habitat selection that may not be achievable or applicable in all areas. Site-specific benchmarks must be based on the site's ecological potential informed by ecological site descriptions and associated state-and-transition models and the site's current ecological state.

When completing site-scale assessments, **it is *inappropriate* to use a single indicator** from any of the below **Tables 8-1.A-G** or the HAF habitat suitability form to determine overall habitat suitability of the plot (i.e., suitable, marginal, or unsuitable) unless sagebrush is absent or limiting. Instead, BLM staff must consider all the indicators using multiple lines of evidence, as described in the HAF and in the training materials, to determine the plot's overall habitat suitability. The measured habitat indicator values will vary seasonally, driven largely by use and environmental conditions (e.g., ecological site potential of the monitoring plot), including factors such as annual rainfall, drought, annual production, and natural disturbances, such as high intensity wildfires and flooding. In addition, a site may not meet the suitable rating if many indicators are impacted by annual climate variability (e.g., drought conditions), which is independent of management. Thus, it is critical to document environmental factors when completing the habitat suitability forms. This

information is essential to inform land health assessments and evaluations. The use of disturbance response groups may also be appropriate to provide context to BLM HAF assessments.

Indicators are assessed following the methods described in the Sage-grouse Habitat Assessment Framework. BLM will leverage the terrestrial Assessment, Inventory, & Monitoring (AIM) methods (Herrick et al. 2017), additional monitoring approaches for wetland & riparian habitats, credible partner data, and supplemental long-term monitoring data and guidelines developed by the BLM to collect data on site-scale habitat condition (**Tables 8-1.A-G**). Not all monitoring locations within a given seasonal habitat area will be able to achieve all suitable benchmark values in the Habitat Indicators Table due to the inherent variation in vegetation communities and ecological site potential. The intent is not to meet all habitat requirements at all monitoring locations, but to provide seasonal habitat requirements sufficiently across the landscape. Marginal or unsuitable ratings may still provide, or have the capacity to provide, one or more of the habitat components.

As research becomes available, new data could refine or clarify GRSG selection for vegetation structure and composition in seasonal habitats for certain populations. Because of this, the Habitat Indicators Table(s) (**see below in the remainder of Section 8.2**) will be periodically reviewed to incorporate the best available science in coordination with applicable federal, state, local, and tribal agencies. The addition or adjustment to indicators or benchmarks in the Habitat Indicators Table must include the reference or basis for which the changes are made. Edits should only be made if warranted by scientific evidence, in coordination with the applicable state agency.

### 8.2.1 Colorado GRSG Habitat Indicators Table

**Table 8-1.A. Colorado GRSG Seasonal Habitat Indicators and Benchmarks**

| Attribute | Indicators | Benchmark | Reference |
|---|---|---|---|
| **BREEDING AND NESTING** [1,2]<br>Seasonal Use Period for Arid sites: March 1-June 15<br>Seasonal Use Period for Mesic sites: March 15-June 30<br>Apply 4 miles from active leks. [13] | | | [1] Doherty 2008<br>[2] Holloran and Anderson 2005 |
| Lek Security | Proximity of trees [3] | Trees or other tall structures are none to uncommon within line of site or 1.86 miles (3 km) of leks [4,5] | [3] Baruch-Mordo et al. 2013<br>[4] Stiver et al. 2015<br>[5] Connelly et al. 2000a |
| | Proximity of sagebrush to leks [4] | Adjacent protective sagebrush cover within 328 feet (100 m) of lek [4] | [4] Stiver et al. 2015 |
| Cover | Sagebrush canopy cover [4,5,6,15]<br>Arid sites<br>Mesic sites | 15 to 30% [15,16]<br>20 to 30% [15,16] | [4] Stiver et al. 2015<br>[5] Connelly et al. 2000a<br>[6] Connelly et al. 2003<br>[15] CO GRSG Steering Committee 2008 |
| | Sagebrush height [5,15]<br>Arid sites [4,5,7]<br>Mesic sites [4,5,8] | <br>11.8 to 31.5 inches (30-80 cm)<br>15.7 to 31.5 inches (40-80 cm) | [4] Stiver et al. 2015<br>[5] Connelly et al. 2000a |
| | Perennial grass canopy cover (such as native bunchgrasses) [4,5,15]<br>Arid sites [5,7]<br>Mesic sites [5,8,15] | <br>≥10%<br>≥20% [15] | [4] Stiver et al. 2015<br>[5] Connelly et al. 2000a<br>[15] CO GRSG Steering Committee 2008 |
| | Perennial grass and forb height (includes residual cover) [5,6,7] | >6 inches (15 cm) [5,14,15] | [5] Stiver et al. 2015<br>[15] CO GRSG Steering Committee 2008 |

| Attribute | Indicators | Benchmark | Reference |
|---|---|---|---|
| Cover *(cont.)* | Perennial forb canopy cover [4,5,6]<br>Arid sites [7]<br>Mesic sites [8] | ≥5% [4,5,15]<br>≥15% [4,5,15] | [4] Stiver et al. 2015<br>[5] Connelly et al. 2000a<br>[6] Connelly et al. 2003<br>[15] CO GRSG Steering Committee 2008 |
| | Invasive annual grass cover [17] | <2% cover [17] | [17] BLM synthesis of research |
| | Conifer [18] | 0 (Absence of conifer) [18] | [18] BLM synthesis of research |
| **BROOD-REARING/SUMMER**<br>Seasonal Use Period for Arid sites: June 16-October 31<br>Seasonal Use Period for Mesic sites: July 1-October 31 | | | |
| Cover | Sagebrush canopy cover [4,5,6,15] | 10 to 25% | [4] Stiver et al. 2015<br>[5] Connelly et al. 2000a<br>[6] Connelly et al. 2003<br>[15] CO GRSG Steering Committee 2008 |
| | Sagebrush height [5,6,15]<br>Arid sites [7]<br>Mesic sites [8] | 11.8 to 31.5 inches (30-80 cm)<br>13.8 to 31.5 inches (35-80 cm) | [5] Connelly et al. 2000a<br>[6] Connelly et al. 2003 |
| | Perennial grass canopy cover and forbs [5,6,15]<br>Arid sites [7]<br>Mesic sites [8] | >15% [15]<br>>25% [15] | [5] Connelly et al. 2000a<br>[6] Connelly et al. 2003<br>[15] CO GRSG Steering Committee 2008 |
| | Invasive annual grass cover [17] | <2% cover [17] | [17] BLM synthesis of research |
| | Conifer | 0 (Absence of conifer) | [18] BLM synthesis of research |
| | Riparian areas (both lentic and lotic systems) | Proper Functioning Condition [11] | |
| | Upland and riparian perennial forb availability [4,5] | Preferred forbs are common with several preferred species present [10] | [4] Stiver et al. 2015<br>[5] Connelly et al. 2000a |
| **WINTER (Seasonal Use Period November 1-February 28)**<br>Seasonal Use Period for Arid sites: November 1-February 28<br>Seasonal Use Period for Mesic sites: November 1-March 14 | | | |
| Cover and Food | Sagebrush canopy cover above snow [4,5,6]<br>Arid sites [7]<br>Mesic sites [8] | >20% [15]<br>>25% [15] | [4] Stiver et al. 2015<br>[5] Connelly et al. 2000a<br>[6] Connelly et al. 2003<br>[15] CO GRSG Steering Committee 2008 |
| | Sagebrush height above snow [4,5,6] | >10 inches [12] | [4] Stiver et al. 2015<br>[5] Connelly et al. 2000a<br>[6] Connelly et al. 2003 |
| | Conifer | 0 (Absence of conifer) | [18] BLM synthesis of research |

Notes:
[1] Doherty 2008
[2] Holloran and Anderson 2005.
[3] Baruch-Mordo et al. 2013
[4] Stiver et. al. 2014
[5] Connelly et al. 2000
[6] Connelly et al. 2003
[7] 10–12 inch precipitation zone; *Artemisia tridentata wyomingensis* is a common big sagebrush sub-species for this type site (Stiver et. al. 2014).
[8] >12 inch precipitation zone; *Artemisia tridentata vaseyana* is a common big sagebrush sub-species for this type site (Stiver et. al. 2014).
[9] Sagebrush plants with a spreading shape provide more protective cover than sagebrush plants that are more tree or columnar shaped (Stiver et. al. 2014).
[10] Preferred forbs are listed in Habitat Assessment Framework Table III-2 (Stiver et. al. 2014). Overall, total forb cover may be greater than that of preferred forb cover since not all forb species are listed as preferred in Table III-2.
[11] Existing land management plan desired conditions for riparian areas/wet meadows (spring seeps) may be used in place of properly functioning conditions, if appropriate for meeting GRSG habitat requirements.
[12] The height of sagebrush remaining above the snow depends upon snow depth in a particular year. The intent is to manage for a mosaic of sagebrush stands with tall, healthy, sagebrush present in swales or bottoms.
[13] Buffer distance may be changed only if 3 out of 5 years of telemetry studies indicate the 4 miles is not appropriate.
[14] Measured as "droop height"; the highest naturally growing portion of the plant.
[15] Colorado Greater Sage-grouse Steering Committee 2008
[16] If sagebrush cover exceeds 30%, this would not be cause to consider the site as less than suitable unless total shrub cover is above 40%[15]

[17] BLM synthesis of research on the impacts invasive annual grasses have on sage-grouse habitat suitability (**Attachment 8-1**)
[18] BLM synthesis of research on the impact conifer have on sage-grouse habitat suitability (**Attachment 8-2**)

### 8.2.2 Idaho GRSG Habitat Indicators Table

**Table 8-1.B. Idaho GRSG Seasonal Habitat Indicators and Benchmarks**

| Attribute | Indicator | Benchmarks | Reference |
|---|---|---|---|
| **LEK HABITAT** (Seasonal Use Period March 1 – May 15) [1] | | | |
| Lek Security | Proximity of trees | Trees (i.e., mainly juniper, conifers, and does not include old- growth juniper, pinyon pine and mountain mahogany) absent or uncommon on shrub/grassland ecological sites within 1.86 miles (3 km) of occupied leks. | Baruch-Mordo et al. 2013<br>Stiver et al. 2015 |
| | Proximity of sagebrush to leks | Adjacent protective sagebrush cover within 328 ft. (100 m) of an occupied lek | Stiver et al. 2015 |
| **NESTING/EARLY BROOD REARING** [1,5] (Seasonal Use Period May 1 – June 30) [1] | | | |
| Cover and Food | Sagebrush cover [2] | 15-25% | Connelly et al. 2000<br>Connelly et al. 2003 Hagen et al. 2007<br>Stevens et al. 2023 |
| | Sagebrush height<br>Arid sites [3]<br>Mesic sites [4] | <br>12-31 inches (30-80cm)<br>16-31 inches (40-80cm) | Connelly et al. 2000 |
| | Predominant sagebrush shape | Predominantly spreading shape [5] | Stiver et al. 2015 |
| | Perennial grass cover (such as native bunchgrasses) [2]<br>Arid sites [3]<br>Mesic sites [4] | <br>≥10%<br>≥15% | Connelly et al. 2000<br>Stiver et al. 2015 |
| | Perennial grass (and forb) height (includes residual grasses) | ≥ 7 inches | Connelly et al. 2000<br>Connelly et al. 2003 Hagen et al. 2007 Stiver et al. 2015 |
| | Perennial forb cover [2]<br>Arid sites [3]<br>Mesic sites [4] | <br>≥5%<br>≥10% | Connelly et al. 2000 |
| | Perennial forb availability | Preferred forbs are common with several species present [6] | Stiver et al. 2015 |
| | Invasive annual grass cover | <2% cover | BLM synthesis of research [9] |
| | Conifer | 0 (Absence of conifer) | BLM synthesis of research [10] |
| **LATE BROOD-REARING/SUMMER** [1, 7] (July-October) [1] Late brood-rearing areas, such as riparian, meadows, springs, higher elevation mesic uplands, etc. may occur within other mapped seasonal habitat areas. Apply late brood rearing/summer habitat desired conditions locally as appropriate. | | | |
| Cover and Food | Sagebrush cover [2] | Uplands 10-25%<br>Riparian/Meadow: Sagebrush cover within 100 m | Connelly et al. 2000 |
| | Sagebrush height | 16 to 32 inches (40-80cm) | Connelly et al. 2000 |
| | Perennial grass and forb cover [2] | >15% | |
| | Upland and riparian perennial forb availability [2] | Preferred forbs are common with appropriate numbers of species present [6] | Stiver et al. 2015 |
| | Riparian and/or meadow habitat condition | Proper Functioning Condition | Stiver et al. 2015 |
| | Invasive annual grass cover | <2% cover | BLM synthesis of research [9] |
| | Conifer | 0 (Absence of conifer) | BLM synthesis of research [10] |
| **WINTER** [1] **November-March** [1] (Apply to areas of known or likely winter-use) | | | |
| Cover and Food | Sagebrush cover and height above snow. | Sagebrush is at least 10 inches (25 cm) above snow and ≥10% cover [8] | Connelly et al. 2000<br>Stiver et al. 2015 |
| | Conifer | 0 (Absence of conifer) | BLM synthesis of research [10] |

Notes:
[1] Seasonal dates can be adjusted by local unit according to geographic region.

[2] Since plant species and/or life forms may overlap, total vegetative cover, inclusive of shrubs, forbs and grasses may exceed 100%. Note that sagebrush cover objectives may exceed 25% in some areas, for example in areas with higher precipitation, and/or where local science is available demonstrating sage-grouse use of areas with sagebrush cover > 25%.
[3] Arid corresponds to the 10 – 12 inch precipitation zone; *Artemisia tridentata wyomingensis* is a common big sagebrush sub- species for this type site (Stiver et al. 2015).
[4] Mesic corresponds to the ≥12 inch precipitation zone; *Artemisia tridentata vaseyana* is a common big sagebrush sub-species for this type site (Stiver et al. 2015).
[5] Collectively the indicators for sagebrush (cover, height, and shape), perennial grass and perennial forb (cover, height and/or availability) represent the desired condition range for nesting/early brood rearing habitat characteristics, consistent with the breeding habitat suitability matrix identified in Stiver et al. *2015*. Sagebrush plants that are more tree or columnar-shaped provide less protective cover near the ground than sagebrush plants with a spreading shape (Stiver et al. 2015). Some sagebrush plants are naturally columnar (e.g., Great Basin big sagebrush), and a natural part of the plant community. However, a predominance of columnar shape arising from animal impacts may warrant management investigation or adjustments at site specific scales.
[6] Preferred forbs are listed in Stiver et al. 2015. Overall total forb cover may be greater than that of preferred forb cover since not all forb species are listed as preferred.
[7] Some late brood habitat occurs at higher elevations outside of mapped nesting habitat and some is embedded within nesting landscapes especially areas such as wet meadows, riparian areas, springs and seeps.
[8] Winter habitat metrics are a guideline but snow depths and habitat availability may vary widely depending on winter severity, topography and elevation.
[9] BLM synthesis of research on the impacts invasive annual grasses have on sage-grouse habitat suitability (**Attachment 8-1**)
[10] BLM synthesis of research on the impact conifer have on sage-grouse habitat suitability (**Attachment 8-2**)

### 8.2.3 Montana/Dakotas GRSG Habitat Indicators Tables

MT-Dak does not have a 2019 amendment and Butte/UMRBNM were not included in the 2015 amendment process. These 2015 Tables are provided for reference but may be modified/adjusted to switch ecological boundaries and to account for new science, BLM review of recent science, and additional comments/information provided during the planning process.

**Table 8-1.C.1. North Dakota Habitat Indicators and Benchmarks**

| Attribute | Indicators | Benchmarks | Reference |
|---|---|---|---|
| **BREEDING AND NESTING** (Seasonal Use Period March 1 - June 15) | | | |
| Lek Security | Proximity of trees | 0.388 miles avoidance of coniferous habitats | Doherty 2008 |
| | Proximity of sagebrush to leks | Adjacent protective sagebrush cover within 328 feet (ft.) (100 meters [m]) of an occupied lek | Stiver et al. 2015 |
| Cover | Sagebrush cover | ≥5-25% | Herman-Brunson 2007<br>Doherty et al. 2010 |
| | Sagebrush height | 7-30 inches | Swanson 2009<br>Holloran et al. 2005<br>Herman-Brunson 2007 |
| | Predominant sagebrush shape | Predominately spreading shape | Stiver et al. 2015 |
| | Perennial grass cover | ≥10% Not Continuous | Doherty et al. 2010<br>Doherty et al. 2011<br>Holloran et al. 2005<br>Hagen et al. 2007 |
| | Perennial grass and forb height | Adequate nest cover based on ecological site potential and seasonal precipitation; 4.4-11.3 inches [1] | Doherty et al. 2014 |
| | Perennial forb cover | ≥5% Not Continuous | Doherty et al. 2010<br>Doherty et al. 2011<br>Hagen et al. 2007<br>Holloran et al. 2005 |
| | Invasive annual grass cover | <2% cover | BLM synthesis of research [2] |
| | Conifer | 0 (Absence of conifer) | BLM synthesis of research [3] |

| Attribute | Indicators | Benchmarks | Reference |
|---|---|---|---|
| **BROOD-REARING/SUMMER** (Seasonal Use Period June 16-October 31) | | | |
| Cover | Sagebrush cover | ≥5 % | Herman-Brunson 2007<br>Swanson 2009<br>Doherty et al. 2010<br>Doherty et al. 2011<br>Hagen et al. 2007 |
| | Sagebrush height | 7-30 inches | Herman-Brunson 2007<br>Doherty et al. 2011<br>Holloran et al. 2005<br>Schroeder et al. 1999 |
| | Perennial grass and forbs | ≥20% Forbs 6-16% | Doherty et al. 2010<br>Doherty et al. 2011<br>Holloran et al. 2005<br>Herman-Brunson 2007 |
| | Riparian areas/ mesic meadows | Proper Functioning Condition | BLM 1997c<br>Prichard et al. 1999<br>Dickard et al. 2015 |
| | Upland and riparian perennial forb availability | Preferred forbs are common with several preferred species present. | Stiver et al. 2015<br>Doherty et al. 2011 |
| | Invasive annual grass cover | <2% cover | BLM synthesis of research[2] |
| | Conifer | 0 (Absence of conifer) | BLM synthesis of research[3] |
| **WINTER** (Seasonal Use Period November 1-February 28) | | | |
| Cover and Food | Sagebrush cover above snow | ≥10% | Schroeder et al. 1999<br>Swanson 2009 |
| | Sagebrush height above snow | ≥ 6 inches | Schroeder et al. 1999<br>Doherty et al. 2011<br>Swanson 2009 |
| | Conifer | 0 (Absence of conifer) | BLM synthesis of research [3] |

Notes:
[1] Specific height requirements needed to meet the objective will be set at the time of watershed assessments.
[2] BLM synthesis of research on the impacts invasive annual grasses have on sage-grouse habitat suitability (**Attachment 8-1**)
[3] BLM synthesis of research on the impact conifer have on sage-grouse habitat suitability (**Attachment 8-2**)

## Table 8-1.C.2. South Dakota Habitat Indicators and Benchmarks

| Attribute | Indicators | Benchmarks | Reference |
|---|---|---|---|
| **BREEDING HABITAT (LEK AND NESTING/EARLY BROOD REARING)** | | | |
| Lek Security | Proximity of trees | Trees absent or rare. When present trees consist of rocky mountain juniper and ponderosa pine >328 feet (100 meters) from lek. | Baruch-Mordo et al. 2013<br>Stiver et al. 2015 |
| | Proximity of sagebrush to leks | Adjacent protective sagebrush cover within 328 feet (100 m) of an occupied lek | Stiver et al. 2015 |
| **NESTING/EARLY BROOD REARING** | | | |
| Cover | Sagebrush canopy cover [2] | 2-20% | Connelly et al. 2000<br>Connelly et al. 2003<br>Hagen et al. 2011 |
| | Sagebrush height | 4-12 inches (10.16-30.48 cm) | Connelly et al. 2000 |
| | Predominant sagebrush shape | Predominantly spreading shape [5] | Stiver et al. 2015 |
| | Perennial grass cover (such as native rhizomatous and bunchgrasses) [2] | >10% | Stiver et al. 2015<br>Connelly et al. 2000 |

| Attribute | Indicators | Benchmarks | Reference |
|---|---|---|---|
| Cover *(cont.)* | Perennial grass height (includes residual grasses) | Adequate nest cover based on ecological site potential and seasonal precipitation. [7] | Connelly et al. 2000<br>Stiver et al. 2015<br>Connelly et al. 2003<br>Hagen et al. 2011 |
| | Perennial forb cover [2] | >3%, Based on ecological site potential and seasonal precipitation | Connelly et al. 2000 |
| | Perennial forb availability | Preferred forbs are common with several species present [6] | Stiver et al. 2015 |
| | Invasive annual grass cover | <2% cover | BLM synthesis of research [8] |
| | Conifer | 0 (Absence of conifer) | BLM synthesis of research [9] |
| **LATE BROOD-REARING/SUMMER** [1] (July-October) (Apply to all habitat outside of nesting/breeding and winter) | | | |
| Cover | Sagebrush canopy cover [2] | 2-20% | Connelly et al. 2000 |
| | Sagebrush height | 4 - 12 inches (10.16-30.48 cm) | Connelly et al. 2000 |
| | Perennial grass canopy cover [2] | >10% | Connelly et al. 2000 |
| | Upland and riparian perennial forb availability [2] | Preferred forbs are common with several preferred species present,6, | Stiver et al. 2015 |
| | Riparian meadow habitat condition | Proper Functioning Condition (PFC)13 | |
| | Invasive annual grass cover | <2% cover | BLM synthesis of research [8] |
| | Conifer | 0 (Absence of conifer) | BLM synthesis of research [9] |
| **WINTER November-March** [1] (Apply to areas of known or likely winter-use) | | | |
| Cover and Food | Seasonal habitat extent | Winter habitat is managed to optimize its potential within the constraints of ecological site potential | Connelly et al. 2000<br>Stiver et al. 2015 |
| | Sagebrush canopy cover | 2-20% | Connelly et al. 2000<br>Stiver et al. 2015 |
| | Sagebrush height above snow | Winter habitat is managed to optimize its potential within the constraints of ecological site potential | Connelly et al. 2000 |
| | Conifer | 0 (Absence of conifer) | BLM synthesis of research [9] |

Notes:
[1] Seasonal dates can be adjusted by local unit according to geographic region.
[2] Absolute cover is the actual recorded cover and can exceed 100% when recorded across all species and all layers. It is not relative cover, which is the proportions of each species, and equals 100%. Note that cover is reported for only those species (e.g., sagebrush, preferred forbs) that are sampled to determine suitability of habitat for sage-grouse. Overall cover at the site will be greater than that sampled for sage-grouse habitat, due to other species present. Percent cover refers to foliar cover, measured using the HAF protocol line-point intercept method.
[3] Arid corresponds to the 10 – 12 inch precipitation zone; Artemisia tridentata wyomingensis is a common big sagebrush subspecies for this type site (Stiver et al. 2015 In press).
[4] Mesic corresponds to the >12 inch precipitation zone.
[5] Collectively the indicators for sagebrush (cover, height, and shape), perennial grass and perennial forb (cover, height and/or availability) represent the desired condition range for nesting/early brood rearing habitat characteristics, consistent with the breeding habitat suitability matrix identified in Stiver et al. 2015 In press. Sagebrush plants that are more tree or columnar shaped provide less protective cover near the ground than sagebrush plants with a spreading shape (Stiver et al. 2015 In press). Some sagebrush plants are naturally columnar (e.g., Great Basin big sagebrush), and a natural part of the plant community. However, a predominance of columnar shape arising from animal impacts may warrant management investigation or adjustments at site specific scales.
[6] Preferred forbs are listed in Stiver et al. 2015 In press. Overall total forb cover may be greater than that of preferred for cover since not all forb species are listed as preferred.
[7] Specific height requirements needed to meet the objective will be set when project level planning is completed.
[8] BLM synthesis of research on the impacts invasive annual grasses have on sage-grouse habitat suitability (**Attachment 8-1**)
[9] BLM synthesis of research on the impact conifer have on sage-grouse habitat suitability (**Attachment 8-2**)

## Table 8-1.C.3. Dillon and Butte Habitat Indicators and Benchmarks

| Attribute | Indicator | Benchmarks | Reference |
|---|---|---|---|
| **LEK HABITAT** (Seasonal Use Period March 1 – May 15) [1] | | | |
| Lek Security | Proximity of trees | Trees (i.e., in Idaho mainly juniper, conifers, and does not include old-growth juniper, pinyon pine and mountain mahogany; in Montana mainly Douglas-fir) absent or uncommon on shrub/grassland ecological sites within 1.86 miles (3 km) of occupied leks. | Baruch-Mordo et al.2013<br>Stiver et al. 2015 |
| | Proximity of sagebrush to leks | Adjacent protective sagebrush cover within 328 ft. (100 m) of an occupied lek | Stiver et al. 2015 |
| **NESTING/EARLY BROOD REARING** (Seasonal Use Period May 1 – June 30) [1] | | | |
| Cover and Food | Sagebrush cover [2] | 15-25% | Connelly et al. 2000<br>Connelly et al. 2003<br>Hagen et al. 2007 |
| | Sagebrush height<br>Arid sites [3]<br>Mesic sites [4] | <br>12-31 inches (30-80cm)<br>16-31 inches (40-80cm) | Connelly et al. 2000 |
| | Predominant sagebrush shape | Predominantly spreading shape [5] | Stiver et al. 2015 |
| | Perennial grass cover (such as native bunchgrasses) [2]<br>Arid sites [3]<br>Mesic sites [4] | <br><br>>10%<br>>15% | Connelly et al. 2000<br>Stiver et al. 2015 |
| | Perennial grass (and forb) height (includes residual grasses) | ≥ 7 inches | Connelly et al. 2000<br>Connelly et al. 2003<br>Hagen et al. 2007<br>Stiver et al. 2015 |
| | Perennial forb cover [2]<br>Arid sites [3]<br>Mesic sites [4] | <br>>5%<br>>10% | Connelly et al. 2000 |
| | Perennial forb availability | Preferred forbs are common with several species present [6] | Stiver et al. 2015 |
| | Invasive annual grass cover | <2% cover | BLM synthesis of research [9] |
| | Conifer | 0 (Absence of conifer) | BLM synthesis of research [10] |
| **LATE BROOD-REARING/SUMMER** (July-October) [1] Late brood-rearing areas, such as riparia | | | |
| Cover and Food | Sagebrush cover [2] | Uplands 10-25%<br>Riparian/Meadow: Sagebrush cover within 100 m | Connelly et al. 2000 |
| | Sagebrush height | 16 to 32 inches (40-80cm) | Connelly et al. 2000 |
| | Perennial grass and forb cover [2] | >15% | |
| | Upland and riparian perennial forb availability [2] | Preferred forbs are common with appropriate numbers of species present [6] | Stiver et al. 2015 |
| | Riparian and/or meadow habitat condition | Proper Functioning Condition | Stiver et al. 2015 |
| | Invasive annual grass cover | <2% cover | BLM synthesis of research [9] |
| | Conifer | 0 (Absence of conifer) | BLM synthesis of research [10] |

| Attribute | Indicator | Benchmarks | Reference |
|---|---|---|---|
| **WINTER November-March** [1] (Apply to areas of known or likely winter-use) | | | |
| Cover and Food | Sagebrush cover and height above snow, | Sagebrush is at least 10 inches (25 cm) above snow and ≥10% cover [8] | Connelly et al. 2000<br>Stiver et al. 2015 |
| | Conifer | 0 (Absence of conifer) | BLM synthesis of research [10] |

Notes:
[1] Seasonal dates can be adjusted by local unit according to geographic region.
[2] Since plant species and/or life forms may overlap, total vegetative cover, inclusive of shrubs, forbs and grasses may exceed 100%.
[3] Arid corresponds to the 10 – 12 inch precipitation zone; Artemisia tridentata wyomingensis is a common big sagebrush subspecies for this type site (Stiver et al. 2015).
[4] Mesic corresponds to the >12 inch precipitation zone; Artemisia tridentata vaseyana is a common big sagebrush sub-species for this type site (Stiver et al. 2015).
[5] Collectively the indicators for sagebrush (cover, height, and shape), perennial grass and perennial forb (cover, height and/or availability) represent the desired condition range for nesting/early brood rearing habitat characteristics, consistent with the breeding habitat suitability matrix identified in Stiver et al. 2015. Sagebrush plants that are more tree or columnar-shaped provide less protective cover near the ground than sagebrush plants with a spreading shape (Stiver et al. 2015). Some sagebrush plants are naturally columnar (e.g., Great Basin big sagebrush), and a natural part of the plant community. However, a predominance of columnar shape arising from animal impacts may warrant management investigation or adjustments at site specific scales.
[6] Preferred forbs are listed in Stiver et al. 2015. Overall total forb cover may be greater than that of preferred forb cover since not all forb species are listed as preferred.
[7] Some late brood habitat occurs at higher elevations outside of mapped nesting habitat and some is embedded within nesting landscapes especially areas such as wet meadows, riparian areas, springs and seeps.
[8] Winter habitat metrics are a guideline but snow depths and habitat availability may vary widely depending on winter severity, topography and elevation.
[9] BLM synthesis of research on the impacts invasive annual grasses have on sage-grouse habitat suitability (**Attachment 8-1**)
[10] BLM synthesis of research on the impact conifer have on sage-grouse habitat suitability (**Attachment 8-2**)

## Table 8-1.C.4. Billings Habitat Indicators and Benchmarks

| Attribute | Indicator | Benchmarks | Reference |
|---|---|---|---|
| **Breeding, Nesting, and Early Brood-Rearing** (Seasonal Use Period: March 1 – June 15) | | | |
| Lek Security | Proximity of trees | .65-Km$^2$ (.388 miles) avoidance of coniferous habitats | Doherty 2008 |
| | Collision Risks | Fences and other structures that pose a high collision risk are absent or mitigated with visual markers within 1.25 miles of leks active within 5 years. | Connelly et al. 2000<br>Stiver et al. 2015 |
| | Proximity of sagebrush to leks | Adjacent protective sagebrush cover within 100 m (328 ft.) of an active lek | Stiver et al. 2015 |
| Cover | Sagebrush canopy cover | 5-25% | Herman–Brunson 2007<br>Swanson 2009<br>Doherty et al. 2010<br>Hagen et al. 2007<br>Doherty et al. 2011<br>Foster et al. 2014<br>Wright et al. 2005 |
| | Sagebrush height | 6-31 inches (15-50cm) | Schroeder et al. 1999<br>Swanson 2009<br>Holloran et al. 2005<br>Doherty et al. 2011<br>Lane 2005 |
| | Predominant sagebrush shape | Predominately spreading shape | Stiver et al. 2015 |
| | Perennial grass cover (including bunchgrasses/important native grasses) | ≥10% | Doherty et al. 2011<br>Holloran et al. 2005<br>Doherty et al. 2010<br>Hagen et al. 2007<br>Lane 2005 |

| Attribute | Indicator | Benchmarks | Reference |
|---|---|---|---|
| Cover *(cont.)* | Perennial grass and forb height (including residual grasses) | Adequate nest cover based on ecological site potential and seasonal precipitation; 4.4-11.3 inches (11.4-29 cm) | Doherty et al. 2014 |
| | Perennial forb canopy cover | ≥3% | Doherty et al. 2011<br>Holloran, et al. 2005<br>Doherty et al. 2010<br>Hagen et al. 2007 |
| | Invasive annual grass cover | <2% cover | BLM synthesis of research [1] |
| | Conifer | 0 (Absence of conifer) | BLM synthesis of research [2] |
| **Brood-Rearing/Summer** [1] (Seasonal Use Period: June 16 – October 31) | | | |
| Cover | Sagebrush canopy cover | 5-25% | Herman–Brunson 2007<br>Swanson 2009<br>Doherty et al. 2010<br>Doherty et al. 2011<br>Foster et al. 2014<br>Lane 2005 |
| | Sagebrush height | 6-31 inches (15-50cm) | Schroeder et al. 1999<br>Holloran et al. 2005<br>Doherty et al. 2011<br>Lane 2005 |
| | Perennial grass and forb canopy cover | ≥10% | Doherty et al. 2011<br>Holloran et al. 2010<br>Hagen et al. 2007 |
| | Riparian areas/mesic meadows | Proper Functioning Condition | BLM 1997c<br>Prichard et al. 1999<br>Prichard 1998 |
| | Upland and riparian perennial forb availability | Preferred forbs are common with several preferred species present. | Stiver et al. 2015<br>Doherty et al. 2011 |
| | Invasive annual grass cover | <2% cover | BLM synthesis of research [1] |
| | Conifer | 0 (Absence of conifer) | BLM synthesis of research [2] |
| **Winter** [1] (Seasonal Use Period: November 1 – February 28) | | | |
| Cover and Food | Sagebrush canopy cover | ≥10% | Schroeder et al. 1999<br>Swanson 2009<br>Foster et al. 2014 |
| | Sagebrush height | ≥25cm | Connelly et al. 2000 |
| | Conifer | 0 (Absence of conifer) | BLM synthesis of research [2] |

Notes:
[1] BLM synthesis of research on the impacts invasive annual grasses have on sage-grouse habitat suitability (**Attachment 8-1**)
[2] BLM synthesis of research on the impact conifer have on sage-grouse habitat suitability (**Attachment 8-2**)

## Table 8-1.C.5. Lewistown and UMRBNM Habitat Indicators and Benchmarks

| Attribute | Indicator | Benchmarks | Reference |
|---|---|---|---|
| **BREEDING, NESTING, AND EARLY BROOD REARING** (Seasonal Use Period: March 1 to June 30) | | | |
| Lek Security | Proximity of trees | Trees or other tall structures are not within line of sight of lek and absent or uncommon within 3 kilometers (km) (1.9 miles) of the lek. | Connelly et al. 2000 |
| | Collision Risks | Fences and other structures that pose a high collision risk are absent or mitigated with visual markers. | Connelly et al. 2000.<br>Stevens 2011 |
| | Proximity of sagebrush to leks | Adjacent protective sagebrush cover within 100 meters (m; 328 feet [ft.]) of an active lek. | Stiver et al. 2015 |

| Attribute | Indicator | Benchmarks | Reference |
|---|---|---|---|
| Cover | Sagebrush cover | 10-25% | Berkeley et al. 2013<br>Connelly et al. 2000<br>Doherty et al. 2010<br>Lane 2005<br>Hagen et al. 2007<br>Sant et al. 2014 |
| | Sagebrush height | 40-80 centimeters (cm) (15.7-31.5 inches) individual sagebrush available within stand (for nesting) with a variety of heights (including those <40 cm [<15.7 inches]). | Connelly et al. 2000<br>Lane 2005 |
| | Predominant sagebrush shape | Spreading | Stiver et al. 2015 |
| | Perennial grass cover (such as bluebunch wheatgrass, green needlegrass and western wheatgrass) | ≥15% | Connelly et al. 2000<br>Lane 2005<br>Sant et al. 2014 |
| | Perennial grass and forb height (includes residual grasses) | ≥18 cm (≥7.1 inches) | Berkeley et al. 2013<br>Connelly et al. 2000<br>Doherty et al. 2014<br>Hagen et al. 2007<br>Taylor et al. 2012 |
| | Perennial forb cover | ≥10% | Connelly et al. 2000<br>Sant et al. 2014 |
| | Invasive annual grass cover | <2% cover | BLM synthesis of research [1] |
| | Conifer | 0 (Absence of conifer) | BLM synthesis of research [2] |
| **LATE BROOD-REARING/SUMMER** (Seasonal Use Period: July 1 to October 31) | | | |
| Cover | Sagebrush cover | 5-25% | Connelly et al. 2000<br>Lane 2005<br>Hagen et al. 2007<br>Sant et al. 2014 |
| | Sagebrush height | 40-80 cm (15.7-31.5 inches) individual sagebrush available within stand (for nesting) with a variety of heights (including those <40 cm [<15.7 inches]). | Connelly et al. 2000<br>Lane 2005 |
| | Perennial grass and forb cover | ≥25% | Connelly et al. 2000<br>Hagen et al. 2007 Sant et al. 2014 |
| | Riparian areas/mesic meadows | 80% or more of PHMA in Proper Functioning Condition (PFC) or higher. | Prichard et al. 1999<br>Schroeder et al. 1999<br>USDI BLM 1997 |
| | Upland and riparian perennial forb availability | Preferred forbs are common with several preferred species present | Connelly et al. 2000<br>Stiver et al. 2015 |
| | Invasive annual grass cover | <2% cover | BLM synthesis of research [1] |
| | Conifer | 0 (Absence of conifer) | BLM synthesis of research [2] |
| **WINTER** (Seasonal Use Period: November 1 to February 28) | | | |
| Cover and Food | Sagebrush cover | ≥10% | Wallestad 1975<br>Connelly et al. 2000<br>Sant et al. 2014 |
| | Sagebrush height | ≥25cm (≥9.8 inches) | Connelly et al. 2000 |
| | Conifer | 0 (Absence of conifer) | BLM synthesis of research [2] |

Notes:
[1] BLM synthesis of research on the impacts invasive annual grasses have on sage-grouse habitat suitability (**Attachment 8-1**)
[2] BLM synthesis of research on the impact conifer have on sage-grouse habitat suitability (**Attachment 8-2**)

## Table 8-1.C.6. HiLine Habitat Indicators and Benchmarks

| Habitat Indicators | Dominant Sagebrush, Soil Type and/or Ecological Site | | | | |
|---|---|---|---|---|---|
| | **Sagebrush on Saline and/or Sodic Soils** | **Sagebrush on Acid Shale Parent Materials** | **Silver Sagebrush on Overflow Sites** | **Silver Sagebrush on All Other Soils/Sites** | **Wyoming Big Sagebrush on All Other Soils/Sites Sage-Grouse Breeding Habitat** |
| Sagebrush Canopy Cover | > 5% | > 5% | 10-25% | > 2% | 15-25% |
| Sagebrush Height | > 6 inches | > 6 inches | > 12 inches | > 12 inches | > 12 inches |
| Perennial Grass Heights (includes residual grasses) | > 5 inches | > 7 inches | > 7 inches | > 7 inches | > 7 inches |
| Perennial Grass Canopy Cover (such as green needlegrass) | > 10% | > 10% | > 15% | > 15% | > 10% |
| Perennial Forb Canopy Cover | > 3% | > 3% | > 10% | > 5% | > 5% |
| Perennial Forb Availability | > 3 species | > 3 species | > 5 species | > 5 species | > 5 species |
| Invasive annual grass cover | <2% cover [1] | | | | |
| Conifer | 0 (Absence of conifer) [2] | | | | |
| Riparian Areas & Wet Meadows | Proper Functioning Condition | | | | |
| Lek Security | Rocky Mountain juniper and/or Ponderosa pine with less than 1% canopy cover on shrub/grassland ecological sites within 3 kilometers (1.86 miles) of occupied leks Sage-Grouse | | | | |
| **Winter Habitat** | | | | | |
| Sagebrush Availability | >10% canopy and >10 inches visible above snow | | | | |
| Conifer | 0 (Absence of conifer) [2] | | | | |

Notes:
[1] BLM synthesis of research on the impacts invasive annual grasses have on sage-grouse habitat suitability (**Attachment 8-1**)
[2] BLM synthesis of research on the impact conifer have on sage-grouse habitat suitability (**Attachment 8-2**)

## Table 8-1.C.7. Miles City Habitat Indicators and Benchmarks

| Attribute | Indicator | Benchmarks | References |
|---|---|---|---|
| **BREEDING, NESTING AND EARLY BROOD-REARING** (Seasonal Use Period March 1-June 15) | | | |
| Lek Security | Proximity of trees | .65–Km$^2$ (.388 miles) avoidance of coniferous habitats | Doherty 2008 |
| | Proximity of sagebrush to leks | Adjacent protective sagebrush cover within 328 ft. (100 m) of an occupied lek | Stiver et al. 2015 |
| Cover | Sagebrush canopy cover | 5-25% | Herman–Brunson 2007<br>Swanson 2009<br>Doherty et al. 2010<br>Hagen et al. 2007<br>Doherty et al. 2011<br>Foster et al. 2014<br>Wright and Wegner 2008 |
| | Sagebrush height | 6-31 inches (15-50cm) | Swanson 2009<br>Doherty et al. 2011<br>Schroeder et al. 1999<br>Holloran et al. 2005 |
| | Predominant sagebrush shape | Predominately spreading shape | Stiver et al. 2015 |

| Attribute | Indicator | Benchmarks | References |
|---|---|---|---|
| Cover *(cont.)* | Perennial grass cover (such as western wheatgrass) | ≥10% | Doherty et al. 2010<br>Hagen et al. 2007<br>Doherty et al. 2011<br>Holloran et al. 2005 |
| | Perennial grass and forb height (includes residual grasses) | Adequate nest cover based on ecological site potential and seasonal precipitation; 4.4-11.3 inches (11.4-29 cm) | Doherty et al. 2014 |
| | Perennial forb canopy cover | ≥3% | Doherty et al. 2010<br>Hagen et al. 2007<br>Doherty et al. 2011<br>Holloran et al. 2005 |
| | Invasive annual grass cover | <2% cover | BLM synthesis of research [1] |
| | Conifer | 0 (Absence of conifer) | BLM synthesis of research [2] |
| **BROOD-REARING/SUMMER** (Seasonal Use Period June 16-October 31) | | | |
| Cover | Sagebrush canopy cover | 5-25% | Herman–Brunson 2007<br>Swanson 2009<br>Doherty et al. 2010<br>Hagen et al. 2007<br>Doherty et al. 2011<br>Foster et al. 2014 |
| | Sagebrush height | 6-31 inches (15-50cm) | Doherty et al. 2011<br>Foster et al. 2014<br>Schroeder et al. 1999<br>Holloran et al. 2005 |
| | Perennial grass canopy cover and forbs | ≥10% | Doherty et al. 2010<br>Hagen et al. 2007<br>Doherty et al. 2011<br>Holloran et al. 2005 |
| | Riparian areas/mesic meadows | Proper Functioning Condition | BLM 1997<br>Prichard et al. 1999<br>Prichard 1998 |
| | Upland and riparian perennial forb availability | Preferred forbs are common with several preferred species present. | Stiver et al. 2015<br>Doherty et al. 2011 |
| | Invasive annual grass cover | <2% cover | BLM synthesis of research [1] |
| | Conifer | 0 (Absence of conifer) | BLM synthesis of research [2] |
| **WINTER** (Seasonal Use Period November 1-February 28) | | | |
| Cover and Food | Sagebrush canopy cover above snow | >10% | Swanson 2009<br>Foster et al. 2014<br>Schroeder et al. 1999 |
| | Sagebrush height above snow | 6-31 inches (15-50cm) | Doherty et al. 2011<br>Schroeder et al. 1999 |
| | Conifer | 0 (Absence of conifer) | BLM synthesis of research [2] |

Notes:
[1] BLM synthesis of research on the impacts invasive annual grasses have on sage-grouse habitat suitability (**Attachment 8-1**)
[2] BLM synthesis of research on the impact conifer have on sage-grouse habitat suitability (**Attachment 8-2**)

### 8.2.4 Nevada/California GRSG Habitat Indicators Table(s)

**Table 8-1.D. Nevada/California GRSG Habitat Indicators Table**

| Attribute | Indicators | Benchmarks | Reference |
|---|---|---|---|
| **GENERAL/LANDSCAPE-LEVEL** [1] | | | |
| All life stages | Rangeland health assessments | Meeting all standards[2] | |
| Cover (nesting) | Seasonal habitat needed | >65% of the landscape in sagebrush cover | Aldridge and Boyce 2007 |
| | Annual grasses | <%5 | Blomberg et al. 2012 |
| Security (nesting) | Conifer encroachment | <3% phase I (>0 to <25% cover)<br>No phase II (25 to 50% cover)<br>No phase III (>50% cover) | Casazza et al. 2011<br>Coates et al. 2016 |
| Cover and food (winter) | Conifer encroachment | <5% phase I (>0 to <25% cover)<br>No phase II (25 to 50% cover)<br>No phase III (>50%) | Coates et al. 2016 |
| | Sagebrush extent | >85% sagebrush land cover | Doherty et al. 2008 |
| **LEK** (Seasonal Use Period: March 1 to May 15) [1] | | | |
| Cover | Availability of sagebrush cover | Adjacent sagebrush provides escape cover | Blomberg et al. 2012<br>Connelly et al. 2000<br>Stiver et al. 2015 |
| Security [3] | Pinyon or juniper cover | <2% landscape cover within .6 mile of leks | Connelly et al. 2000 (modified)<br>Stiver et al. 2015<br>Baruch-Mordo et al. 2013<br>Coates et al. 2017a |
| | Proximity of Linear Features | >3.1 miles | Manier et al. 2014 |
| | Proximity of Surface Disturbance | >3.1 miles | Manier et al. 2014 |
| | Proximity of Tall Structures | >2 miles | Coates et al. 2013<br>Manier et al. 2014 |
| | Proximity of Low Structures | >1.2 miles | Manier et al. 2014 |
| **NESTING** (Seasonal Use Period: April 1 to June 30) [1] | | | |
| Cover [6] | Sagebrush cover | Arid [8]: ≥20%<br>Mesic [8]: ≥20% | Kolada et al. 2009a, 2009b<br>Coates et al. 2017 |
| | Residual and live perennial grass cover (such as native bunchgrasses) | Arid [8]: ≥7% if shrub cover is >20% [5]<br>Mesic [8]: ≥13% if shrub cover is >20% [5] | Coates et al. 2013; 2017<br>Coates and Delehanty 2010<br>Kolada et al. 2009a, 2009b |
| | Annual grass cover | Arid [8]: <3%<br>Mesic [8]: <3% | Coates et al. 2017 |
| | Total shrub cover | Arid [8]: >28%<br>Mesic [8]: >26% | Coates and Delehanty 2010<br>Kolada et al. 2009a<br>Coates et al. 2017 |
| | Perennial grass height (includes residual grasses) | Arid [8]: 12cm<br>Mesic [8]: 18cm | Connelly et al. 2000, 2003<br>Hagen et al. 2007<br>Stiver et. al. 2015<br>Coates et al. 2017 |
| Security [2] | Proximity of tall structures [4] (3 feet [1 meter] above shrub height) | Use Manier et al. 2014, Conservation Buffer Distance Estimates for GRSG-A Review; preference is 3 miles | Coates et al. 2013<br>Gibson et al. 2013<br>Manier et al. 2014 |
| | Pinyon or juniper cover | <3% within 800 meters | Severson et al. 2017 |
| | Invasive annual grass cover | <2% cover | BLM synthesis of research [9] |
| | Conifer | 0 (Absence of conifer at site) | BLM synthesis of research [10] |

| Attribute | Indicators | Benchmarks | Reference |
|---|---|---|---|
| **BROOD-REARING/SUMMER** (Seasonal Use Period: May 15 to September 15; Early: May 15 to June 15; Late: June 15 to September 15) [1] | | | |
| ***UPLAND HABITATS*** | | | |
| Cover [6] | Sagebrush cover | Arid [8]: ≥20%<br>Mesic [8]: ≥15% | Connelly et al. 2000<br>Coates et al. 2017 |
| | Perennial grass and forb cover | Arid [8]: >19%<br>Mesic [8]: >25% | Connelly et al. 2000<br>Hagen et al. 2007<br>Coates et al. 2017 |
| | Deep rooted perennial bunchgrass (within 522 feet [200 meters] of riparian areas and wet meadows) | Arid [8]: 12cm [7]<br>Mesic [8]: 14cm [7] | Hagen et al. 2007<br>Casazza et al. 2011<br>Coates et al. 2017 |
| Cover and food [6] | Perennial forb cover | Arid [8]: >5%<br>Mesic [8]: >9% | Casazza et al. 2011<br>Lockyer et al. 2015<br>Coates et al. 2017 |
| | Invasive annual grass cover | <2% cover | BLM synthesis of research [9] |
| | Conifer | 0 (Absence of conifer) | BLM synthesis of research [10] |
| ***RIPARIAN/MEADOW HABITATS*** [1] | | | |
| Cover and food [6] | Riparian areas/meadows | PFC | Dickard et al. 2014<br>Prichard et al. 1998, 1999<br>Stiver et al. 2015 |
| Security [6] | Upland and riparian perennial forb availability and understory species richness | Preferred forbs are common with several species present and high species richness (all plants) | Stiver et al. 2015 |
| | Riparian area/meadow interspersion with adjacent sagebrush | Has adjacent sagebrush cover within 200 meters | Casazza et al. 2011<br>Stiver et al. 2015 |
| | Invasive annual grass cover | <2% cover | BLM synthesis of research [9] |
| | Conifer | 0 (Absence of conifer) | BLM synthesis of research [10] |
| **WINTER** (Seasonal Use Period: November 1 to February 28)[1] | | | |
| Cover and Food | Sagebrush cover | ≥10% | Connelly et al. 2000<br>Stiver et al. 2015 |
| | Sagebrush height | > 25cm above snow depth | Connelly et al. 2000<br>Stiver et al. 2015 |
| | Conifer | 0 (Absence of conifer) | BLM synthesis of research [10] |

Notes:
[1] Any one single habitat indicator does not define whether the habitat objective is or is not met. Instead, the preponderance of evidence from all indicators within that seasonal habitat period must be considered when assessing GRSG habitat objectives.
[2] Upland standards are based on indicators for cover, including litter, live vegetation, and rock, appropriate to the ecological potential of the site in context of the site's current ecological state and using the associated state and transition model/disturbance response group.
[3] Applicable to Phase I and Phase II pinyon and/or juniper.
[4] Does not include fences.
[5] In addition, if upland rangeland health standards are being met.
[6] Ecological site potential to meet habitat objectives should be considered when determining if objectives are feasible for the site. See discussion below Table 2-2.
[7] In drought years, 4-inch perennial bunchgrass height with greater than 20 percent measurements exceeding 5 inches in dry years.
[8] Arid is defined as areas that received >35.0 cm of average annual precipitation.
Mesic is defined as areas that received ≤35.0 cm of average annual precipitation.
[9] BLM synthesis of research on the impacts invasive annual grasses have on sage-grouse habitat suitability (**Attachment 8-1**)
[10] BLM synthesis of research on the impact conifer have on sage-grouse habitat suitability (**Attachment 8-2**)

### 8.2.5 Oregon GRSG Habitat Indicators Table

**Table 8-1.E. Oregon GRSG Habitat Indicators Table**

| Attribute | Indicators | Benchmarks | Reference |
|---|---|---|---|
| **Breeding Including Lekking, Pre-nesting, Nesting, and Early Brood Rearing** (Seasonal Use Period March 1 – June 30) | | | |
| Lek Security | Proximity of trees or other tall structures | No conifers or tall structures[1] within 1.0 mile of lek center and conifer cover ≤4% within 4.0 miles of lek, excluding pre-settlement trees | Connelly et al. 2000<br>Fresse 2009<br>Baruch-Mordo et al. 2013<br>Knick et al. 2013 |
| | Proximity of sagebrush to leks | Lek has adjacent sagebrush cover | Connelly et al. 2000 |
| Cover | Sagebrush cover (%) | 10 to 25 | Doescher et al. 1986<br>Gregg et al. 1994<br>Hanf et al. 1994<br>Coggins 1998<br>Crawford and Carver 2000<br>Bates and Davies 2014<br>BLM 2015a |
| | Sagebrush height (inches)<br>Arid sites (warm-dry)<br>Mesic sites (cool-moist) | <br>11 to 31<br>15 to 31 | Gregg et al. 1994<br>Hanf et al. 1994<br>Coggins 1998<br>Crawford and Carver 2000<br>Freese 2009 |
| | Predominant sagebrush shape | Spreading | Connelly et al. 2000 |
| | Perennial grass cover (such as bunchgrass) (%)<br>Arid sites<br>Warm-dry<br>Shallow-dry<br>Mesic sites<br>Cool-moist<br>Warm-moist | <br><br>≥10<br>≥10<br><br>≥20<br>≥20 | Gregg at al. 1994<br>Coggins 1998<br>Crawford and Carver 2000<br>Freese 2009<br>NRCS 2015<br>Bates and Davies 2014<br>Jon Bates, USDA ARS, pers. comm. 2/10/2015<br>BLM 2015a<br>BLM 2015b |
| | Perennial grass and forb height (inches, including residual grasses) – most important in nest areas; excludes shallow-dry sites[2]<br>Arid sites (warm-dry)<br>Mesic sites (cool-moist) | <br>≥7<br>≥9 | Gregg et al. 1994<br>Hanf et al. 1994<br>Crawford and Carver 2000<br>Hagen et al. 2007<br>Jon Bates, USDA ARS, pers. comm. 2/10/2015 |
| | Perennial forb cover (%)[3]<br>Arid sagebrush<br>Warm-dry<br>Shallow-dry<br>Mesic sagebrush<br>Cool-moist<br>Warm-moist | <br><br>≥2<br>≥2<br><br>≥6<br>≥5 | Drut 1992<br>Drut et al. 1994<br>Crawford and Carver 2000<br>Freese 2009<br>NRCS 2015<br>Bates and Davies 2014<br>BLM 2015a<br>Jon Bates, USDA ARS, pers. comm. 2/10/2015<br>BLM 2015b |
| | Invasive annual grass cover | <2% cover | BLM synthesis of research[7] |
| | Conifer | 0 (Absence of conifer) | BLM synthesis of research[8] |

| Attribute | Indicators | Benchmarks | Reference |
|---|---|---|---|
| Food | forb diversity and availability [3] | Palatable forbs are common (≥6 individual plants) with ≥5 species present[4] and ≥2% forb cover | Hanf et al. 1994<br>Crawford and Carver 2000<br>Freese 2009<br>Bates and Davies 2014<br>BLM 2015a<br>Jon Bates, USDA ARS, pers. comm. 2/10/2015 |
| **Brood-rearing/Summer Including Late-brood Rearing, Summering, and Early Autumn** (Seasonal Use Period July 1- October 31) | | | |
| Cover | Sagebrush cover (%) | 10 to 25 | Doescher et al. 1986<br>Drut et al. 1994<br>Connelly et al. 2000<br>Crawford and Carver 2000<br>Bates and Davies 2014<br>Jon Bates, USDA ARS, pers. comm. 2/10/2015 |
| | Sagebrush height (inches) | 15 to 31 | Gregg et al. 1994<br>Hanf et al. 1994<br>Crawford and Carver 2000<br>Freese 2009 |
| | Perennial herbaceous (grass and forbs) cover (%)<br>Arid sagebrush<br>Warm-dry<br>Shallow-dry<br>Mesic sagebrush<br>Cool-moist<br>Warm-moist<br>Riparian [5] | <br><br>≥15<br>≥10<br><br>≥20<br>≥30<br>≥50 | Drut et al. 1994<br>Bates and Davies 2014<br>NRCS 2015<br>BLM 2015b<br>Jon Bates, USDA ARS, pers. comm. 2/10/2015 |
| | Riparian areas/mesic meadows | Majority of areas are in PFC | Stiver et al. 2010, or as updated |
| | Invasive annual grass cover | <2% cover | BLM synthesis of research[7] |
| | Conifer | 0 (Absence of conifer) | BLM synthesis of research[8] |
| Food | Upland and riparian perennial forb availability [3] | Palatable forbs are common (≥6 individuals present) with ≥5 species present [4] and ≥2% forb cover in upland habitat and ≥4% forb cover in riparian habitat [5] | Hanf et al. 1994<br>Freese 2009<br>Bates and Davies 2014<br>BLM 2015b<br>Jon Bates, USDA ARS, pers. comm. 2/10/2015 |
| **Winter Including Late Autumn and Winter** (Seasonal Use Period November 1 – February 28) | | | |
| Cover and Food | Sagebrush cover (%) | ≥10 | Willis 1990 (in Hagen 2011)<br>Bruce 2011 |
| | Sagebrush height above snow (inches) [6] | ≥10 | Willis 1990 (in Hagen 2011)<br>Bruce 2011 |
| | Conifer | 0 (Absence of conifer) | BLM synthesis of research [8] |

Notes:

[1] Tall structures are any man-made structure that has the potential to disrupt lekking or nesting birds by creating perching and nesting opportunities for predators (e.g., raptors and ravens) or that decrease use of an area by sage-grouse, including communication towers, meteorological towers, electrical transmission or distribution towers, power poles, wind turbines, and associated structures.

[2] Perennial grass and forb minimum height may not be achievable in years with below normal precipitation. Other indicators of desired condition may still render the site suitable, however.

[3] In drought years, forb cover and availability may not be at the desired condition. In certain plant associations, such as Wyoming big sagebrush/Needle and Thread, these indicators may rarely be achieved even in years with normal precipitation.

[4] Native plant species important for sage-grouse in Oregon are listed in Appendix I. This partial list may be revised and expanded with additional plant species as new information becomes available.

[5] Riparian includes swales, wet meadows, and intermittent/ephemeral streams.

[6] Low sagebrush vegetation types (average sagebrush height <12 inches) found along slopes that are cleared of snow by prevailing winds are potentially important winter foraging areas.

[7] BLM synthesis of research on the impacts invasive annual grasses have on sage-grouse habitat suitability (Attachment 8-1)

[8] BLM synthesis of research on the impact conifer have on sage-grouse habitat suitability (Attachment 8-2)

### 8.2.6 Utah GRSG Habitat Indicators Table

**Table 8-1.F. Utah GRSG Habitat Indicators Table**

| Attribute | Indicators | Benchmarks | Reference |
|---|---|---|---|
| **Breeding and Nesting** (February 15-June 15) | | | |
| Lek Security | Proximity to conifers | Conifers are absent or uncommon on shrub/grassland ecological sites within 1.8 miles (approx. 3 kilometers) of occupied leks. | Stiver et al. 2015<br>Baruch-Mordo et al. 2013<br>Connelly et al. 2000 |
| | Proximity of sagebrush to leks | Has adjacent sagebrush cover. | Stiver et al. 2015 |
| Cover | Sagebrush cover | Low: ≥ 7%<br>Mid: ≥ 18%<br>High: ≥ 14% | Dahlgren et al. 2019 |
| | Total shrub cover | Low: ≥ 17%<br>Mid: ≥ 22%<br>High: ≥ 19% | Stiver et al. 2015<br>Connelly et al. 2000<br>Dahlgren et al. 2019 |
| | Sagebrush Composition | Low: ≥ 36%<br>Mid: ≥ 71%<br>High: ≥ 83% | Dahlgren et al. 2019 |
| | Shrub height | Low: ≥ 12 inches (30 cm)<br>Mid: ≥ 5.9 inches (15 cm)<br>High: ≥ 9 inches (23 cm) | Stiver et al. 2015<br>Connelly et al. 2000<br>Dahlgren et al. 2019 |
| | Perennial grass cover (such as native bunchgrasses, rhizomatous grasses called for on applicable ecological site descriptions, or other perennial grasses that provide similar functionality) | Low: ≥ 5%<br>Mid: ≥ 4%<br>High: ≥ 8% | Stiver et al. 2015<br>Connelly et al. 2000<br>Dahlgren et al. 2019 |
| | Perennial grass and forb height (includes residual grasses) | Provide overhead and lateral concealment from predators.[2] | Stiver et al. 2015<br>Connelly et al. 2000<br>Dahlgren et al. 2019 |
| | Perennial forb canopy cover | Low: ≥ 2%<br>Mid: ≥ 1%<br>High: ≥ 4% | Stiver et al. 2015<br>Connelly et al. 2000<br>Dahlgren et al. 2019 |
| | Invasive annual grass cover | <2% cover | BLM synthesis of research [4] |
| | Conifer | 0 (Absence of conifer) | BLM synthesis of research [5] |
| **Brood-Rearing/Summer** (April 15-August 15) [1] | | | |
| Cover | Sagebrush cover | Low: ≥ 4%<br>Mid: ≥ 16%<br>High: ≥ 15% | Stiver et al. 2015<br>Connelly et al. 2000<br>Dahlgren et al. 2019 |
| | Total shrub cover | Low: ≥ 10%<br>Mid: ≥ 19%<br>High: ≥ 17% | Stiver et al. 2015<br>Connelly et al. 2000<br>Dahlgren et al. 2019 |
| | Sagebrush Composition | Low: ≥ 28%<br>Mid: ≥ 77%<br>High: ≥ 77% | Dahlgren et al. 2019 |
| | Shrub height | Low: ≥ 10.25 inches (26 cm)<br>Mid: ≥ 4.3 inches (11 cm)<br>High: ≥ 8 inches (20 cm) | Stiver et al. 2015<br>Connelly et al. 2000<br>Dahlgren et al. 2019 |
| | Perennial grass cover | Low: ≥ 5%<br>Mid: ≥ 6%<br>High: ≥ 8% | Dahlgren et al. 2019 |
| | Perennial forb cover | Low: ≥ 2%<br>Mid: ≥ 2%<br>High: ≥ 6% | Dahlgren et al. 2019 |
| | Riparian areas/mesic meadows | Proper Functioning Condition | |
| | Upland and riparian perennial forb availability | Preferred forbs are common with several preferred species present [3] | Stiver et al. 2015 |

| Attribute | Indicators | Benchmarks | Reference |
|---|---|---|---|
| Cover *(cont.)* | Invasive annual grass cover | <2% cover | BLM synthesis of research [4] |
| | Conifer | 0 (Absence of conifer) | BLM synthesis of research [5] |
| **Winter** (November 15-March 15) [1] | | | |
| Cover and Food | Sagebrush cover above snow | ≥10% | Stiver et al. 2015<br>Connelly et al. 2000 |
| | Shrub height | Low: ≥ 12 inches (30 cm)<br>Mid: ≥ 5.9 inches (15 cm)<br>High: ≥ 9 inches (23 cm) | Connelly et al. 2000 |
| | Conifer | 0 (Absence of conifer) | BLM synthesis of research [5] |

Notes:
[1] Specific dates will be based on site-specific conditions and may be modified due to documented local variations (e.g., higher/lower elevations) or annual climactic fluctuations (e.g., early/late spring, and long and/or heavy winter), in coordination with the appropriate State of Utah agency.
[2] Specific height requirements needed to meet the objective will be set at the time of watershed assessments.
[3] Preferred forbs are listed in Stiver et al. 2015. Overall total forb cover may be greater than that of preferred forb cover, since not all forb species are listed as preferred.
[4] BLM synthesis of research on the impacts invasive annual grasses have on sage-grouse habitat suitability (Attachment 8-1)
[5] BLM synthesis of research on the impact conifer have on sage-grouse habitat suitability (Attachment 8-2)

## 8.2.7 Wyoming GRSG Habitat Indicators Table

### Table 8-1.G. Wyoming GRSG Habitat Indicators Table

| Attribute | Indicators [1] | Benchmarks [2] | Reference |
|---|---|---|---|
| **Breeding** (Seasonal Use Period March 1 – June 15; Doherty 2008, Holloran and Anderson 2005) [3] | | | |
| Lek Security | Proximity of trees | Conifer cover in shrub/grassland ecological sites <4% in each 125-acre (50.6-ha) segment within 3.1 miles (5 km) of occupied leks [4] | Baruch-Mordo et al. 2013<br>Stiver et al. 2015<br>Beers and Frey 2022<br>Severson et al. 2017 |
| | Proximity of sagebrush to leks | Protective sagebrush cover within 330 ft. (approx. 100 m) of occupied leks | Stiver et al. 2015 |
| Cover | Sagebrush cover [5] | 5 to 25% | Connelly et al. 2000<br>Hagen et al 2007<br>Hanser et al. 2018 |
| | Sagebrush height | 12 to 31 in (30 to 80 cm) Arid sites [6]<br>16 to 31 in (40 to 80 cm) Mesic sites [7] | Connelly et al. 2000 |
| | Sagebrush shape | Predominantly spreading shape [8] | Stiver et al. 2015 |
| | Perennial grass cover [5,9] | >10% Arid sites [6]<br>>15% Mesic sites [7] | Connelly et al. 2000<br>Stiver et al. 2015<br>Cagney et al. 2010 |
| | Perennial grass and forb height (including residual grasses) | Reference state as determined by ecological site potential in consideration of annual variability; robust cool-season bunchgrass understory necessary for adequate herbaceous height [9] | Connelly et al. 2000<br>Coates et al. 2017<br>Doherty et al. 2014<br>Hagen et al. 2007<br>Stiver et al. 2015<br>Cagney et al. 2010 |
| | Forb cover [5] | >5% Arid sites [6]<br>>10% Mesic sites [7]<br>Preferred species [10] present in upland nesting/early brood-rearing areas | Connelly et al. 2000<br>Stiver et al. 2015<br>Hagen et al. 2007 |
| | Invasive annual grass cover | <2% cover | BLM synthesis of research [13] |
| | Conifer | 0 (Absence of conifer) | BLM synthesis of research [14] |

| Attribute | Indicators [1] | Benchmarks [2] | Reference |
|---|---|---|---|
| **Late Brood-Rearing/Summer** (Seasonal Use Period June 16 – October 31) [3] | | | |
| Cover and Food | Sagebrush cover [5] | 5 to 25% in adjacent sagebrush stands within 200 ft. (approx. 60 m) of late brood-rearing/summer feeding sites [11] | Connelly et al. 2000<br>Slater 2003 |
| | Sagebrush height | 16 to 31 in (40 to 80 cm) in adjacent sagebrush stands within 200 ft. (approx. 60 m) of late brood-rearing/summer feeding sites [11] | Connelly et al. 2000<br>Slater 2003 |
| | Perennial grass and forb cover [5] | >25% in late brood-rearing/summer feeding sites [11] | Connelly et al. 2000<br>Coates et al. 2017 |
| | Riparian areas; Mesic meadows | Proper functioning condition | Stiver et al. 2015 |
| | Forb availability | Preferred species [10] present in late brood-rearing/summer feeding sites [12] | Stiver et al. 2015 |
| | Invasive annual grass cover | <2% cover | BLM synthesis of research [13] |
| | Conifer | 0 (Absence of conifer) | BLM synthesis of research [14] |
| **Winter** (Seasonal Use Period November 1 – February 28) [3] | | | |
| Cover and Food | Sagebrush cover above snow [5, 12] | >5% | Connelly et al. 2000<br>Stiver et al. 2015 |
| | Sagebrush height above snow [12] | >10 in (>25 cm) | Connelly et al. 2000 |
| | Conifer | 0 (Absence of conifer) | BLM synthesis of research [14] |

Notes:

[1] The indicators included represent the minimum habitat requirements that should be considered. When assessing the suitability of a seasonal use area (e.g., HAF site-scale polygon), practitioners are encouraged to use a multiple lines of evidence approach that references all relevant data, expertise, and locally-relevant habitat indicators (BLM Technical Note 453).

[2] Collectively the indicators for sagebrush (cover, height, and shape), perennial grasses, and forbs (cover, height and/or availability) represent the desired condition for the seasonal habitats described. Connected habitats allowing for GRSG dispersal and migration among the seasonal ranges is needed to meet habitat objectives. GRSG habitats in northeastern Wyoming are ecologically limited in terms of sagebrush production and the ability to support dense stands of sagebrush (i.e., sagebrush canopy cover rarely exceeds 15%) and require additional consideration of local conditions, ecological site potential, and GRSG seasonal habitat selection (State of Wyoming Executive Order 2019-3).

[3] Where credible data support different seasonal dates than those identified, dates may be shifted but the amount of days cannot be shortened or lengthened by the local unit.

[4] Conifer reduction treatments should consider and limit potential impacts of those activities on populations of other sensitive species (e.g., pinon jay). Treatments where the likely impacts to habitats important for other sensitive species are not clearly outweighed by the likely benefits to GRSG habitat suitability should be reconsidered.

[5] Absolute cover is the actual recorded cover and can exceed 100% when recorded across all species and all layers. It is not relative cover, which is the proportion of each species and equals 100%. Note that cover is reported for only those species (e.g., sagebrush, preferred forbs) of interest to determine suitability of habitat for sage-grouse. Overall cover at the site may be greater than that sampled for sage-grouse habitat due to the presence of other species.

[6] Arid corresponds to the 10 – 12-inch precipitation zone; Wyoming big sagebrush (*A. t. wyomingensis*) is a common big sagebrush subspecies for this type site (Stiver et al. 2015).

[7] Mesic corresponds to the ≥12-inch precipitation zone; Mountain big sagebrush (*A. t. vaseyana*) is a common big sagebrush sub-species for this type site (Stiver et al. 2015).

[8] Sagebrush plants that are more tree or columnar-shaped provide less protective cover near the ground than sagebrush plants with a spreading shape (Stiver et al. 2015). Some sagebrush plants are naturally columnar (e.g., Basin big sagebrush; *A. t. tridentata*), and a natural part of the plant community. However, a predominance of columnar shape arising from animal impacts may warrant habitat management investigation or adjustments at site-specific scales.

[9] The intent is to manage for the long-term maintenance of sagebrush habitats in or restoration of sagebrush habitats to the reference state in combination with annually maintaining sufficient standing crop (i.e., current year's herbaceous growth) to provide residual hiding cover for the following nesting season (reference Cagney et al. 2010). A robust cool-season bunchgrass understory is necessary to achieve adequate herbaceous heights for suitable GRSG breeding habitats.

[10] Forb availability and diversity in sagebrush upland habitats used by GRSG during pre-laying (Barnett and Crawford 1994), nesting, and early brood-rearing (Hagen et al. 2007) is important for nesting success and chick survival; preferred forbs as established in the Habitat Assessment Framework (Stiver et al. 2015) as updated with state-specific information.

[11] Sage-grouse feed in habitats that maintain moist soils and high forb and insect availability throughout the summer (e.g., wet meadows, riparian areas, irrigated hay meadows, springs/seeps) that are closely associated with protective sagebrush cover (Connelly et al. 2011).

[12] Sage-grouse habitat availability and selection during winter is influenced by snow conditions (e.g., depth, hardness) and topography (elevation, aspect) in addition to sagebrush height and cover and can vary widely depending on winter severity (Connelly et al. 2011). The intent is to manage habitats for a mosaic of sagebrush stands across a variety of topographic conditions as windswept ridges with low-stature sagebrush and/or draws with tall sagebrush can provide access to sagebrush above snow for sage-grouse during any given winter.

[13] BLM synthesis of research on the impacts invasive annual grasses have on sage-grouse habitat suitability (**Attachment 8-1**)

[14] BLM synthesis of research on the impact conifer have on sage-grouse habitat suitability (**Attachment 8-2**)

## 8.3 USING THE HABITAT INDICATORS TABLE(S)

The Habitat Indicators Tables are to be used as follows:

- To inform habitat suitability at one point in time, as defined by the processes described in the Habitat Assessment Framework and BLM HAF Implementation Guidelines.
- To inform measurable project objectives during implementation-level planning for BLM-permitted and BLM-initiated actions in HMAs, as applicable.
- To inform agency decision-makers regarding consideration of whether a project or proposal should be approved, denied, or modified based on how it would affect an area's existing habitat suitability status.

Additional guidance on the use of the Habitat Indicators Table and the associated products is available in the Habitat Assessment Framework (Stiver et al. 2015, BLM TR 6710-1, as revised) and BLM Sage-grouse HAF Implementation Guidelines.

When assessing seasonal habitat suitability, the BLM will summarize and report the number of monitoring locations, or amount of seasonal habitat in the analysis area, that are suitable, marginal, or unsuitable. Based on the monitoring locations rated as suitable, marginal, or unsuitable and the documentation of conditions across the entire analysis area such as ecological site potential (using appropriate ecological site descriptions, State and Transition Models, reference sheets, etc.), weather, and land ownership patterns, the BLM will determine if a given seasonal habitat is a limiting factor for sage-grouse. All rationale will be documented in a HAF summary report.

***Relationship of the Habitat Indicators Table to other assessment and planning tools***

The indicators and benchmarks in the Habitat Indicators Table are meant to inform the wildlife and/or sensitive species component of the Land Health Standards evaluation process (LHS, 43 CFR 4180.2; **Figure 8-1**). The Habitat Indicators are not land health standards and do not replace land health assessments. The indicators relating to vegetative cover are assessed using AIM methodology (Herrick et al. 2017). The HAF, GRSG Monitoring Framework (see **Appendix 7**), and land health assessments all incorporate AIM data to monitor existing conditions and track changes over time. The Land Use Plan (LUP) indicators use AIM methods to measure several of the GRSG habitat indicators.

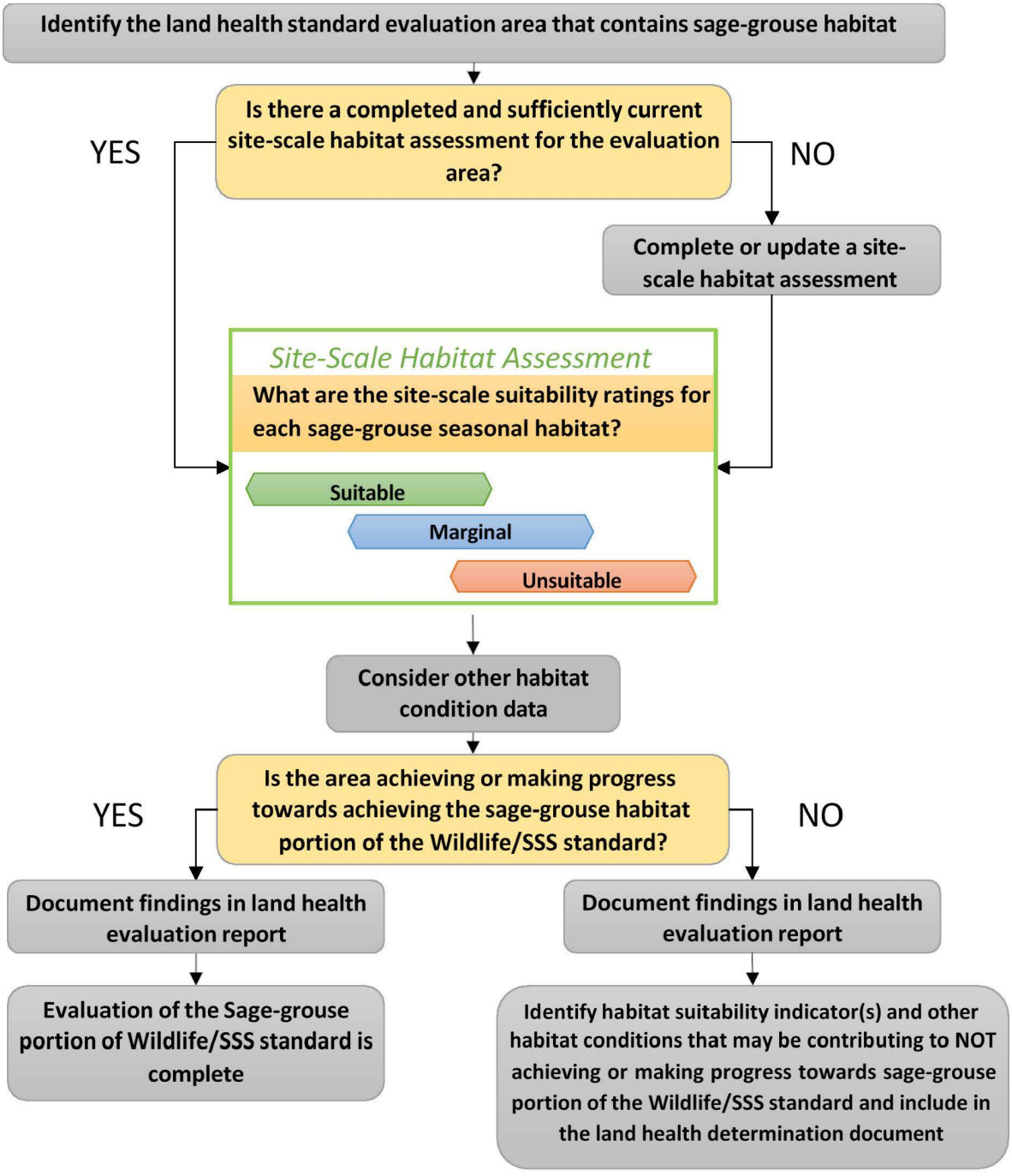
**Table 8-2. Relationships of LUP, HAF, LHS, and MF relative to the GRSG Habitat Objectives**

| Land Health Standards (LHS) Evaluation | Land Use Plan (LUP) | GRSG Habitat Assessment Framework (HAF) | GRSG Monitoring Framework (MF) |
|---|---|---|---|
| Evaluates if the sage-grouse portion of the Special Status Species Land Health Standard is achieved or significant progress towards achievement is made. These evaluations utilize HAF results along with other data. | Sets GRSG habitat objective(s) and Identifies the GRSG habitat indicators (see **Tables 8-1.A-G** above) and benchmarks from best available science for evaluating progress toward meeting the objective | Provides methods to assess GRSG habitats using the LUP indicators and benchmarks from this appendix (see **Tables 8-1.A-G** above) | Provides framework for reporting progress toward achieving the objective(s) of the LUP |

## 8.4 INAPPROPRIATE USES OF THE HABITAT INDICATORS TABLE

- Using the indicator value(s) as default desired conditions to inform LUP effectiveness without considering the current state compared to ecological potential of the site and relevant local information where measurements were taken.
- Using a single measured indicator value to determine sage-grouse habitat suitability.
- Using a single indicator as a criterion to modify grazing management or any other use.
- Adjusting use authorizations based on measured indicator values without adequate monitoring data.
- Adjusting use authorizations before determining whether the change will help move towards suitable habitat.

**Figure 8-1. Flowchart on Incorporating the Results of Site-Scale Sage-Grouse Habitat Assessment* into Wildlife/SSS Standard in the Land Health Assessments and Evaluations****




**Acronyms:**

SSS – Special Status Species
* Following the Sage-Grouse Habitat Assessment Framework (Stiver et al. 2015)

**For the complete land health standards evaluation and causal factor determination workflow, refer to: Kachergis, E., N. Lepak, M. Karl, S. Miller, and Z. Davidson. 2020. Guide to Using AIM and LMF Data in Land Health Evaluations and Authorizations of Permitted Uses. Tech Note 453. U.S. Department of the Interior, Bureau of Land Management, National Operations Center, Denver, CO.

# Attachment 8-1. Justification for Invasive Annual Grass as a Habitat Suitability Indicator at the Sage-grouse Habitat Assessment Framework (HAF) Site-Scale

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## BACKGROUND

Invasive annual grasses, such as cheatgrass, medusahead, and ventenata species, are a recognized threat to sagebrush ecosystems (Chambers et al. 2016, Remington et al. 2021, Rowland et al. 2019) causing reduced ecosystem function, displacement of native vegetation, increased fire risk and reduced rates of post-fire recovery (D'Antonio and Vitousek 1992, Bradely et al. 2018) all of which can lead to degradation and/or loss of sage-grouse habitat (Nelle et al. 2000, Wik et al. 2002, Coates et al. 2015, Coates et al. 2016, Lockyer et al. 2015, Steenvoorden et al 2019, Brussee et al. 2022, Poessel et al. 2022). The Bureau of Land Management (BLM) uses the Sage-grouse Habitat Assessment Framework (HAF; Stiver et al. 2015) to assess sage-grouse habitat suitability at multiple spatial scales (mid-, fine- and site-scale) by examining scale-specific indicators that represent both habitat requirements (i.e., food, water, cover, security) and threats to habitat (i.e., anthropogenic disturbances, proximity of trees to leks). However, invasive annual grasses are not included as an indicator of habitat suitability at any scale of the HAF (Stiver et al. 2015). This omission has been recognized by both authors and implementors of the HAF as a shortcoming that should be remedied, as supported by scientific literature.

The purpose of this document is to:

- Provide scientifically based rationale for including invasive annual grass cover as an additional indicator in HAF site-scale habitat assessments (Stiver et al. 2015, revised), and
- Recommend scale-specific benchmarks for invasive annual grass cover for HAF site-scale assessments based on scientific literature relevant to that scale.

## RATIONALE

Research has shown that invasive annual grasses can reduce habitat suitability for sage-grouse, at the site-scale (i.e., microhabitat), by displacing native vegetation and altering habitat composition and structure (Chambers et al. 2016, Coates et al. 2017, Brussee et al. 2022). This degradation can cause sage-grouse to avoid areas with invasive annual grasses (Lockyer et al. 2015, Coates et al. 2017, Poessel et al. 2022) and can cause lower occupancy and survival rates in areas with invasive annual grasses (Wik et al 2002, Kirol et al. 2012, Lockyer et al. 2015). General speaking, studies have shown that greater sage-grouse will use areas with relatively low amounts of invasive annual grasses for nesting and brood-rearing; however, in areas with relatively higher amounts of invasive annual grasses, rates of occupancy and/or survival are lower (Coates et al. 2017, Dinkins et al. 2016, Lockyer et al. 2015, Schreiber et al. 2015, Stonehouse et al. 2015, Wik 2002).

For example, a study conducted in Nevada and California found that cheatgrass abundance was the single greatest micro-habitat feature distinguishing greater sage-grouse nest sites from random sites in the study area and that average cheatgrass cover at nest sites (7.1%; SE=1.0) was lower than at random sites (13.3%; SE=1.2) (Lockyer et al. 2015). A study in Idaho found that successful nests had lower average cheatgrass cover (1%) than unsuccessful nests (4%) while successful broods had lower average cheatgrass cover (2%) than unsuccessful broods (6%) (Wik et al. 2002). In Nevada and California, a study indicated that > 5% annual grass cover was unsuitable for GRSG during nesting and brood-rearing (Coates et al. 2017). They also recommended suitability categories for invasive annual grasses in nesting habitat specific to xeric sites (<2.5% invasive annual grass cover is suitable, 2.5 – 4.8% is marginal, >4.8% is unsuitable) and mesic sites (<2.5% invasive annual grass cover is suitable, 2.5 – 5.2% is marginal, >5.2% is unsuitable).

Although individual studies reported different values of invasive annual grass cover associated with sage-grouse site selection and nest/brood success, there was notable overlap. In studies that examined site selection (not success), they reported mean values ranging between <1% to 17% cover of invasive annual grasses at used sites (regardless of success), with most reporting <7% cover (**Table 1**). In studies that examined nest and/or brood success relative to invasive annual grasses, they reported mean values between 1% to 7% for successful sites (Wik et al. 2002, Lockyer et al. 2015) (**Table 1**). Of note, some studies have shown that sage-grouse exhibit maladaptive site selection to invasive annual grasses and other habitat indicators due to nest site fidelity (Coates et al. 2017, Brussee et al. 2022, Cutting et al. 2019) so nest/brood success may be a more accurate indicator of the impacts of invasive annual grasses to sage-grouse habitat suitability.

Collectively, this research indicates that invasive annual grasses can reduce habitat suitability for nesting and brood-rearing greater sage-grouse at the site-scale and that habitat suitability generally decreases as invasive annual grass cover increases. It is recommended that invasive annual grass cover be included as a habitat suitability indicator for sage-grouse habitat assessments conducted at the HAF site-scale, as described in the Recommendations section below.

*Table 1. The table below lists and describes key aspects and findings from research that has examined the relationship of invasive annual grass cover to greater sage-grouse habitat selection and/or survival at the site-scale (i.e., microhabitat). Note that no studies specifically examined the potential impacts of invasive annual grasses on Gunnison sage-grouse.*

| Citation | State | Scale/ Extent | Season | Applicable Findings |
|---|---|---|---|---|
| Coates et al. 2017 | NV | 10m of nest | Nesting | Mean invasive annual grass cover at nests was 4.8% in xeric sites and 5.1% in mesic sites.<br>Authors recommended suitability categories:<br>• xeric sites (suitable is <2.5%, marginal is 2.5 – 4.8%, unsuitable is >4.8%) and<br>• mesic sites (suitable is <2.5%, marginal is 2.5 – 5.2%, unsuitable is >5.2%) |
| | | 10m of brood | Brood-rearing | Mean invasive annual grass cover at brood sites was 4.3% in xeric 4.79% in mesic.<br>Authors recommended suitability categories:<br>• xeric sites (suitable is <2.5%, marginal is 2.5 – 4.3%, unsuitable is >4.3%) and<br>• mesic sites (suitable is <2.5%, marginal is 2.5 – 4.8%, unsuitable is >4.8%) |

| Citation | State | Scale/ Extent | Season | Applicable Findings |
|---|---|---|---|---|
| Dinkins et al. 2016 | WY | 5m of nest | Nesting | Mean invasive annual grass cover at nests 2.14% (SE=0.11) which was higher but similar to random sites with a mean of 1.75% (SE=0.10). |
| Kirol et al. 2012 | WY | 8m of nest | Nesting | Nest selection was negatively related to the presence of cheatgrass when compared to available habitat. "Cheatgrass occurred at 6% of the nest locations and 19% of the corresponding random locations." |
| Lockyer et al. 2015 | NV/CA | 0.01ha of nest | Nesting | Average cover of cheatgrass at nests and random sites was 7.1% (SE=1.0) and 13.3% (SE=1.2), respectively. Sites with >7.1% cheatgrass cover had lower nest success. Cheatgrass was the single greatest micro-habitat feature distinguishing nests from random sites. |
| Schreiber et al. 2015 | WY | 20m of brood | Brood-rearing | Cheatgrass cover was lower at early brood-rearing sites (0.55% +/-0.38%) than at random points (0.71% +/-0.30%) but similar. Cheatgrass cover was lower at late brood-rearing sites (1.44% +/-0.65%) than at random points (2.13% +/-0.72%) but similar. |
| Stonehouse et al. 2015 | WA | | Nesting | Mean cover of invasive annual grasses at nest sites was 13% (SE=1); random sites were not assessed. |
| Wik et al. 2002 | ID | 20m of nest | Nesting | All nests had an average of 3% cover. Successful nests had lower average cheatgrass cover (1% in 20m transect) than unsuccessful nest (4% in 20m transect). |
| | | 20 m of brood | Brood-rearing | All broods had average of 5% cheatgrass. Unsuccessful broods has lower cheatgrass (2% in 20m) at use-sites than successful broods (6% in 20m). |
| Wing et al. 2014 | UT | 15m of nest | Nesting | All nest, brood, and non-brooding use sites had cheatgrass which was similar in cover to random sites. Cheatgrass cover means: Nest mean = 17.6% (0.8), Brood mean = 15.6% (0.8), non-brood females and males = 14.3% (0.7), random sites mean = 15.9% (0.8). |

## RECOMMENDATIONS

Based on the findings of the research summarized above (**Table 1**), invasive annual grass cover should be assessed as a habitat indicator for nesting/early brood-rearing, late brood-rearing, and wintering habitat during a HAF site-scale assessment using the following benchmarks, adjusted as warranted by best available science. Note that these benchmarks were based more heavily on research that examined nest and brood *success* relative to invasive annual grass cover (more so than research that examined *use versus availability* of habitat) because sage-grouse have been shown to exhibit maladaptive site selection (Coates et al. 2017, Brussee et al. 2022, Cutting et al. 2019). Invasive annual grasses are not assessed at the site-scale for leks because the AIM strategy does not include leks in its sampling strategy; however, invasive annual grasses are assessed for lekking habitat at the HAF *fine-scale*. There was not sufficient research to suggest different benchmarks for winter habitat due to a lack of research on winter habitat as compared to nesting and brood-rearing. If future research indicates otherwise, benchmarks may be adjusted accordingly.

*Table 2. Recommended habitat suitability benchmarks for assessing invasive annual grass at the HAF site-scale.*

| Habitat Indicator | Metric | Benchmarks | | |
|---|---|---|---|---|
| | | Suitable | Marginal | Unsuitable |
| Invasive Annual Grass | % cover | <2% | 2 – 5% | >5% |

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# Attachment 8-2. Justification for Conifer as a Habitat Suitability Indicator at the Sage-grouse Habitat Assessment Framework (HAF) Site-Scale

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## BACKGROUND

Recent research has shown that conifer expansion into native sagebrush communities can reduce habitat suitability for sage-grouse (Nisbet et al 1983, Doherty et al. 2010, Fedy et al. 2014, Doherty et al. 2016, Westover et al. 2016, Baxter et al. 2017, Picardi et al. 2020, Saher et al. 2021, Brussee et al. 2022, Roth et al. 2022). The Bureau of Land Management (BLM) uses the Sage-grouse Habitat Assessment Framework (HAF; Stiver et al. 2015) to assess sage-grouse habitat suitability at multiple spatial scales (mid-, fine- and site-scale) by examining scale-specific indicators that represent both habitat requirements (i.e., food, water, cover, security) and threats to habitat (i.e., anthropogenic disturbances, predation risk). However, conifer cover is not included as an indicator of habitat suitability at any scale of the HAF (Stiver et al. 2015). This omission has been recognized by BLM personnel as a shortcoming of the HAF that should be remedied, as supported by scientific literature.

The purpose of this document is to:

- Provide scientifically based rationale for including conifer as an additional habitat indicator in HAF site-scale habitat assessments (Stiver et al. 2015, revised), and
- Recommend scale-specific thresholds for conifer for HAF site-scale assessments based on scientific literature relevant to that scale.

## RATIONALE

Studies that examine site-scale sage-grouse habitat (also referred to as microhabitat) often do not report or analyze conifer as a habitat characteristic, likely because it is not a habitat requirement of sage-grouse but rather a deterrent, especially at such a small scale (e.g., within 10m of a nest site). In a review of over 40 peer-reviewed microhabitat studies on sage-grouse, no study reported conifer cover as a standard microhabitat characteristic for sage-grouse (such as sagebrush cover, grass height, forb cover) nor did they test for a relationship between conifer and sage-grouse. A few studies, such as Duvuvuei 2013 and Wing 2014, reported frequency of nests located under conifer in Utah (see **Table 1**). Wing 2014 reported that nesting under juniper was rare and that only one of those nests was successful. Duvuvuei 2013 showed that nests were commonly placed under junipers, especially by translocated females, but suggested that use of juniper for nesting was due to maladaptation caused by a lack of sagebrush cover and extensive juniper expansion into the study area.

Most studies that examine the potential impacts of conifer on sage-grouse and their habitat are conducted at landscape scales, typically estimating conifer cover near sage-grouse locations (e.g., within 1,000m of a nest site) using remotely sensed landcover data. These studies have established that conifer cover, even in low amounts (e.g., <2 % cover), can negatively impact sage-grouse across all seasons (lekking, nesting, brood-rearing and wintering) causing avoidance and/or reduced vital rates (Nisbet et al 1983, Doherty et al. 2010, Fedy et al. 2014, Doherty et al. 2016, Westover et al. 2016, Baxter et al. 2017, Picardi et al. 2020, Saher et al. 2021, Brussee et al. 2022, Roth et al. 2022). However, these findings are mostly applicable to HAF mid- and/or fine-scale assessments which are also landscape level.

Given the established negative impacts of conifer cover on sage-grouse at landscape scales and the lack of conifer being reported in microhabitat studies (i.e., suggesting avoidance of conifer at site-scales), it is recommended that conifer be included as a habitat suitability indicator for sage-grouse habitat assessments conducted at the HAF site-scale, as described in the Recommendations section below.

*Table 1. The table below lists and describes key aspects and findings from research that has examined the relationship of conifer to greater sage-grouse habitat selection and/or survival at the site-scale (i.e., microhabitat). Note that no studies specifically examined the potential impacts of invasive annual grasses on Gunnison sage-grouse.*

| Name | Tree Type | State | Season | Applicable Findings |
|---|---|---|---|---|
| Wing 2014 | Juniper | UT | Nesting | GRSG females rarely selected juniper as a nesting shrub (n=4) and only one nest was successful. |
| Duvuvuei 2013 | Juniper | UT | Nesting | Translocated GRSG females (24%) nested under juniper but was accredited to lack of sagebrush cover and extensive conifer expansion in study area. |

## RECOMMENDATIONS

Based on the rationale above, conifer should be assessed as a habitat indicator during HAF site-scale assessments for nesting, brood-rearing, and wintering habitat. Conifer is not being added as an additional indicator in lek assessments because existing lek indicators already incorporate conifer and other trees. The metric used to assess conifer suitability is the count of conifer and, if available, the height of those conifer relative to surrounding sagebrush (or native shrubs, if used as a surrogate), using the benchmarks shown below (adjusted as warranted by best available science). Percent conifer is not recommended as the primary metric for conifer suitability because there is insufficient science to support a benchmark at the site-scale; however, percent conifer cover may still be used as ancillary information, as interpreted by local experts, to support assessment of conifer as a habitat suitability indicator.

*Table 2. Recommended habitat suitability benchmarks for assessing conifer at the HAF site-scale.*

| Habitat Indicator | Metric | Benchmarks | | |
|---|---|---|---|---|
| | | **Suitable** | **Marginal** | **Unsuitable** |
| Conifer | Count | • 0 trees (absence of conifer) | If height is unknown:<br>• 1 tree<br><br>If height is known:<br>• 1 tree that is taller than local average sagebrush height,<br>and/or<br>• <=3 trees that are not taller than local average sagebrush height | If height is unknown:<br>• >1 tree<br><br>If height is known:<br>• >1 tree that is taller than local average sagebrush height,<br>and/or<br>• >3 trees that are not taller than local average sagebrush height |

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# Appendix 9

Tables and Figures

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## 9.1 CHAPTER 3 TABLES

**Table 3-1. Vegetation Communities within GRSG HMAs By State**

| State HMA | Acres of Sagebrush | Acres of Sagebrush-Associated | Acres of Non-Sagebrush |
|---|---|---|---|
| **California** | **1,993,000** | **185,000** | **7,188,000** |
| PHMA | 418,000 | 59,000 | 190,000 |
| GHMA | 779,000 | 54,000 | 598,000 |
| OHMA | 370,000 | 33,000 | 728,000 |
| **Colorado** | **3,033,000** | **1,603,000** | **10,562,000** |
| PHMA | 1,253,000 | 119,000 | 493,000 |
| GHMA | 851,000 | 203,000 | 705,000 |
| LCHMA | 57,000 | 75,000 | 208,000 |
| **Idaho** | **14,950,000** | **1,631,000** | **22,973,000** |
| PHMA | 5,056,000 | 320,000 | 643,000 |
| GHMA | 2,236,000 | 308,000 | 1,802,000 |
| IHMA | 3,245,000 | 408,000 | 864,000 |
| **Montana** | **16,204,000** | **19,160,000** | **37,762,000** |
| PHMA | 4,852,000 | 2,838,000 | 1,636,000 |
| GHMA | 5,272,000 | 6,768,000 | 6,817,000 |
| RHMA | 203,000 | 145,000 | 74,000 |
| **Nevada** | **24,860,000** | **6,088,000** | **29,891,000** |
| PHMA | 9,216,000 | 825,000 | 2,096,000 |
| GHMA | 4,151,000 | 657,000 | 3,175,000 |
| OHMA | 3,387,000 | 803,000 | 1,926,000 |
| **North Dakota** | **43,000** | **569,000** | **351,000** |
| PHMA | 43,000 | 321,000 | 97,000 |
| GHMA | 100 | 122,000 | 120,000 |
| **Oregon** | **14,027,000** | **1,793,000** | **15,855,000** |
| PHMA | 5,342,000 | 498,000 | 789,000 |
| GHMA | 6,063,000 | 498,000 | 1,591,000 |
| **South Dakota** | **550,000** | **6,573,000** | **4,177,000** |
| PHMA | 260,000 | 606,000 | 118,000 |
| GHMA | 97,000 | 875,000 | 203,000 |
| **Utah** | **8,490,000** | **6,398,000** | **33,289,000** |
| PHMA | 2,855,000 | 486,000 | 28,000 |
| GHMA | 676,000 | 225,000 | 785,000 |
| **Wyoming** | **24,981,000** | **8,905,000** | **20,142,000** |
| PHMA | 11,094,000 | 1,568,000 | 2,697,000 |
| GHMA | 12,492,000 | 5,508,000 | 8,139,000 |
| **Grand Total** | **109,131,000** | **52,905,000** | **182,190,000** |

Source: LANDFIRE 2023

## Table 3-2. Acres for Percent Conifer Coverage

| State | Habitat Type | < 1% | 1 - 4% | 4 - 10% | 10 - 20% | 20 - 50% | > 50% | Total Conifer Cover Mapped |
|---|---|---|---|---|---|---|---|---|
| **California** | **PHMA** | 475,000 | 61,000 | 49,000 | 31,000 | 23,000 | 900 | 640,000 |
| | **GHMA** | 421,000 | 93,000 | 116,000 | 139,000 | 162,000 | 4,500 | 935,000 |
| **Colorado** | **PHMA** | 1,649,000 | 74,000 | 47,000 | 20,000 | 4,600 | - | 1,795,000 |
| | **GHMA** | 1,192,000 | 109,000 | 99,000 | 82,000 | 44,000 | - | 1,526,000 |
| **Idaho** | **PHMA** | 5,452,000 | 220,000 | 154,000 | 89,000 | 15,000 | - | 5,931,000 |
| | **GHMA** | 1,926,000 | 142,000 | 131,000 | 126,000 | 34,000 | - | 2,358,000 |
| **Montana** | **PHMA** | 1,264,000 | 35,000 | 43,000 | 54,000 | 37,000 | - | 1,434,000 |
| | **GHMA** | 1,022,000 | 50,000 | 61,000 | 80,000 | 78,000 | - | 1,292,000 |
| **Nevada** | **PHMA** | 10,583,000 | 676,000 | 458,000 | 297,000 | 113,000 | - | 12,127,000 |
| | **GHMA** | 5,115,000 | 530,000 | 543,000 | 767,000 | 842,000 | - | 7,798,000 |
| **Oregon** | **PHMA** | 5,822,000 | 311,000 | 243,000 | 183,000 | 68,000 | - | 6,627,000 |
| | **GHMA** | 6,646,000 | 458,000 | 406,000 | 310,000 | 95,000 | - | 7,916,000 |
| **Utah** | **PHMA** | 2,713,000 | 778,000 | 738,000 | 831,000 | 507,000 | - | 5,568,000 |
| | **GHMA** | 556,000 | 107,000 | 117,000 | 162,000 | 79,000 | - | 1,022,000 |
| **Wyoming** | **PHMA** | 11,173,000 | 168,000 | 154,000 | 91,000 | 32,000 | - | 11,618,000 |
| | **GHMA** | 10,000 | 900 | 700 | 500 | 200 | - | 13,000 |
| **Grand Total** | **PHMA** | **39,131,000** | **2,323,000** | **1,886,000** | **1,596,000** | **799,600** | **900** | **45,740,000** |
| | **GHMA** | **16,888,000** | **1,489,900** | **1,473,700** | **1,666,500** | **1,334,200** | **4,500** | **22,860,000** |

## Table 3-3. GRSG HMA Resistance to Disturbance Acres By State

| State HMA | Acres of High and Medium-High Resistance to Disturbance in HMA | Acres of Medium Resistance to Disturbance in HMA | Acres of Medium-Low Resistance to Disturbance in HMA | Acres of Low Resistance to Disturbance in HMA | Acres Not Analyzed in HMA |
|---|---|---|---|---|---|
| EIS / HMA | — | — | — | — | — |
| **California** | **1,900** | **61,000** | **168,000** | **886,000** | **8,282,000** |
| PHMA | 700 | 19,000 | 61,000 | 363,000 | 224,000 |
| GHMA | 1,200 | 35,000 | 97,000 | 231,000 | 1,066,000 |
| OHMA | 0 | 5,100 | 5,800 | 101,000 | 1,019,000 |
| **Colorado** | **1,080,000** | **1,772,000** | **2,335,000** | **457,000** | **9,553,000** |
| PHMA | 237,000 | 725,000 | 211,000 | 2,700 | 689,000 |
| GHMA | 248,000 | 527,000 | 399,000 | 78,000 | 506,000 |
| LCHMA | 109,000 | 28,000 | 46,000 | 0 | 157,000 |
| **Idaho** | **3,403,000** | **5,865,000** | **1,466,000** | **7,799,000** | **21,021,000** |
| PHMA | 997,000 | 2,014,000 | 501,000 | 1,977,000 | 530,000 |
| GHMA | 358,000 | 1,143,000 | 221,000 | 1,374,000 | 1,251,000 |
| IHMA | 583,000 | 1,161,000 | 650,000 | 1,510,000 | 613,000 |
| **Montana** | **3,325,000** | **29,773,000** | **48,000** | **42,000** | **40,164,000** |
| PHMA | 576,000 | 5,953,000 | 30,000 | 12,000 | 2,770,000 |
| GHMA | 498,000 | 12,222,000 | 100 | 11,000 | 6,223,000 |
| RHMA | 7,500 | 405,000 | 0 | 3,100 | 28,000 |
| **Nevada** | **1,415,000** | **5,929,000** | **3,427,000** | **42,924,000** | **7,145,000** |
| PHMA | 571,000 | 3,077,000 | 1,015,000 | 6,877,000 | 597,000 |
| GHMA | 301,000 | 1,236,000 | 726,000 | 5,162,000 | 558,000 |
| OHMA | 186,000 | 269,000 | 224,000 | 5,055,000 | 380,000 |

| State HMA | Acres of High and Medium-High Resistance to Disturbance in HMA | Acres of Medium Resistance to Disturbance in HMA | Acres of Medium-Low Resistance to Disturbance in HMA | Acres of Low Resistance to Disturbance in HMA | Acres Not Analyzed in HMA |
|---|---|---|---|---|---|
| **North Dakota** | **0** | **710,000** | **0** | **0** | **253,000** |
| PHMA | 0 | 410,000 | 0 | 0 | 51,000 |
| GHMA | 0 | 155,000 | 0 | 0 | 87,000 |
| **Oregon** | **121,000** | **1,023,000** | **2,183,000** | **10,040,000** | **18,306,000** |
| GHMA | 64,000 | 372,000 | 875,000 | 5,198,000 | 1,643,000 |
| PHMA | 51,000 | 622,000 | 960,000 | 3,110,000 | 1,886,000 |
| OHMA | 0 | 0 | 0 | 0 | 0 |
| **South Dakota** | **545,000** | **1,790,000** | **0** | **0** | **11,061,000** |
| PHMA | 170,000 | 685,000 | 0 | 0 | 127,000 |
| GHMA | 293,000 | 517,000 | 0 | 0 | 364,000 |
| **Utah** | **962,000** | **2,094,000** | **5,472,000** | **16,163,000** | **23,484,000** |
| PHMA | 389,000 | 894,000 | 681,000 | 1,271,000 | 2,449,000 |
| GHMA | 157,000 | 125,000 | 295,000 | 531,000 | 578,000 |
| OHMA | 0 | 0 | 0 | 0 | 0 |
| **Wyoming** | **2,923,000** | **18,911,000** | **11,456,000** | **3,676,000** | **17,062,000** |
| PHMA | 804,000 | 6,207,000 | 5,324,000 | 1,145,000 | 1,877,000 |
| GHMA | 1,197,000 | 11,482,000 | 6,100,000 | 2,523,000 | 4,837,000 |
| **Grand Total** | **13,775,900** | **67,928,000** | **26,555,000** | **81,987,000** | **156,331,000** |

Source: Chambers et al. 2023

**Table 3-4. Wild Horse and Burro Herd Management Areas by State**

| State | Acres of Wild Horse and Burro WHB HMAs | Statewide "High" Allowable Management Level (AML) | Estimated Current Population | Percent Above AML |
|---|---|---|---|---|
| California | 2,053,082 | 2,200 | 10,140 | 361% |
| Colorado | 365,988 | 827 | 1,873 | 126% |
| Idaho | 383,894 | 617 | 555 | 0% |
| Montana | 27,094 | 120 | 195 | 63% |
| Nevada | 14,032,947 | 12,811 | 46,570 | 264% |
| Oregon | 2,733,577 | 2,700 | 4,532 | 68% |
| Utah | 3,644,013 | 3,795 | 4,017 | 115% |
| Wyoming | 26,917,766 | 2,200 | 4,734 | 115% |
| **Total** | **2,053,082** | **26,785** | **82,384** | **208%** |

Source: BLM 2022b

**Table 3-5. Acres of Wild Horse and Burro Herd Management Areas in GRSG Habitat Management Areas**

| State | Acres |
|---|---|
| California | 601,000 |
| Colorado | 384,000 |
| Idaho | 418,000 |
| Montana | 38,000 |
| Nevada | 13,850,000 |
| Oregon | 2,820,000 |
| Utah | 2,473,000 |
| Wyoming | 4,781,000 |
| **Total** | **25,365,000** |

Source: BLM GIS 2023

**Table 3-6. Count of Allotments with at least 15% PHMA by Land Health Standard Category**

| Land Health Evaluation Reporting Category | Total # Allotments | % of Total |
|---|---|---|
| Category A: Rangelands meeting all standards or making significant progress toward meeting the standard | 5140 | 53.17% |
| Category B: Rangelands not meeting all standards or making significant progress toward meeting the standards, but appropriate action has been taken to ensure significant progress toward meeting the standards (livestock is a significant factor) | 911 | 9.42% |
| Category C: Rangelands not meeting standards or making significant progress toward meeting the standards, and no appropriate action has been taken to ensure significant progress toward meeting the standards (livestock is a significant factor) | 95 | 0.98% |
| Category D: Rangelands not meeting all standards or making significant progress toward meeting the standards due to causes other than livestock grazing | 742 | 7.68% |
| Category F: Rangelands not meeting standards or making significant progress, but determination of causal factor(s) has not been completed | 139 | 1.44% |
| Unevaluated: Rangelands that have not been evaluated. | 1958 | 20.25% |
| No information available: Allotments not found in master land health status dataset | 682 | 7.05% |

Source: BLM GIS 2023

**Table 3-7. Transmission Lines (Acres)**

| State | Acres of Transmission Lines |
|---|---|
| Colorado | 33,000 |
| Idaho | 109,000 |
| Montana | 124,000 |
| Nevada | 91,000 |
| North Dakota | 2,300 |
| Northeastern California | 21,000 |
| Oregon | 45,000 |
| South Dakota | 23,000 |
| Utah | 111,000 |
| Wyoming | 120,000 |

Source: BLM GIS 2023

**Table 3-8. Railroads within the Planning Area**

| State | Acres of Disturbance Associate with Railroads[1] |
|---|---|
| Colorado | 2,000 |
| Idaho | 5,900 |
| Montana | 9,900 |
| Nevada | 5,400 |
| North Dakota | 100 |
| Northeastern California | 2,200 |
| Oregon | 3,100 |
| South Dakota | 1,500 |
| Utah | 7,700 |
| Wyoming | 8,800 |
| **Total** | **46,600** |

Source: BLM 2023

[1]Acres have been calculated per the direct area of influence in **Table 7-4** in **Appendix 7**.

**Table 3-9. Roads within the Planning Area**

| State | Acres of Disturbance Associate with Roads[1] |
|---|---|
| Colorado | 137,000 |
| Idaho | 260,000 |
| Montana | 405,000 |
| Nevada | 216,000 |
| North Dakota | 8,200 |
| Northeastern California | 127,000 |
| Oregon | 331,000 |
| South Dakota | 81,000 |
| Utah | 328,000 |
| Wyoming | 304,000 |
| **Total** | **2,197,200** |

Source: BLM 2023

[1]Acres have been calculated per the direct area of influence in **Table 7-4** in **Appendix 7**.

**Table 3-10. Acres of Solar Facilities and ROWs in the Planning Area**

| State[1] | Acres of Solar Facilities[2] | Acres of Solar ROWs[2] |
|---|---|---|
| Idaho | 1,000 | 0 |
| Nevada | 1,200 | 3,600 |
| Oregon | 300 | 0 |
| Utah | 800 | 6,200 |
| Wyoming | 0 | 500 |

Source: BLM GIS 2023

[1] States for which there are no solar facilities or solar ROWs are not included in the table.

[2] Acres have been calculated per the direct area of influence in **Table 7-4** in **Appendix 7**.

**Table 3-11. Acres of Wind Turbines and ROWs in the Planning Area**

| State[1] | Acres of Wind Turbines[2] | Acres of Wind ROWs[2, 3] |
|---|---|---|
| Idaho | 1,600 | 40 |
| Montana | 2,200 | 0 |
| Nevada | 200 | 8,500 |
| North Dakota | 40 | 0 |
| Oregon | 2,100 | 100 |
| South Dakota | 100 | 0 |
| Utah | 500 | 6,900 |
| Wyoming | 4,300 | 34,000 |

Source: BLM GIS 2023

[1] States for which there are no acres of wind turbines or wind ROWs are not included in the table.

[2] Acres have been calculated per the direct area of influence in **Table 7-4** in **Appendix 7**.

[3] Wind energy testing (Type 2) ROWs are not included; Development (Type 3) ROWs are included.

**Table 3-12. Wind Potential in the Planning Area**

| Wind Speed (meters per second) | Acres within Planning Area |
|---|---|
| Greater than 5.8 | 36,243,000 |
| Less than 5.8 | 33,740,000 |

Source: BLM 2023

**Table 3-13. Locatable Mineral Types in the Planning Area***

| States | Precious and Base Metals | Industrial Minerals |
|---|---|---|
| Colorado | Gold, Molybdenum, and Uranium | Gypsum |
| Idaho | Gold, Silver, Copper, Lead, Iron, Molybdenum, Beryllium, Uranium, and Vanadium | Limestone, Bentonite, High-alumina clay, and Gypsum |
| Nevada | Gold, Silver, Copper, Lithium, Galena, Iron, Zinc, Cobalt, Vanadium, Tungsten, Antimony, and Molybdenum | Gypsum, Limestone, Diatomite, Bentonite, Silica Sand, Magnesium, and Barite |
| Montana | Gold, Silver, Mercury | Bentonite, Diamonds |
| Oregon | Gold, Silver, Lead-silver-zinc, Copper, Uranium, Iron, Arsenic | Borax, Dimension stone, Mercury, Limestone, Diatomaceous earth, Zeolites, Kaolinite, Perlite, Gemstones, and Bentonite |

| States | Precious and Base Metals | Industrial Minerals |
|---|---|---|
| Utah | Gold, Silver, Copper, Lead, Iron, Molybdenum, Beryllium, Uranium, and Vanadium | Limestone, Bentonite, High-Alumina Clay, and Gypsum |
| Wyoming | Uranium, Gold, Titanium, Lithium, Rare earths | Limestone, Marble, Bentonite, Jade |

Source: Bureau of Land Management and Forest Service 2015, Muntean et. al 2022, USGS 2016
*This list includes locatable minerals commonly known to exist in the planning area, it is not an exhaustive list of all locatable minerals in the planning area. Inclusion on this list does not imply that these metals and minerals are being developed or extracted.

**Table 3-14. Oregon key RNA acreages**

| RNA Name | District | RNA Acres | RNA Acres Unavailable for Livestock Grazing |
|---|---|---|---|
| Black Canyon | Vale | 2,639 | 2,639 |
| Dry Creek Bench | Vale | 1,637 | 622 |
| East Fork Trout Creek | Burns | 361 | 304 |
| Fish Creek Rim | Lakeview | 8,718 | 2,750 |
| Foley Lake | Lakeview | 2,228 | 1,269 |
| Foster Flat* | Burns | 2,687 | 0* |
| Guano Creek-Sink Lakes* | Lakeview | 11,813 | 0* |
| Lake Ridge | Vale | 3,860 | 769 |
| Mahogany Ridge | Vale | 682 | 155 |
| North Ridge Bully Creek | Vale | 1,569 | 164 |
| Rahilly-Gravelly | Lakeview | 18,678 | 8,282 |
| South Bull Canyon | Vale | 790 | 747 |
| South Ridge Bully Creek | Vale | 621 | 397 |
| Spring Mountain | Vale | 996 | 996 |
| Toppin Creek Butte | Vale | 3,998 | 2,865 |
| Totals | - | 60,649 | 21,959 |

*RNAs that were made unavailable to livestock grazing in the district underlying RMP or by an Act of Congress and closed prior to the 2015 ARMPA.

**Table 3-15. Vegetation Types Found in the 15 Oregon Key RNAs[1]**

| Vegetation Type | Research Natural Area |
|---|---|
| Cool-Moist Sagebrush | East Fork Trout Creek, Fish Creek Rim, Mahogany Ridge, Rahilly-Gravelly, South Bull Canyon, Spring Mountain, Toppin Creek Butte |
| Ecotone between Cool-Moist and Warm-Dry Sagebrush | Black Canyon, Mahogany Ridge, North Ridge Bully Creek, South Bull Canyon, South Ridge Bully Creek, |
| Warm-Dry Sagebrush | Black Canyon, Dry Creek Bench, Foley Lake, Foster Flat, Guano Creek-Sink Lakes, Lake Ridge, North Ridge Bully Creek, Rahilly-Gravelly, South Bull Canyon, South Ridge Bully Creek, Spring Mountain, Toppin Creek Butte |
| Shallow-Dry Sagebrush | Black Canyon, Dry Creek Bench, Fish Creek Rim, Foley Lake, Foster Flat, Guano Creek-Sink Lakes, Rahilly-Gravelly, Spring Mountain |
| Mountain Brush | Dry Creek Bench, East Fork Trout Creek, Fish Creek Rim, Mahogany Ridge, Rahilly-Gravelly, Spring Mountain |
| Riparian-Wetland | Black Canyon, East Fork Trout Creek, Fish Creek Rim, Guano Creek-Sink Lakes, Lake Ridge, Spring Mountain |
| Playa | Foley Lake, Foster Flat, Guano Creek-Sink Lakes, Toppin Creek Butte |

[1] Table 4-3 from the 2018 Oregon GRSG RMP Amendment FEIS.

**Table 3-16. Vegetation Types Found in the 15 Oregon Key RNAs That Are Important Habitats to Greater Sage-Grouse at Some Point in Their Life Cycle (e.g. Nesting and Brood Rearing)** [2]

| Vegetation Type | Plant Communities |
|---|---|
| Cool-Moist Sagebrush | Mountain big sagebrush/Idaho fescue<br>Mountain big sagebrush-antelope bitterbrush/Idaho fescue<br>Mountain big sagebrush-mountain mahogany/slender wheatgrass-bluebunch wheatgrass<br>Mountain big sagebrush-antelope bitterbrush-mountain snowberry/Thurber's needlegrass<br>Mountain big sagebrush-mountain snowberry/Idaho fescue<br>Low sagebrush/Idaho fescue<br>Wyoming big sagebrush-antelope bitterbrush/Idaho fescue |
| Ecotone between Cool-Moist and Warm-Dry Sagebrush | Mountain big sagebrush/bluebunch wheatgrass<br>Wyoming big sagebrush/Idaho fescue<br>Wyoming big sagebrush-antelope bitterbrush/bluebunch wheatgrass<br>Wyoming big sagebrush-threetip sagebrush/Idaho fescue<br>Wyoming big sagebrush-wild crab apple/Idaho fescue<br>Wyoming big sagebrush-threetip sagebrush/bluebunch wheatgrass<br>Threetip sagebrush/Idaho fescue<br>Threetip sagebrush-wild crab apple/Idaho fescue<br>Threetip sagebrush/bluebunch wheatgrass |
| Warm-Dry Sagebrush | Basin big sagebrush/Nevada bluegrass<br>Basin big sagebrush/bluebunch wheatgrass<br>Basin big sagebrush-Wyoming big sagebrush/bluebunch wheatgrass<br>Wyoming big sagebrush/Idaho fescue-bottlebrush squirreltail<br>Wyoming big sagebrush/needle-and-thread<br>Wyoming big sagebrush/Thurber's needlegrass<br>Low sagebrush/bottlebrush squirreltail-Idaho fescue<br>Low sagebrush/bluebunch wheatgrass<br>Low sagebrush/Idaho fescue-Thurber's needlegrass<br>Low sagebrush/Thurber's needlegrass |
| Shallow-Dry Sagebrush | Low sagebrush/Sandberg bluegrass<br>Stiff sagebrush/Sandberg bluegrass<br>Black sagebrush/Sandberg bluegrass |
| Mountain Brush | Mountain mahogany-mountain snowberry/Idaho fescue<br>Mountain mahogany-mountain big sagebrush/Idaho fescue<br>Serviceberry-snowberry-mountain big sagebrush<br>Snowberry-bittercherry complex<br>Mountain big sagebrush-mountain snowberry/Idaho fescue<br>Mountain mahogany-Oregon grape<br>Mountain big sagebrush-mountain snowberry-wild crab apple<br>Mountain mahogany-chokecherry scrub |

[2] Table 4-4 from the 2018 Oregon GRSG RMP Amendment FEIS

| Vegetation Type | Plant Communities |
|---|---|
| Riparian-Wetland | Willow-mixed shrub |
| | Scouler's willow-aspen |
| | Wet meadow |
| | Aspen-white fir-ponderosa pine |
| | Willow |
| | Pond |
| Playa | Silver sagebrush/Sandberg bluegrass |
| | Silver sagebrush/Nevada bluegrass |
| | Sliver sagebrush-green rabbitbrush |
| | Silver sagebrush/Baltic rush |
| | Silver sagebrush-basin wildrye |

**Table 3-17. Nonattainment Areas within the Planning Area**

| State | Pollutant[1] | Nonattainment Area | Classification[2,3,4,5] | Date of Designation |
|---|---|---|---|---|
| California | 8-Hour Ozone (2015) | Nevada County (western part) | Serious | 8/3/2018 |
| Colorado | 8-Hour Ozone (2015) | Larimer County portion of the Denver-Boulder-Greeley-Ft. Collins nonattainment area | Moderate | 7/20/2012 |
| | 8-Hour Ozone (2008) | Larimer County portion of the Denver/North Front Range nonattainment area | Severe-15 | 6/3/2018 |
| Idaho | $PM_{10}$ (1987) | Fort Hall Indian Reservation (parts of Bannock and Power Counties) | Moderate | 11/15/1990 |
| Montana | $PM_{10}$ (1987) | Rosebud County (part) | Moderate | 11/15/1990 |
| Utah | 8-Hour Ozone (2015) | Northern Wasatch Front nonattainment area (Davis and Salt Lake Counties and part of Tooele and Weber Counties) | Moderate | 6/3/2018 |
| | | Southern Wasatch Front nonattainment area (Part of Utah County) | Marginal | 6/3/2018 |
| | | Uinta Basin nonattainment area (Parts of Duchesne and Uintah Counties) | Marginal | 6/3/2018 |
| | 24-hour $PM_{2.5}$ (2006) | Provo (Part of Utah County) | Serious | 12/14/2009 |
| | | Salt Lake City nonattainment area (David, Salt Lake Counties and part of Box Elder, Tooele, and Weber Counties) | Serious | 12/14/2009 |
| | Sulfur Dioxide (1971) | Salt Lake County and part of Tooele County | — | |
| Wyoming | 8-Hour Ozone (2008) | Upper Green River Basin nonattainment area (Sublette County and part of Lincoln and Sweetwater Counties) | Marginal | 07/20/2012 |

Source: EPA 2023a

[1] Shows the pollutant and the year of the final rule/decision that established the standard that was exceeded. In 2015, the EPA changed the 8-hour ozone standard from the 2008 standard of 0.075 parts per million to 0.070 parts per million.

[2] Classifications of 8-hour ozone (2008) – Extreme: Area has a design value of 0.175 ppm and above; Severe 17: Area has a design value of 0.119 up to but not including 0.175 ppm; Severe 15: Area has a design value of 0.113 up to but not including 0.119 ppm; Serious: Area has a design value of 0.100 up to but not including 0.113 ppm; Moderate: Area has a design value of 0.086 up to but not including 0.100 ppm; Marginal: Area has a design value of 0.076 up to but not including 0.086 ppm.

[3] Classifications of 8-hour ozone (2015) – Extreme: Area has a design value of 0.163 ppm and above; Severe 17: Area has a design value of 0.111 up to but not including 0.163 ppm; Severe 15: Area has a design value of 0.105 up to but not including 0.111 ppm; Serious: Area has a design value of 0.093 up to but not including 0.105 ppm; Moderate: Area has a design value of 0.081 up to but not including 0.093 ppm; Marginal: Area has a design value of 0.071 up to but not including 0.081 ppm.

[4] Classifications of $PM_{10}$ (1987) – Extreme: Area has a design value of 0.175 ppm and above; Severe 17: Area has a design value of 0.119 up to but not including 0.175 ppm; Severe 15: Area has a design value of 0.113 up to but not including 0.119 ppm; Serious: Area has a design value of 0.100 up to but not including 0.113 ppm; Moderate: Area has a design value of 0.086 up to but not including 0.100 ppm; Marginal: Area has a design value of 0.076 up to but not including 0.086 ppm.

[5] Classifications of 24-hour $PM_{2.5}$ (2006) – Extreme: Area has a design value of 0.175 ppm and above; Severe 17: Area has a design value of 0.119 up to but not including 0.175 ppm; Severe 15: Area has a design value of 0.113 up to but not including 0.119 ppm; Serious: Area has a design value of 0.100 up to but not including 0.113 ppm; Moderate: Area has a design value of 0.086 up to but not including 0.100 ppm; Marginal: Area has a design value of 0.076 up to but not including 0.086 ppm.

**Table 3-18. Maintenance Areas within the Planning Area**

| State | Pollutant[1] | Maintenance Area | Date of Redesignation |
|---|---|---|---|
| Colorado | $PM_{10}$ (1987) | Pitkin County (part) | 07/14/2003 |
| | | Routt County (part) | 11/24/2004 |
| Idaho | Carbon Monoxide (1971) | Ada County (part) | 12/27/2002 |
| | $PM_{10}$ (1987) | Ada County (part) | 11/26/2003 |
| | | Bannock County (part) | 08/14/2006 |
| | | Bonner County (part) | 05/03/2013 |
| | | Power County (part) | 08/14/2006 |
| | $PM_{2.5}$ (2006) | Franklin County (part) | 06/21/2021 |
| Montana | CO (1971) | Billings (Part of Yellowstone County) | 04/22/2002 |
| | Sulfur Dioxide (1971) | Billings (Part of Yellowstone County) | 06/09/2016 |
| Nevada | Carbon Monoxide (1971) | Lake Tahoe (Parts of Carson City, Douglas, and Washoe Counties) | 02/13/2004 |
| | | Reno area (Part of Washoe County) | 08/04/2008 |
| | $PM_{10}$ (1987) | Reno planning area (Part of Washoe County) | 01/07/2016 |
| | Sulfur Dioxide (1971) | Central Steptoe Valley (Part of White Pine County) | 06/11/2002 |
| Oregon | $PM_{10}$ (1987) | Lake County (part) | 07/19/2006 |
| | | Union County (part) | 07/19/2006 |
| Utah | Carbon Monoxide (1971) | Salt Lake City (Part of Salt Lake County | 03/22/1999 |
| | | Provo (Part of Utah County) | 01/03/2006 |
| | | Ogden (Part of Weber County) | 05/08/2001 |
| | 24-hour $PM_{2.5}$ (2006) | Logan, Utah-Idaho (Part of Cache County) | 06/18/2021 |
| | $PM_{10}$ (1987) | Salt Lake County | 03/27/2020 |
| | | Utah County | 03/27/2020 |
| | | Ogden (Part of Weber County) | 03/27/2020 |
| Wyoming | $PM_{10}$ (1987) | Sheridan County (part) | 05/04/2018 |

Source: EPA 2023a

[1] Shows the pollutant and the year of the final rule/decision that established the standard that was exceeded. In 2015, the EPA changed the 8-hour ozone standard from the 2008 standard of 0.075 parts per million to 0.070 parts per million.

**Table 3-19. Ozone, $PM_{10}$, and $PM_{2.5}$ Air Quality Monitoring Data by Planning Area County (2020-2022)**

| State | Planning Area County | 8-hour Ozone (ppm) *(Standard: 0.070 ppm)* | | | 24-hour $PM_{10}$ ($\mu g/m^3$) *(Standard: 150 $\mu g/m^3$)* | | | Annual $PM_{2.5}$ / 24-Hour $PM_{2.5}$ *(Standard: 12.0 ($\mu g/m^3$ / 35 $\mu g/m^3$)* | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | **2020** | **2021** | **2022** | **2020** | **2021** | **2022** | **2020** | **2021** | **2022** |
| California | Nevada | **0.078** | **0.090** | – | – | – | – | – | 8.7 / **65** | – |
| | Placer | **0.083** | **0.085** | **0.075** | **213** | 137 | – | **12.4 / 93** | 11.3 / **57** | – |
| | Plumas | – | – | – | – | – | – | **12.5 / 40** | **16.4 / 70** | – |
| Colorado | Boulder | **0.076** | **0.082** | **0.072** | 74 | 51 | – | 10.1 / **52** | 10.8 / **54** | 6.8 / 25 |
| | Garfield | 0.063 | 0.065 | – | – | – | – | – | – | – |
| | Larimer | **0.075** | **0.085** | **0.073** | – | – | – | 8.1 / **47** | 8.5 / 29 | 6.5 / 17 |
| | Mesa | 0.065 | 0.068 | – | 50 | 40 | 72 | 6.1 / 20 | 6.2 / 18 | 5.2 / 15 |
| | Rio Blanco | 0.065 | 0.070 | 0.062 | – | – | – | 8.4 / 23 | 9.5 / 26 | – |
| | Routt | – | – | – | 69 | 69 | – | – | – | – |
| Idaho | Ada | 0.065 | 0.069 | 0.068 | 95 | 84 | – | 5.7 / 17 | 6.4 / 20 | – |
| | Bannock | 0.059 | 0.069 | 0.057 | 90 | 147 | – | – | – | – |
| | Butte | 0.056 | 0.070 | 0.060 | – | – | – | – | – | – |
| | Canyon | – | – | – | 96 | 97 | – | 7.8 / 23 | – | – |
| | Caribou | – | – | – | – | – | – | – | – | – |
| | Franklin | – | – | – | – | – | – | 5.2 / 15 | 5.7 / 19 | – |
| | Lemhi | – | – | – | – | – | – | 8.6 / 28 | 7.1 / 20 | – |
| Montana | Custer | – | **–** | 0.058 | – | – | – | – | – | – |
| | Fergus | 0.057 | **0.073** | 0.057 | 35 | 27 | – | 3.7 / 11 | 4 / 10 | – |
| | Gallatin | – | – | – | – | – | – | 2.3 / **40** | 5.7 / 34 | – |
| | Phillips | 0.052 | 0.064 | 0.051 | 150 | 57 | – | – | – | – |
| | Powder River | 0.060 | 0.069 | 0.059 | – | – | – | 5.6 / 14 | 5.5 / 12 | – |
| | Richland | 0.054 | 0.070 | 0.054 | – | 72 | – | 4.1 / 10 | 4.2 / 11 | – |
| | Rosebud | 0.059 | 0.066 | – | – | – | – | – | – | – |
| | Silver Bow | – | – | – | 55 | 64 | – | 6.5 / 21 | 7.5 / 22 | – |
| | Yellowstone | – | – | – | – | – | – | 5.8 / 13 | 7 / 16 | – |
| Nevada | Carson City | 0.069 | 0.067 | – | – | – | – | 5.6 / 28 | 5.9 / 27 | – |
| | Churchill | 0.065 | 0.066 | – | **210** | – | – | – | – | – |
| | Douglas | – | – | – | – | – | – | 5.7 / 23 | 6.3 / 26 | – |
| | Elko | – | – | – | 120 | 120 | – | – | – | – |
| | Lyon | 0.066 | – | – | – | – | – | – | – | – |
| | Nye | – | – | – | 130 | 123 | – | – | – | – |
| | Washoe | **0.079** | **0.08** | **0.074** | **220** | **284** | – | 11.1 / **75** | **12.4 / 105** | – |
| | White Pine | 0.070 | 0.068 | 0.061 | – | – | | – | – | – |

| State | Planning Area County | 8-hour Ozone (ppm) *(Standard: 0.070 ppm)* | | | 24-hour $PM_{10}$ (µg/m³) *(Standard: 150 µg/m³)* | | | Annual $PM_{2.5}$ / 24-Hour $PM_{2.5}$ *(Standard: 12.0 (µg/m³ / 35 µg/m³)* | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | **2020** | **2021** | **2022** | **2020** | **2021** | **2022** | **2020** | **2021** | **2022** |
| Oregon | Harney | – | – | – | – | – | – | 11.9 / **61** | 11.2 / **47** | – |
| | Umatilla | 0.056 | 0.065 | 0.064 | – | – | – | – | – | – |
| | Union | – | – | – | 39 | 42 | – | – | – | – |
| South Dakota | Bookings | 0.064 | 0.070 | – | 95 | 119 | – | 4.4 / 16 | 6/7 / 29 | – |
| | Brown | – | – | – | 75 | 89 | – | 5.6 / 15 | 6.7 / 30 | – |
| | Clay | – | – | 0.062 | – | – | – | – | – | – |
| | Codington | 0.057 | 0.066 | 0.066 | 129 | 143 | – | 6.7 / 16 | 9.2 / 29 | – |
| | Custer | 0.063 | 0.065 | – | 55 | 59 | – | 3.3 / 16 | 4.8 / 22 | – |
| | Hughes | – | – | – | – | – | – | 4 / 13 | 3.8 / 17 | – |
| | Jackson | 0.061 | 0.054 | 0.065 | 43 | 77 | – | 4.2 / 17 | 5.9 / 22 | – |
| | Meade | 0.062 | **0.072** | 0.059 | 63 | 63 | – | – | – | – |
| | Minnehaha | 0.064 | 0.065 | – | 71 | – | – | 6.8 / 17 | – | – |
| | Pennington | – | – | – | 124 | **168** | – | 6.8 / 23 | 8.1 / **168** | – |
| | Union | 0.063 | 0.065 | – | 88 | – | – | 6.1 / 17 | – | – |
| Utah | Davis | **0.08** | **0.082** | **0.075** | 52 | 77 | 53 | 8.9 / 33 | 9.4 / **36** | 7.2 / 27 |
| | Duchesne | 0.064 | **0.072** | 0.066 | – | – | 97 | 7.5 / 23 | 7.5 / 27 | 6.2 / 21 |
| | Garfield | 0.060 | 0.069 | – | – | – | – | – | – | – |
| | Iron | 0.061 | 0.065 | 0.061 | – | – | – | 5.4 / 17 | 6.5 / 21 | 5.7 / 12 |
| | Salt Lake | **0.08** | **0.087** | 0.076 | 106 | 103 | 152 | 10.5 / **37** | 11 / **49** | 9.9 / **40** |
| | Tooele | 0.070 | **0.075** | 0.070 | – | – | – | 6.7 / 24 | 8.1 / **37** | 6.8 / 28 |
| | Uintah | 0.066 | **0.072** | 0.064 | – | – | – | 6.6 / 22 | 7.3 / 27 | 5.1 / 17 |
| | Utah | 0.070 | **0.077** | **0.074** | 90 | 100 | 88 | 9.1 / 32 | 8.2 / **36** | 7.2 / 25 |
| | Weber | **0.074** | **0.077** | **0.071** | 77 | 86 | 67 | 6.7 / 22 | 8.1 / 32 | 6.7 / 27 |

| State | Planning Area County | 8-hour Ozone (ppm) *(Standard: 0.070 ppm)* | | | 24-hour $PM_{10}$ (µg/m³) *(Standard: 150 µg/m³)* | | | Annual $PM_{2.5}$ / 24-Hour $PM_{2.5}$ *(Standard: 12.0 (µg/m³ / 35 µg/m³)* | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | **2020** | **2021** | **2022** | **2020** | **2021** | **2022** | **2020** | **2021** | **2022** |
| Wyoming | Albany | 0.066 | **0.072** | 0.067 | **184** | **230** | – | 4.9 / 25 | – | – |
| | Big Horn | 0.058 | 0.067 | 0.057 | – | – | – | – | – | – |
| | Campbell | 0.061 | **0.075** | 0.061 | 149 | 154 | – | – | – | – |
| | Carbon | – | – | – | 83 | – | – | – | – | – |
| | Converse | 0.070 | **0.080** | 0.059 | 68 | 125 | – | – | – | – |
| | Johnson | 0.064 | **0.074** | 0.058 | 67 | 64 | – | – | – | – |
| | Laramie | 0.060 | **0.075** | – | 127 | 63 | – | 4.2 / 21 | 5.1 / 27 | – |
| | Lincoln | – | – | – | 91 | 97 | – | – | – | – |
| | Natrona | 0.066 | **0.071** | 0.060 | 56 | – | – | 4.1 / 17 | 4.5 / 21 | – |
| | Sheridan | – | – | – | 52 | – | – | 6.7 / 34 | – | – |
| | Sublette | 0.069 | **0.071** | 0.062 | 63 | 59 | – | 2.8 / 17 | 4.4 / 24 | – |
| | Sweetwater | 0.063 | 0.070 | 0.061 | **301** | **162** | – | – | – | – |
| | Teton | 0.066 | 0.067 | 0.058 | 34 | – | – | 4.5 / **48** | 5.1 / **36** | – |
| | Uinta | 0.066 | – | – | 47 | – | – | – | – | – |
| | Weston | 0.066 | 0.068 | 0.058 | – | | – | – | – | – |

Source: EPA 2023b

Values in bold are above the level of the respective air quality standard; exceptional events have been excluded.

= no monitoring data collected

**Table 3-20. 2020 Emissions Inventory by Source (tons per year)**

| Source | Carbon Monoxide | Nitrogen Oxides | $PM_{10}$ | $PM_{2.5}$ | Sulfur Dioxide | VOCs |
|---|---|---|---|---|---|---|
| Area source[1] | 678,451 | 93,029 | 1,595,419 | 284,524 | 6,721 | 291,794 |
| Oil and gas[2] | 20,933 | 18,993 | 870 | 868 | 1,173 | 159,224 |
| Off-road mobile[3] | 422,969 | 47,702 | 4,988 | 4,742 | 47 | 37,822 |
| On-road mobile[4] | 679,522 | 144,946 | 8,852 | 4,257 | 406 | 57,496 |
| Point source[5] | 126,082 | 147,845 | 50,532 | 22,005 | 68,623 | 89,468 |
| Biogenics[6] | 373,990 | 117,066 | 0 | 0 | 0 | 1,939,722 |
| Wildfires | 6,126,624 | 71,800 | 612,720 | 519,254 | 42,434 | 1,442,166 |
| **Total** | **8,428,571** | **641,381** | **2,273,381** | **835,650** | **119,404** | **4,017,692** |

Source: EPA 2023

[1] Area sources are stationary sources that are too small or too numerous to be treated as individual point sources. Source categories include agricultural and prescribed burning, outdoor grilling and residential wood combustion, trains and commercial marine vessels, and other sources not covered by the point source category.

[2] Oil and Gas includes oil and exploration and production; petroleum refining; and petroleum and petroleum product transport and storage.

[3] Off-road mobile sources include mobile equipment (e.g., construction, agriculture, industrial, lawn and garden, commercial, logging, recreational vehicles, some recreational marine vehicles, and underground mining equipment) that do not operate on roads, excluding commercial marine vehicles, railways, and aircraft.

[4] On-road mobile sources include emissions from motorized vehicles that normally operate on public roadways.

[5] Point sources include individual facilities such as large energy and industrial sites (e.g., petroleum refineries, electric generating utilities, and manufacturing facilities), smaller point sources included voluntarily by state, local, and Tribal agencies (e.g., crematoria, dry cleaners, and gas stations), airport operation and aircraft landing and take-off emissions, and locomotive missions within railyards.

[6] Natural (nonanthropogenic) emissions from forests, vegetation, and soils

**Table 3-21. Climate Trends and Projections for Planning Area States**

| State | Climate Trends |
|---|---|
| California | The average annual temperatures in California have increased by nearly 3°F since the beginning of the 20th century. Multiple record warm years have been recorded in the last decade, and the most recent 10-year period (2011-2020) was the warmest on record. Since 1995, California has experienced a below normal number of cold nights and its highest number of very warm nights over the historical record (NOAA 2022). The record warmth, in combination with multiple years of below average precipitation, including the driest year, led to the most severe drought of the past 1,200 years (Griffin and Anchukaitis 2014). Precipitation and snowpack vary greatly from year to year. Statewide April 1 snowpack has averaged about 10 percent lower during the first two decades of the 21st century as compared with the last two decades of the 20th century, with 2015 likely featuring the lowest snowpack in the Sierra Nevada in the last 500 years (Belmecheri et al. 2015). |
| Colorado | The rugged topography of western Colorado causes large variations in climate within short distances, and few climatic generalizations apply to the whole area. Temperatures in Colorado have risen about 2.5°F since the beginning of the 20th century and have remained above the long-term average since 1998. Six of the eight warmest years on record have occurred since 2012, and warming has been seen in all four seasons. Long-term average annual precipitation has been variable. Unlike many areas of the United States, Colorado has not seen an increase in the frequency of heavy precipitation events (NOAA 2022). |
| Idaho | Idaho experiences dramatic seasonal temperature differences due to its northerly latitude and interior location, with cold winters and warm summers. Temperatures have risen almost 2°F since the beginning of the 20th century. For the 126-year record, there has been significant variation in precipitation across the state, but no overall trend. However, since 2000, the number of 1-inch extreme precipitation events has been increasing and has been above average for the last 16 years. Snowfall is highly variable from year to year and has generally decreased since the middle of the 20th century. Extreme weather and weather-related events in Idaho include severe winter storms, wildfires, floods, droughts, and heat and cold waves (NOAA 2022). |

| State | Climate Trends |
|---|---|
| Montana | Due to its diverse geography and extensive altitudinal range, Montana experiences significant climatic variations. Since the turn of the century, temperatures in Montana have increased by almost 2.5°F. Warming has occurred in most parts of the state and during all seasons. Montana's topographic variety generates significant regional variances in precipitation; however, there is no clear long-term trend in precipitation. Frequent thunderstorms during the summer months can produce hail, lightning, and strong winds. Precipitation events in the spring can cause severe flooding (NOAA 2022). Rising temperatures and recent droughts have killed many trees by drying out soils, increasing the risk of forest fires, or enabling outbreaks of forest insects (BLM 2020). |
| Nevada | Nevada is mostly a dry state with a wide range of elevations and a very variable climate. Since the beginning of the 20th century, temperatures in Nevada have increased by about 2.4°F. The total annual precipitation has been around or below the average since 2000, but there has been no overall trend over the 126-year period of record. Throughout the state, there are different seasonal patterns of precipitation, but in most places, the winter is when it rains the most. Drought poses a serious climatic threat to Nevada. Since 2004, the state has experienced multiple severe wildfire and flooding events (NOAA 2022). |
| North and South Dakota | The Dakotas have significant temperature extremes as a result of their location in the middle of the North American continent, distant from the oceans' climate-moderating influence. Temperatures in North Dakota have risen more than 2.6°F since the beginning of the 20th century, while temperatures in South Dakota have risen almost 2°F. Most precipitation falls between late spring and early summer, when the number of thunderstorms is at its peak. The strongest thunderstorms have the potential to create hail, tornadoes, or destructive straight-line winds that reach 75 mph. Compared to other northern states, North Dakota receives less annual snowfall. Conversely, South Dakota is particularly vulnerable to heavy snowfall, strong winds, and low wind chill temperatures, although, snowfall totals are highly variable from year to year. Both North and South Dakota are highly prone to the hazards of flooding and drought (NOAA 2022). |
| Oregon | Oregon's climate varies widely from the eastern to western regions of the state. Since the beginning of the 20th century, temperatures in Oregon have increased by around 2.5°F, with the highest temperatures recorded in the last 30 years. The amount of precipitation differs considerably from year to year and across the state, with areas west of the Cascades also experiencing significant seasonal variations in rainfall. Compared to many other parts of the country, Oregon has not seen an increase in the frequency of extreme precipitation events (NOAA 2022; Fleishman 2023). |
| Utah | With forested, alpine, and desert areas, Utah has a diverse geographic landscape contributing to its variable climate. Utah has had a temperature increase of over 2.5°F since the turn of the century, and the early 21st century has been the warmest period on record. The past three decades have seen a decrease in the frequency of very cold nights and an increase in very warm nights (NOAA 2022). There has been no statistically significant trend in precipitation. As the state has warmed, the percentage of precipitation falling as snow during the winter has decreased, as has snow depth and snow cover (BLM 2020). |
| Wyoming | Wyoming's interior, mid-latitude location and exposure to sporadic storm systems results in a primarily semiarid climate. Temperatures have increased by around 2.5°F since the beginning of the 20th century. Warming is most noticeable during winter, as seen by a generally below-average number of extremely cold days since 2000 (NOAA 2022). There is no long-term trend in annual mean precipitation. Summer thunderstorms are common, which can bring about hail, lightning, and powerful winds, and the state is prone to the effects of winter storm systems, such as significant snowfall, strong winds, and low wind chill temperatures (BLM 2020; NOAA 2022). |

**Table 3-22. Greenhouse Gas Emission from Oil and Gas Development on BLM-administered Lands (2021)[1]**

| State | Emissions (megatonnes of $CO_2e$) |
|---|---|
| California | 5.3 |
| Colorado | 45.7 |
| Idaho | 0.0 |
| Montana | 3.0 |
| Nevada | 0.1 |
| North Dakota | 36.3 |
| Oregon | 0.0 |
| South Dakota | 0.1 |
| Utah | 12.7 |
| Washington | 0.0 |
| Wyoming | 107.5 |

Source: BLM 2020

[1] The values represent emissions from all public lands in each state and are not specific to the planning area; therefore, emissions from coal, oil, and gas development for the planning area are expected to be lower than estimates above.

[2] Megatonnes = million metric tons

**Table 3-23. Federally Recognized Native American Tribes Associated with the Planning Area by State**

| Tribe | CO | ID | MT | ND | NV | OR | SD | UT | WY |
|---|---|---|---|---|---|---|---|---|---|
| Alturas Indian Rancheria | N | N | N | N | Y | N | N | N | N |
| Assiniboine and Sioux Tribes of the Fort Peck Indian Reservation | N | N | N | N | N | N | Y | N | Y |
| Battle Mountain Band of the Te-Moak Tribe of Western Shoshone Indians | N | N | N | N | Y | N | N | N | N |
| Blackfeet Tribe | N | Y | Y | N | N | N | N | N | Y |
| Burns Paiute Tribe | N | N | N | N | N | Y | N | N | N |
| Cedarville Rancheria | N | N | N | N | Y | N | N | N | N |
| Chippewa Cree | N | N | Y | N | N | N | N | N | N |
| Cheyenne River Sioux Tribe | N | N | N | N | N | N | Y | N | Y |
| Cheyenne-Arapaho Tribes of Oklahoma | N | N | N | N | N | N | Y | N | N |
| Coeur d'Alene Tribe | N | Y | N | N | N | N | N | N | N |
| Confederated Salish and Kootenai Tribes | N | Y | Y | N | N | N | N | N | N |
| Confederated Tribes of the Colville Reservation | N | Y | N | N | N | Y | N | N | N |
| Confederated Tribes of the Goshute Indian Reservation | N | N | N | N | Y | N | N | Y | N |
| Confederated Tribes of the Umatilla Indian Reservation | N | Y | N | N | N | Y | N | N | N |
| Confederated Tribes of the Warm Springs Reservation | N | N | N | N | N | Y | N | N | N |
| Crow Creek Sioux Tribe | N | N | N | N | N | N | Y | N | Y |
| Crow Tribe | N | N | Y | N | N | N | Y | N | Y |
| Duckwater Shoshone Tribe | N | N | N | N | Y | N | N | N | N |
| Eastern Shoshone Tribe of the Wind River Reservation | Y | N | Y | N | N | N | Y | Y | Y |

| Tribe | CO | ID | MT | ND | NV | OR | SD | UT | WY |
|---|---|---|---|---|---|---|---|---|---|
| Elko Band of the Te-Moak Tribe of Western Shoshone Indians | N | N | N | N | Y | N | N | N | N |
| Ely Shoshone Tribe | N | N | N | N | Y | N | N | N | N |
| Flandreau Santee Sioux Tribe | N | N | N | N | N | N | Y | N | N |
| Fort Belknap Indian Community | N | N | N | N | N | N | Y | N | N |
| Fort Bidwell Indian Community | N | N | N | N | Y | Y | N | N | N |
| Fort McDermitt Paiute and Shoshone Tribes | N | N | N | N | Y | Y | N | N | N |
| Greenville Rancheria | N | N | N | N | Y | N | N | N | N |
| Hopi Tribe of Arizona | N | N | N | N | N | N | N | Y | N |
| Kaibab Band of Paiute Indians | N | N | N | N | N | N | N | Y | N |
| Klamath Tribes | N | N | N | N | Y | Y | N | N | N |
| Kootenai Tribe | N | Y | N | N | N | N | N | N | N |
| Lovelock Paiute Tribe | N | N | N | N | Y | N | N | N | N |
| Lower Brule Sioux Tribe | N | N | N | N | N | N | Y | N | Y |
| Lower Sioux Indian Community | N | N | N | Y | N | N | Y | N | N |
| Mandan, Hidatsa & Arikara Nation | N | N | N | Y | N | N | Y | N | Y |
| Modoc Tribe of Oklahoma | N | N | N | N | N | Y | N | N | N |
| Navajo Nation | N | N | N | N | N | N | N | Y | N |
| Nez Perce Tribe | N | Y | Y | N | N | Y | N | N | N |
| Northern Arapaho Tribe | Y | N | N | N | N | N | Y | N | Y |
| Northern Cheyenne Tribe | Y | N | N | N | N | N | Y | N | Y |
| Northwestern Band of Shoshoni Nation | N | N | N | N | N | N | N | Y | N |
| Oglala Sioux Tribe | N | N | N | N | N | N | Y | N | Y |
| Omaha Tribe of Nebraska | N | N | N | N | N | N | Y | N | N |
| Paiute Indian Tribe | N | N | N | N | N | N | N | Y | N |
| Paiute-Shoshone Tribe of the Fallon Reservation | N | N | N | N | Y | N | N | N | N |
| Pit River Tribe | N | N | N | N | Y | N | N | N | N |
| Pyramid Lake Paiute Tribe | N | N | N | N | Y | N | N | N | N |
| Reno-Sparks Indian Colony | N | N | N | N | Y | N | N | N | N |
| Rosebud Sioux Tribe | N | N | N | N | N | N | Y | N | Y |
| Santee Sioux Nation | N | N | N | N | N | N | Y | N | Y |
| Shoshone-Bannock Tribes of the Fort Hall Reservation | N | Y | Y | N | N | Y | N | Y | Y |
| Shoshone-Paiute Tribes of the Duck Valley Reservation | N | Y | N | N | Y | Y | N | N | N |
| Sisseton-Wahpeton Oyate | N | N | N | N | N | N | Y | N | Y |
| Skull Valley Band of Goshute Indians | N | N | N | N | Y | N | N | Y | N |
| South Fork Band of the Te-Moak Tribe of Western Shoshone Indians | N | N | N | N | Y | N | N | N | N |
| Southern Ute Indian Tribe | Y | N | N | N | N | N | N | Y | N |
| Spirit Lake Tribe | N | N | N | Y | N | N | Y | N | N |
| Standing Rock Sioux Tribe | N | N | N | Y | N | N | Y | N | Y |
| Summit Lake Paiute Tribe | N | N | N | N | Y | N | N | N | N |
| Susanville Indian Rancheria | N | N | N | N | Y | N | N | N | N |
| Te-Moak Tribe of Western Shoshone Indians | N | N | N | N | Y | N | N | Y | N |
| Turtle Mountain Band of Chippewa Indians | N | N | N | Y | N | N | Y | N | N |
| Upper Sioux Community | N | N | N | N | N | N | Y | N | N |

| Tribe | CO | ID | MT | ND | NV | OR | SD | UT | WY |
|---|---|---|---|---|---|---|---|---|---|
| Ute Indian Tribe of the Uintah and Ouray Reservation | Y | N | N | N | N | N | N | Y | Y |
| Ute Mountain Tribe | Y | N | N | N | N | N | N | Y | N |
| Walker River Paiute Tribe | N | N | N | N | Y | N | N | N | N |
| Washoe Tribe | N | N | N | N | Y | N | N | N | N |
| Wells Band of the Te-Moak Tribe of Western Shoshone Indians | N | N | N | N | Y | N | N | N | N |
| White Earth Band of the Minnesota Chippewa Tribe | N | N | N | N | N | N | Y | N | N |
| Winnemucca Indian Colony | N | N | N | N | Y | N | N | N | N |
| Yankton Sioux Tribe | N | N | N | N | N | N | Y | N | Y |
| Yerington Paiute Tribe | N | N | N | N | Y | N | N | N | N |
| Yomba Shoshone Tribe | N | N | N | N | Y | N | N | N | N |

Note: CO = Colorado, ID = Idaho, MT = Montana, ND = North Dakota NV = Nevada, OR = Oregon, SD = South Dakota, UT = Utah, WY = Wyoming
Y = yes; N = no

**Table 3-24. Lands with Wilderness Characteristics**

| State | Acres | | | |
|---|---|---|---|---|
| | PHMA | GHMA | OHMA | Total |
| California | 2,400 | 0 | 0 | 2,400 |
| Colorado | 261,000 | 392,000 | 20,000 | 673,000 |
| Idaho | 283,000 | 89,000 | 45,000 | 417,000 |
| Montana | 9,200 | 9,700 | 0 | 18,900 |
| Nevada | 87,000 | 57,000 | 23,000 | 167,000 |
| North Dakota | 0 | 0 | 0 | 0 |
| Oregon | 1,360,000 | 1,641,000 | 0 | 3,001,000 |
| South Dakota | 0 | 0 | 0 | 0 |
| Utah | 671,000 | 315,000 | 0 | 986,000 |
| Wyoming | 0 | 12,000 | 0 | 12,000 |
| **Total** | 2,673,600 | 2,515,700 | 88,000 | 5,277,300 |

Source: BLM GIS 2023

## 9.2 CHAPTER 4 TABLES

**Table 4-2.[3] Corrected Vegetation Types found in the 15 Oregon Key RNAs under Alternative 5**

| Vegetation Type | Research Natural Area |
|---|---|
| Cool-Moist Sagebrush | Dry Creek Bench, East Fork Trout Creek, Fish Creek Rim, Mahogany Ridge, Rahilly-Gravelly, South Bull Canyon, Spring Mountain |
| Ecotone between Cool-Moist and Warm-Dry Sagebrush | Black Canyon, North Ridge Bully Creek, South Ridge Bully Creek, Toppin Creek Butte |
| Warm-Dry Sagebrush | Foley Lake, Foster Flat, Guano Creek-Sink Lakes, Rahilly-Gravelly |
| Shallow-Dry Sagebrush | Black Canyon, Dry Creek Bench, Fish Creek Rim, Foley Lake, Foster Flat, Guano Creek-Sink Lakes, Lake Ridge, Rahilly-Gravelly, Spring Mountain, Toppin Creek Butte. |
| Mountain Brush/Shrub | Dry Creek Bench, East Fork Trout Creek, Fish Creek Rim, Mahogany Ridge, Rahilly-Gravelly, Spring Mountain |
| Riparian-Wetland | Black Canyon, East Fork Trout Creek, Spring Mountain |
| Playa | Foley Lake, Foster Flat, Guano Creek-Sink Lakes, Toppin Creek Butte |

**Table 4-3.[4] Vegetation Types found in the Areas Allocated as Unavailable to Livestock Grazing under Oregon Alternative 5**

| Vegetation Type | Research Natural Area |
|---|---|
| Cool-Moist Sagebrush | Fish Creek Rim, Mahogany Ridge and South Bull Canyon retained.<br>Note: Dry Creek Bench Key RNA would still meet research objectives regarding reduced (livestock) disturbance due to historic and current low level of livestock impacts, and desirable conditions. |
| Ecotone between Cool-Moist and Warm-Dry Sagebrush | Toppin Creek Butte<br>Note: Black Canyon Key RNA would still meet research objectives regarding reduced (livestock) disturbance due to historic and current low level of livestock impacts, and desirable conditions. |
| Warm-Dry Sagebrush | Foley Lake, Guano Creek-Sink Lakes, Rahilly-Gravelly |
| Shallow-Dry Sagebrush | Foley Lake, Guano Creek-Sink Lakes, Rahilly-Gravelly, Lake Ridge<br>Note: Black Canyon, Dry Creek Bench and Toppin Creek Butte Key RNAs would still meet research objectives regarding reduced (livestock) disturbance due to historic and current low level of livestock impacts, and desirable conditions. |
| Mountain Brush/Shrub | Mahogany Ridge<br>Note: Dry Creek Bench Key RNA would still meet research objectives regarding reduced (livestock) disturbance due to historic and current low level of livestock impacts, and excellent desirable conditions. |
| Riparian-Wetland | Note: Black Canyon Key RNA would still meet research objectives regarding reduced (livestock) disturbance due to historic and current low level of livestock impacts, and desirable conditions. |
| Playa | Foley Lake, Guano Creek-Sink Lakes, Toppin Creek Butte |

[3] Table 4-3 from the 2018 Oregon GRSG RMP Amendment FEIS.
[4] Table 4-3 from the 2018 Oregon GRSG RMP Amendment FEIS.

**Table 4-4. Acres of Wild Horse and Burro Herd Management Areas in GRSG Habitat Management Areas under Alternative 3**

| State | Acres |
|---|---|
| California | 1,198,000 |
| Colorado | 153,000 |
| Idaho | 295,000 |
| Montana | 1,000 |
| Nevada | 5,508,000 |
| Oregon | 2,455,000 |
| Utah | 361,000 |
| Wyoming | 3,648,000 |
| **Total** | **13,619,000** |

Source: BLM GIS 2023

**Table 4-5. Modeled New Federal Oil and Gas Criteria Air Pollutant and HAP Emissions Circa 2032 (tons per year)**

| State | Carbon Monoxide | Nitrogen Oxides | $PM_{10}$ | $PM_{2.5}$ | Sulfur Dioxide | VOCs | HAPs |
|---|---|---|---|---|---|---|---|
| Colorado | 3,701 | 4,734 | 152 | 150 | 103 | 25,215 | 1,402 |
| Montana | 3,071 | 2,328 | 55 | 55 | 160 | 8,055 | 504 |
| North Dakota | 11,250 | 8,705 | 1,008 | 912 | 6,447 | 24,805 | 2,183 |
| South Dakota | 84 | 169 | 13 | 13 | 4 | 491 | 37 |
| Utah | 1,995 | 2,420 | 121 | 121 | 28 | 71,667 | 5,113 |
| Wyoming | 7,417 | 19,331 | 584 | 584 | 3,208 | 118,696 | 4,055 |
| **Total** | **54,126** | **51,609** | **2,432** | **2,327** | **13,978** | **284,143** | **15,466** |

Source: Ramboll 2023, Appendix A, Table 1-Table 10

**Table 4-6. Modeled New Federal Oil and Gas GHG Emissions Circa 2032 (metric tons per year)**

| State | $CO_2$ | Methane | Nitrous Oxide | 20-Year $CO_2e$* | 100-year $CO_2e$** |
|---|---|---|---|---|---|
| Colorado | 805,064 | 27,292 | 27 | 3,104,727 | 1,576,432 |
| Montana | 512,754 | 18,469 | 11 | 2,067,016 | 1,032,723 |
| North Dakota | 3,844,812 | 32,883 | 46 | 6,619,170 | 4,777,778 |
| South Dakota | 129,822 | 397 | 3 | 163,920 | 141,648 |
| Utah | 1,246,214 | 298,923 | 24 | 26,361,952 | 9,622,286 |
| Wyoming | 3,824,153 | 52,610 | 91 | 8,267,448 | 5,321,344 |
| **Total** | **13,659,693** | **505,931** | **277** | **56,231,036** | **27,899,075** |

Source: Ramboll 2023

*100-year time horizon global warming potentials applied are $CO_2$ = 1; methane = 29.8; nitrous oxide = 273, from the IPCC Sixth Assessment Report (IPCC 2021).

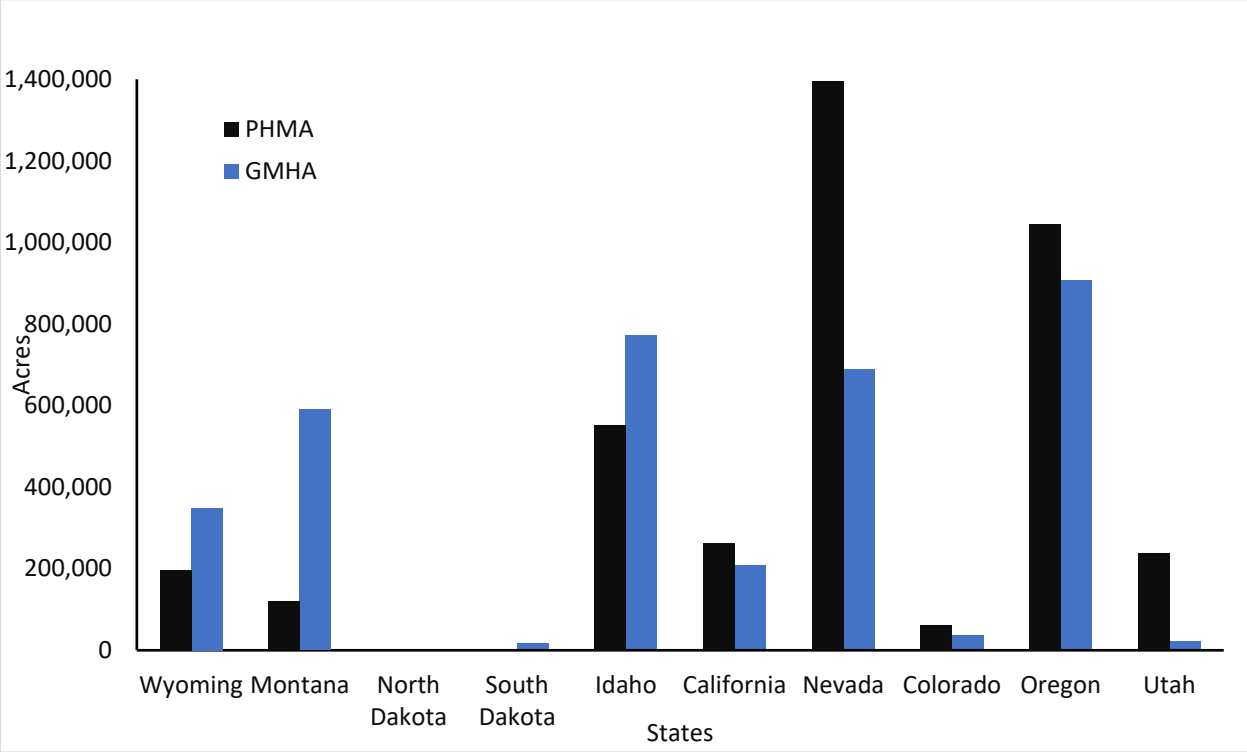
**20-year time horizon global warming potentials applied are $CO_2$ = 1; methane = 82.5; nitrous oxide = 273, from the IPCC Sixth Assessment Report (IPCC 2021).

**Table 4-7. OHV Designations by Alternative**

| OHV Designation | Alternative 1 | Alternative 2 | Alternative 3 | Alternative 4 | Alternative 5 | Alternative 6 |
|---|---|---|---|---|---|---|
| Open | 4,674,000 | 4,809,000 | 382,000 | 3,802,000 | 3,050,000 | 3,076,000 |
| Limited | 59,923,000 | 61,814,000 | 72,078,000 | 68,619,000 | 59,646,000 | 64,529,000 |
| Closed | 1,905,000 | 1,938,000 | 2,601,000 | 2,601,000 | 1,720,000 | 2,234,000 |
| ***Total:*** | *66,502,000* | *68,561,000* | *75,061,000* | *75,022,000* | *64,416,000* | *69,839,000* |

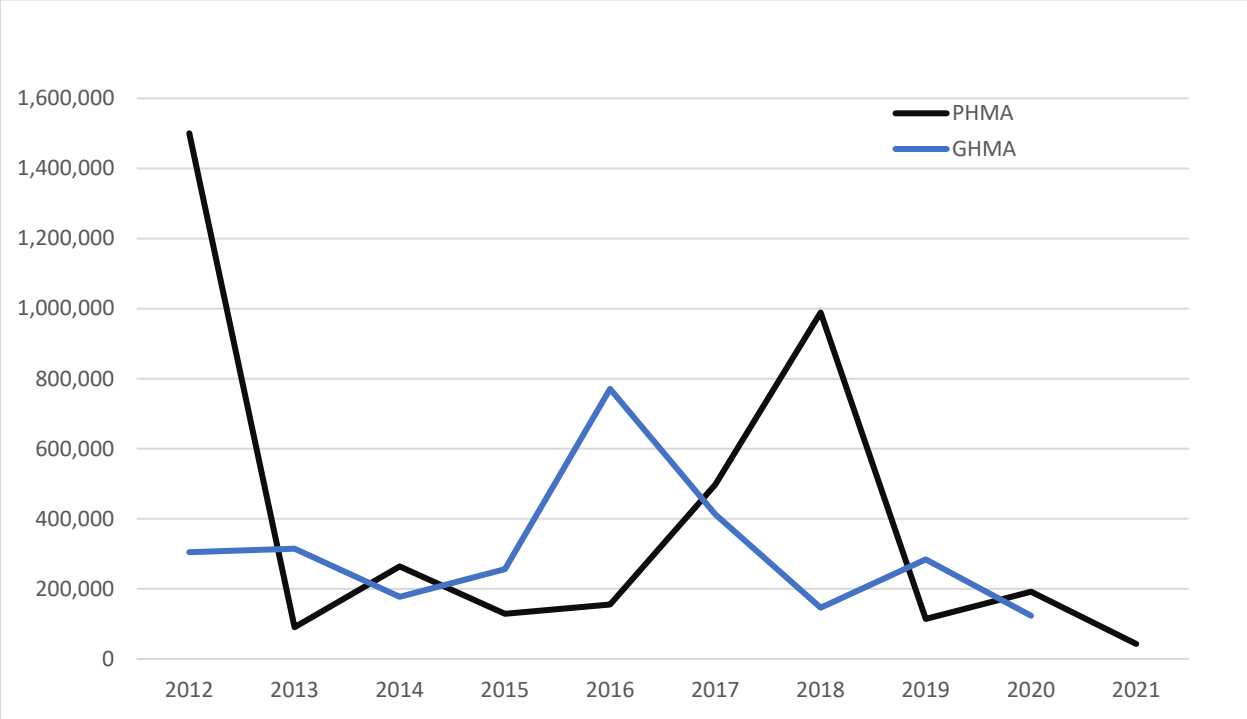
## 9.3 CHAPTER 3 FIGURES

**Figure 3.1 Cumulative Acres Burned by State (2012-2021)**




Source: NIFC GIS 2023

**Figure 3.2 Acres Burned by Year (2012-2021)**




Source: NIFC GIS 2023

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# Appendix 10

## Chapter 4 Methodology, Assumptions, Indicators, and Summary of Environmental Consequences

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# Appendix 10. Chapter 4 Methodology, Assumptions, Indicators, and Summary of Environmental Consequences

## 10.1 Introduction

### 10.1.1 General Methodology for Analyzing Impacts

The discussion of impacts is based on best available data. Knowledge of the planning area and decision area and professional judgment, based on observation and analysis of conditions and responses in similar areas, are used for environmental impacts where data are limited. Acreage figures and other numbers used in the analyses are approximate projections for comparison and analytic purposes only. Readers should not infer that they reflect exact measurements or precise calculations. Potential impacts are described in terms of type, context, duration, and intensity, which are generally defined below.

*Type of impact*—The analysis discloses impacts, both beneficial and adverse. Because types of impacts can be interpreted differently by different people, this chapter seeks to avoid differentiation between beneficial and adverse impacts. Notable exceptions are cases where such characterization is required by law, regulation, or policy. The presentation of impacts for key planning issues is intended to provide the BLM decision maker and reader with an understanding of the multiple use trade-offs associated with each alternative.

*Context*—This describes the area or location (site-specific, local, planning area-wide, or regional) in which the impact would occur. Site-specific impacts would occur at the location of the action, local impacts would occur within the general vicinity of the action area, planning area-wide impacts would affect a greater portion of decision area lands, and regional impacts would extend beyond the planning area boundaries. Refer to **Chapter 1** for a description of the planning area and decision area.

*Duration*—This describes the continuance of an effect, which can be classified as short term or long term. Short-term is defined as anticipated to begin and end within the first 5 years after the action is implemented; long term is defined as lasting beyond 5 years to the end of or beyond the life of this RMPA.

*Intensity*—Rather than categorize impacts by subjective intensity rankings (e.g., major, moderate, or minor), this analysis discusses the intensity of impacts using quantitative data wherever possible.

*Direct, indirect, and cumulative impacts*—Direct impacts are caused by an action or implementation of an alternative and occur at the same time and place; indirect impacts result from implementing an action or alternative but usually occur later in time or are removed in distance and are reasonably certain to occur. Cumulative impacts are effects on the environment that result from the impact of implementing any one of the alternatives in combination with other actions, either within the planning area or adjacent to it. Cumulative effects analysis is provided in **Section 4.21**, Cumulative Impacts.

### 10.1.2 Incomplete or Unavailable Information

The CEQ established implementing regulations for NEPA that require federal agencies to identify relevant information that may be incomplete or unavailable for evaluating reasonably foreseeable significant adverse impacts in an EIS (40 CFR Section 1502.21). If the information is essential to a reasoned choice among

alternatives, it must be included or addressed in an EIS. Knowledge and information is, and will always be, incomplete, particularly with infinitely complex ecosystems considered at various scales.

The best available information pertinent to the decisions to be made was used in developing the RMPA. The BLM has made a considerable effort to acquire and convert resource data into digital format for use in the RMPA, both from the BLM and from outside sources.

Under the FLPMA, the inventory of public land resources is ongoing and continuously updated. However, a comprehensive inventory of wildlife and special status species habitat and condition has not been completed across the planning area, and as such, discussions of impacts on potential habitat are included.

For resources where there is incomplete or unavailable information, estimates were made concerning the number, type, and significance of these resources based on previous surveys and existing knowledge. In addition, some impacts cannot be quantified, given the proposed management actions. Where this gap occurs, impacts are projected in qualitative terms or, in some instances, are described as unknown. Subsequent site-specific project-level analysis would provide the opportunity to collect and examine site-specific inventory data to determine appropriate application of RMP-level guidance. In addition, the BLM and other agencies continue to update and refine information used to implement this RMPA.

GIS data was used to perform acreage calculations, and to generate the maps in **Appendix 1**. Calculations are dependent upon the quality and availability of data. Given the scale of the analysis, the compatibility constraints between datasets, and lack of data for some resources, all calculations are approximate, and serve for comparison and analytic purposes only. Likewise, the maps in **Appendix 1** are provided for illustrative purposes and subject to the limitations discussed above. No warranty is made by the BLM as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data.

### 10.1.3 Analytical Assumptions

Several overarching assumptions have been made in order to facilitate the analysis of the project impacts. These assumptions set guidelines and provide reasonably foreseeable projected levels of development that would occur in the planning area during the planning period. These assumptions should not be interpreted as constraining or redefining the management objectives and actions proposed for each alternative, as described in **Chapter 2**.

The following general assumptions apply to all resource categories. Any specific resource assumptions are provided in the methods and assumptions section for that resource.

- Sufficient funding and personnel would be available for implementing the final decision.
- Implementing actions from any of the RMPA alternatives would comply with all federal regulations, BLM policies, and other requirements.
- Implementation-level actions necessary to execute the decisions in this RMPA would be subject to further environmental review, including that under the NEPA, as appropriate.
- Most direct and indirect impacts of implementing the RMPA would primarily occur on BLM-administered lands in the planning area. However, indirect impacts are also likely, such as limiting development on BLM-administered land that may redirect development to other adjacent and nearby non-BLM-administered land.
- Local climate patterns of historic record and related conditions for plant growth may change. Changes to the timing, type, and amount of precipitation will likely occur over the life of this plan.

- In the future, as tools for predicting climate changes in a management area improve and changes in climate affect resources, the BLM would be able to better incorporate climate change into the implementation of projects.
- Restrictions (such as siting, design, and mitigation measures) would apply, where appropriate, to surface-disturbing activities associated with land use authorizations and permits issued on BLM-administered lands.
- Removal of livestock grazing on BLM-administered lands would likely require fences to separate BLM-administered lands from adjacent lands under different surface land ownership.

## 10.2 GREATER SAGE-GROUSE

### 10.2.1 Methods and Assumptions

#### *Methodology*

Impacts on GRSG would primarily result from management actions described in **Chapter 2** that result in habitat removal, fragmentation, or other alteration, and actions that result in injury or mortality, displacement, or other disturbance. The types of actions that can result in these impacts are discussed in more detail in **Section 4.2.2**, Nature and Type of Effects. For management actions not specifically described below, the effects would remain as described in the 2015 and/or 2019 plans

#### *Indicators*

Indicators of impacts on GRSG are as follows:

- Acres of habitat management area within the planning area.
- Habitat loss/degradation – Likelihood for habitat impacts caused by the loss of habitat function or value, including connectivity, and the extent to which it may influence lek and population persistence/ viability.
- Behavioral disturbance to individuals – Likelihood of impacts on survival or reproduction due to direct or indirect effects, including habitat avoidance, and the extent to which it may influence lek and population persistence/ viability.

#### *Assumptions*

In addition to the assumptions in **Section 4.1.1**, Analytical Assumptions, this analysis includes the following assumptions:

- GRSG habitat management area designations are assumed to represent habitat adequate to maintain GRSG populations in the planning area.
- Seasonal ranges of migratory and nonmigratory GRSG are largely encompassed within GRSG habitat management area designations.
- GRSG habitat management area designations encompass adequate habitat for providing connectivity within populations and subpopulations. Connectivity is considered by incorporating population area information in the design and implementing restoration projects.
- If adverse impacts are identified, mitigation measures could be implemented to reduce the impacts. If analysis indicates remaining residual impacts, compensatory mitigation may be required. If monitoring reveals that mitigation is unsuccessful in reducing or eliminating impacts, measures to prevent further impacts would be implemented as appropriate to the species affected.
- Short-term effects would occur over a timeframe of 5 years or less, and long-term effects would occur over longer than 5 years.

- BMPs, COAs, and SOPs are used for analysis and would be implemented to reduce impacts on GRSG. These are subject to modification based on subsequent guidance and new science.
- Ground-disturbing activities could modify habitat and cause loss or gain of individuals, depending on the size of the area disturbed, the nature of the disturbance (e.g., development vs. habitat restoration), and the location of the disturbance. For example, habitat restoration treatments in sagebrush steppe disturb the ground but are assumed to positively modify habitat quality and quantity in the long term. Roads, transmission lines, pipelines, and other infrastructure generally cause fragmentation of habitat that can impact lek persistence, lek attendance, winter habitat use, recruitment, chick survival, yearling annual survival rate, and female nest site choice (Holloran 2005; Aldridge and Boyce 2007, Walker et al. 2007a; Doherty et al. 2008; Holloran et al. 2010; Hagen et al. 2011; Johnson et al. 2011; Taylor et al. 2012).
- Because GRSG are highly sensitive to habitat fragmentation, development, and changes in habitat conditions and require large, intact habitat patches, alternatives proposing to protect the most GRSG habitat from disturbance are considered of greatest beneficial impact to the species. These impacts can be described both qualitatively and quantitatively.

## 10.3 VEGETATION

### 10.3.1 Methods and Assumptions

#### *Methodology*

Impacts on vegetation would primarily result from management actions described in **Chapter 2** that result in vegetation removal, fragmentation, or other alteration. The types of actions that can result in these impacts are discussed in more detail in **Section 4.3.3**, Nature and Type of Effects. For management actions not specifically described below, the effects would remain as described in the 2015 and/or 2019 plans.

#### *Indicators*

Indicators of impacts on vegetation are as follows:

*Upland and Riparian Vegetation*

- Acres and condition of vegetation communities
- Extent of sagebrush or riparian vegetation fragmentation

*Noxious Weeds and Invasive Species*

- Likelihood for noxious weed or invasive species introduction or spread
- Likelihood for conifer encroachment

#### *Assumptions*

This analysis includes the following assumptions:

- All plant communities would be managed toward achieving a diverse native species composition, cover, and age classes across the landscape.
- The degree of impact attributed to any one disturbance or series of disturbances would be influenced by several factors, including location in the watershed; the type, time, and degree of disturbance; existing vegetation; precipitation; and mitigating actions applied to the disturbance.
- Noxious and invasive weeds would continue to be introduced and spread because of ongoing vehicle traffic in and out of the planning area, recreational activities, wildland fire, wildlife and livestock grazing and movements, and surface-disturbing activities.

- Activities that would disturb soils could cause erosion, loss of topsoil, and soil compaction, which could affect the ability of vegetation to regenerate. Further, surface-disturbing activities could increase dust, which could cover existing vegetation and impair plant photosynthesis and respiration. Resulting impacts could include lowered plant vigor and growth rate, altered or disrupted pollination, and increased susceptibility to disease. These impacts may be reversed by wind or precipitation, which can remove dust from vegetation.
- Ecological health and ecosystem functioning depend on a number of factors, including to but not limited to vegetative cover, species diversity, nutrient cycling and availability, water infiltration and availability, and percent cover of weeds.
- Climatic fluctuation would continue to influence the health and productivity of plant communities on an annual basis.

## 10.4 WILDLAND FIRE ECOLOGY AND MANAGEMENT

### 10.4.1 Methods and Assumptions

#### *Methodology*

Impacts

#### *Indicators*

The indicators of impacts on wildland fire management is: a substantial change in the likelihood or severity of wildfire.

#### *Assumptions*

This analysis includes the following assumptions:

- The spread of invasive annuals (e.g., cheatgrass) has lengthened the fire season in many parts of the planning area. These species often cure sooner than native perennial species and are more prone to ignition. Therefore, actions that reduce the spread or footprint of invasive annuals or restore perennial vegetation communities would reduce the frequency and intensity of wildfires, while reducing wildfire management costs.
- Fire is an important functional natural disturbance in many of the ecological systems found in the planning area.
- In many cases, a direct relationship exists between fuel loading and potential fire intensity and severity.

## 10.5 FISH AND WILDLIFE

### 10.5.1 Methods and Assumptions

#### *Methodology*

Impacts on fish and wildlife species would primarily result from management actions described in **Chapter 2** that result in habitat removal, fragmentation, or other alteration, and actions that result in injury or mortality, displacement, or other disturbance to species. The types of actions that can result in these impacts are discussed in more detail in **Section 4.4.3**, Nature and Type of Effects. For management actions not specifically described below, the effects would remain as described in the 2015 and/or 2019 plans (Colorado 2015 Section 4.3; Oregon 2015 Section 4.5, 2019 Section 4.7; South Dakota 2015 pages 686-725; Utah 2015 Section 4.5, 2019 Section 4.6.6; Wyoming 2015 Section 4.21).

***Indicators***

Indicators of impacts on fish and wildlife species are as follows:

- Amount and condition of available habitat
- Likelihood of mortality, injury, or direct disturbance
- Likelihood of habitat disturbance

***Assumptions***

This analysis includes the following assumptions:

- Implementing the management actions for GRSG would have mostly negligible or beneficial impacts on fish and wildlife species. Impacts on fish and wildlife species from resource use actions can have detrimental effects on fish and wildlife, though not all resource uses will have such effects.
- Impacts on big game populations would result from disturbance and/or loss of seasonally important habitat (for example, overwintering, breeding, or migration corridors) to a point that would cause the species' population to decline. Impacts that reduce the population of any herd unit that currently exceeds population objective levels would not be considered significant, so long as impacts would not reduce the population below defined objective levels.
- If adverse impacts are identified, the full suite of mitigation measures could be implemented to minimize, eliminate, or offset the impacts. If monitoring reveals that mitigation is unsuccessful in reducing or eliminating impacts, measures to prevent further impacts would be implemented as appropriate to the species affected.
- Short-term effects would occur over a timeframe of 5 years or less, and long-term effects would occur over longer than 5 years.

## 10.6 SPECIAL STATUS SPECIES

### 10.6.1 Methods and Assumptions

***Methodology***

Although data on many known locations and habitats within the planning area are available, the data are not complete or comprehensive concerning all special status species known or suspected to occur, or potential habitat that might exist. Known and potential special status species and habitats for key special status species that use sagebrush ecosystems in the planning area were considered in the analysis.

As described for Fish and Wildlife in **Section 4.4.2**, impacts on special status species would primarily result from management actions described in **Chapter 2** that result in habitat removal, fragmentation, or other alteration, and actions that result in injury or mortality, displacement, decreased water quality, or other disturbance to species. The types of actions that can result in these impacts would be the same as those described for fish and wildlife species, in **Section 4.4.3** and vegetation, in **Section 4.3.3**. For management actions not specifically described below, the effects would remain as described in the 2015 and/or 2019 plans.

This analysis focuses on a number of key special status species that would have the greatest potential to be affected by the GRSG management decisions outlined in **Chapter 2**. These are typically species that have overlapping ranges with GRSG, and that are closely associated with sagebrush and pinyon-juniper habitats.

***Indicators***

Indicators of effects on special status species would be the same as those described for Fish and Wildlife in **Section 4.4.1**.

### *Assumptions*

This analysis includes the following assumptions:

- The analysis presented is largely qualitative due to the lack of data or uncertainty in existing data on certain special status species' occurrences. Further, because many special status species may potentially use habitats that are currently unoccupied and populations fluctuate, any quantitative analysis of occupied habitat would change over time as knowledge of species locations increases.
- Impacts on special status species (for example, habitat degradation or direct disturbance) would be more intense than similar impacts on common species. This is because population viability may be already uncertain for special status species, and certain species, such as special status plants, tend to be poor competitors, and habitat may be more limited or fragmented.
- All federal actions would comply with ESA consultation requirements and BLM policy for threatened, endangered, and sensitive species, and all implementation actions would be subject to further special status species review before site-specific projects are authorized or implemented. The USFWS would be consulted on any action that could potentially affect any listed plant or wildlife species or their habitat, including critical habitat.
- The potential for changes to the distribution and extent of special status plant populations and seedbanks.
- Implementing the management actions for GRSG would have mostly negligible or beneficial impacts on other special status species and, therefore, impacts from each alternative are not discussed separately in detail. The key impacts from resource uses, as well as management actions for GRSG, on other special status species are described below.
- If adverse impacts are identified, compensatory mitigation measures could be implemented to minimize or eliminate the impacts. If monitoring reveals that mitigation is unsuccessful in reducing or eliminating impacts, measures to prevent further impacts would be implemented as appropriate to the species affected.
- Short-term effects are defined as those that would occur over a timeframe of 5 years or less, and long-term effects would occur over longer than 5 years.

## 10.7 WILD HORSES AND BURROS

### 10.7.1 Methods and Assumptions

#### *Methodology*

The following section analyzes impacts on wild horses and burros, including herd management areas and associated AMLs from the potential planning decisions in this document. Under Alternatives 1 through 5, the BLM has proposed various management actions in relation to GRSG habitat objectives, and their analyses are outlined below.

#### *Indicators*

Indicators of impacts on wild horses and burros are as follows:

- Changes to population size or AML in mapped GRSG Habitat, changes to forage availability, changes to water resource availability, and climate change
- Ability to perform management activities within herd management areas including gathers and contraceptive activities.

***Assumptions***

In addition to the assumptions in **Section 4.1.1**, Analytical Assumptions, this analysis includes the following assumptions:

- While wild horses and burros may be found on lands outside herd management areas, these areas have no forage allocated to wild horses and burros. The BLM has no authority to manage wild horses and burros outside of herd management areas, except to remove them.
- Wild horses compete with other wildlife species, including GRSG, for various habitat components. When populations exceed AML or when habitat resources become limited (e.g., reduced water flows, low forage production, or dry conditions), they expand beyond the boundaries of the herd management area.
- Factors contributing to failure to meet Land Health Standards within herd management areas commonly include western juniper encroachment, invasive annual grass and other noxious weed infestations, wildfire, and impacts of livestock and wildlife grazing.
- Population growth suppression (fertility control agents, sterilization, and sex ratio adjustments) can aid in population control, but periodic gathers are still necessary to remove excess wild horses and burros.

## 10.8 LIVESTOCK GRAZING

### 10.8.1 Methods and Assumptions

***Methodology***

The following section analyzes impacts on livestock grazing, including range facilities, and rangeland improvements from the planning decisions in this document. Under Alternatives 1 through 5, the BLM has proposed various livestock grazing management actions in relation to GRSG management objectives, and their analyses are outlined below.

***Indicators***

Indicators of impacts on livestock grazing are as follows:

- Changes in permitted AUMs in areas available for livestock grazing.
- Prohibitions or limitations of the construction or maintenance of structural and nonstructural range improvements
- Modifications to or removal of structural range improvements
- Changes to the intensity, timing, duration, or frequency of permitted use, including temporary closures.
- Making areas unavailable for livestock grazing

***Assumptions***

In addition to the assumptions in **Section 4.1.1**, Analytical Assumptions, this analysis includes the following assumptions:

- All new and renewed leases and permits would be subject to terms and conditions determined by the BLM Authorized Officer to manage and achieve resource condition objectives and land health standards for BLM-administered lands.

## 10.9 LANDS AND REALTY (INCLUDING WIND AND SOLAR)

### 10.9.1 Methods and Assumptions

#### *Indicators*

Indicators of impacts on lands and realty, including renewable energy, are as follows:

- Acres of ROW restrictions (avoidance and exclusion areas) that would limit or preclude new transmission line development to support renewable energy projects

#### *Assumptions*

In addition to the assumptions in **Section 4.1**, this analysis includes the following assumptions:

- Existing ROWs, designated utility corridors, and communication sites would be managed to protect valid existing rights.
- On renewal, assignment, or amendment of existing ROWs, permits, and leases, additional stipulations could be included in the land use authorization.
- Major ROWs would be needed to develop and operate renewable energy facilities.
- Maintaining and upgrading utilities, communication sites, and other ROWs is preferred before the construction of new facilities in the decision area, but only if the upgrading can be accommodated within the existing ROW.
- Activities on dispersed private, state, tribal, or non-BLM federal parcels within a decision area would continue to require new or upgraded access, communication, and utility services.
- Federal energy policies including (42 USC Section 13201 et seq. [2005], Executive Order 14008, and the Energy Act of 2020), would continue to support and promote domestic energy production, including renewable energy such as wind and solar.
- The number of ROW applications for new communication and computer technology, such as fiber optic cable, would continue to increase.
- Where demand for new ROWs exists on public lands, restricting ROW development in those areas would likely redirect ROW development to adjacent nonfederal or non-GRSG habitat federal land areas to accommodate the demand where feasible.
- Power lines and other vertical structures in areas naturally devoid of perching opportunities provide a perch for raptors and subsequently increase the potential for GRSG to abandon leks (Johnson and Holloran 2010). Mitigation in the form of burying lines or including non-perching design features on lines could be required to reduce perching opportunities and subsequent impacts on GRSG.
- For all alternatives a major ROWs is defined as a transmission line greater than 100 kV or a 24 inch or larger pipeline, and all others are minor ROWs.

## 10.10 MINERAL RESOURCES

### 10.10.1 Fluid Minerals (including Geothermal)

#### *Methodology*

The analysis of impacts on fluid minerals focuses on impacts of existing and proposed conservation measures to protect GRSG. These impacts may be direct or indirect. For example, a direct impact on oil and gas development would result from closing an area to fluid mineral leasing, particularly an area that has moderate to high potential for the development of an oil or gas resource. An indirect impact would result from managing an area as a ROW exclusion, which could prohibit construction of necessary off-lease facilities and access, thereby changing the economic feasibility of developing the leased resource. Additional actions or

conditions that would cause direct or indirect impacts on fluid minerals are described under indicators below.

***Indicators***

Indicators of impacts on fluid minerals are as follows:

- The amount of land identified as closed to fluid mineral exploration and leasing
- The amount of land open to leasing subject to NSO stipulations
- The amount of land open to leasing subject to CSU stipulations
- The amount of land open to leasing subject to TL stipulations
- Application of COAs on fluid mineral exploration and development activities on existing and future leased lands for the protection of GRSG
- The amount of land managed as ROW avoidance areas
- The amount of land managed as ROW exclusion areas
- The amount of land closed to mineral material disposal

***Assumptions***

The analysis includes the following assumptions:

- Fluid mineral operations on existing federal leases, regardless of surface ownership, would be subject to COAs by the BLM Authorized Officer and the authorized officer of the surface management agency at the time of APD approval. The BLM and Forest Service can deny surface occupancy on portions of leases with COAs to avoid or minimize resource conflicts if this action does not eliminate reasonable opportunities to develop the lease. Existing leases would be developed consistent with applicable laws and valid existing rights, using as many of the RDFs and conservation measures as possible while still allowing reasonable opportunities for development. Access to producing leases, including roads and pipelines to those leases, would not be affected by this RMPA.
- Valid existing leases would be managed under the stipulations in effect when the leases were issued; new stipulations proposed under this RMPA would apply only on new leases.
- Under all alternatives, reclamation bonds would be required, pursuant to 43 CFR 3104, in an amount sufficient to ensure full restoration of lands to the condition in which they were found. In addition, APDs, including drilling plans and surface use plans of operations, would be required under all alternatives in accordance with 43 CFR 3162.
- If an area is leased, it could be developed; however, not all leases would be developed within the life of this RMPA.
- As the demand for energy increases, so will the demand for extracting energy resources in areas with potential.
- Technological advancements, such as directional drilling, could lead to changes in levels of fluid mineral development potential throughout the planning area as additional resources become more easily accessible.

## 10.10.2 Nonenergy Leasable Minerals

***Methodology***

Analysis of impacts on non-energy leasable mineral development from this EIS focuses on the impacts of conservation measures to protect GRSG. These impacts may be direct or indirect. For example, a direct impact on non-energy leasable mineral development would result from closure of an area to non-energy

leasable mineral development. An indirect impact would result from removal of a road, which would change the economic feasibility of developing a site. For example, a direct impact of closing lands to non-energy leasable development would be that those mineral resources are not extracted. An indirect impact would be limited or no traffic into and out of the area since those resources are no longer available to develop. Additional actions or conditions that would cause direct or indirect impacts on non-energy leasable minerals are described under indicators below.

***Indicators***

Indicators of impacts on non-energy solid minerals are as follows:

- The number of acres closed to nonenergy solid mineral leasing
- The number of acres closed to new non-energy leasable surface mining
- The restrictions on surface use or timing placed on non-energy solid mineral leasing
- The restrictions on surface use or timing placed on prospecting and exploration
- Application of RDFs to non-energy leasable development for the protection of GRSG

***Assumptions***

The analysis includes the following assumptions:

- Nonenergy leasable mineral operations on existing federal leases, regardless of surface ownership, could be subject to RDFs by the BLM Authorized Officer and the authorized officer of the surface management agency. Under these circumstances, existing leases would be developed consistent with applicable laws and valid existing rights, using as many of the RDFs and conservation measures as possible while still allowing reasonable access.

### 10.10.3 Coal

***Methodology***

Analysis of impacts on coal development from this EIS focuses on the impacts of conservation measures to protect GRSG. These impacts may be direct or indirect. Additional actions or conditions that would cause direct or indirect impacts on coal are described under indicators below.

***Indicators***

Indicators of impacts on coal are as follows:

- The amount of acres identified as unacceptable for coal leasing
- The amount of land surface identified as unsuitable for surface coal mining
- Application of siting, surface disturbance, and TL stipulations on both surface and underground coal mining
- Application of surface disturbance limitations and TL stipulations and reclamation requirements for coal exploration.

***Assumptions***

The analysis includes the following assumptions:

- If an area is leased, it could be developed. Not all leases would be developed within the life of this RMPA; however, pursuant to 43 CFR 3483, coal leases may be terminated if they are not diligently developed.

- Coal operations on existing federal leases, regardless of surface ownership, could be subject to restrictions on surface disturbance. Under these circumstances, existing leases would be developed consistent with applicable laws and valid existing rights, using as many of the restrictions and conservation measures as possible while still allowing reasonable access.
- As the demand for energy increases worldwide, so will the demand for extracting energy resources in areas with potential.

### 10.10.4 Locatable Minerals

#### *Methodology*

RMP decisions can include those that affect uses related to minerals subject to disposal under the mineral leasing, geothermal leasing, and mineral materials disposal laws; however, no RMP decision can affect the applicability of the US mining laws or uses thereunder. Under section 202(e)(3) of FLPMA, public lands can only be removed from or restored to the operation of the Mining Law of 1872, as amended, by withdrawal action pursuant to section 204 or other action pursuant to applicable law (43 USC 1712(e)(3)). An RMP may recommend an area for withdrawal from location and entry under the U.S. mining laws; however, such recommendation has no legal effect or environmental consequence. Under section 204 of FLPMA, only the Secretary or an individual in the Office of the Secretary who has been appointed by the President, by and with the advice and consent of the Senate, can make, modify, extend, or revoke withdrawals. An RMP recommendation to withdraw an area from location and entry under the U.S. mining laws does not constitute a withdrawal proposal under section 204 of FLPMA, nor does it compel the Secretary to consider such a withdrawal in more detail, or otherwise dictate or limit what areas may be withdrawn.

Despite the lack of legal effect or environmental impact associated with a recommendation in an RMP that the Secretary withdraw any public land from location and entry under the US mining laws, and strictly for the purposes of comparison between the alternatives, this EIS includes a description of the potential environmental consequences of a Secretarial withdrawal of the analysis area from location and entry under the US mining laws. Should the Secretary propose a withdrawal, such proposal would include a legal land description of the land proposed for withdrawal and would be published in the Federal Register for public review and be subject to appropriate analysis under NEPA and FLPMA, including consideration of any relevant mineral potential data.

#### *Indicators*

Indicators of impacts on locatable minerals are as follows:

- The amount of land open to mineral entry
- The amount of land recommended for withdrawal from locatable mineral entry
- The designation of areas as ACECs that would trigger the requirement under 43 C.F.R. § 3809.411(c) to file a plan of operations for any surface disturbing activities in those areas greater than casual use

#### *Assumptions*

The analysis includes the following assumptions:

- Restrictions on locatable mineral development could only occur through existing legal avenues such as the BLM's mandate to prevent unnecessary or undue degradation (43 CFR 3809). The management actions analyzed for this RMPA would not interfere with valid existing rights.
- Areas recommended for withdrawal would be withdrawn by a public land order issued by the Secretary of the Interior (5,000 acres or less) or by an act of Congress (over 5,000 acres).

### 10.10.5 Mineral Materials

#### *Methodology*

Analysis of impacts on mineral materials focuses on the impacts of conservation measures to protect GRSG. These impacts may be direct or indirect. For example, a direct impact on mineral materials would result from closure of an area to mineral material sales disposal. An indirect impact would result from removal of a road, which could change the economic feasibility of developing a site. Additional actions or conditions that might cause direct or indirect impacts on mineral materials are described under Indicators, below.

#### *Indicators*

Indicators of impacts on mineral materials are as follows:

- The amount of land closed to mineral material disposal
- Application of disturbance, timing, and other limitations
- The amount of land over which RDFs would be applied to mineral material disposals
- Application of restoration requirements

#### *Assumptions*

The analysis includes the following assumptions:

- Future demand for mineral materials will vary depending upon market conditions, which differ according to economic conditions and construction activity. Construction projects within approximately 50 miles of mineral materials deposits may lead to development of these deposits. It is expected that mineral materials activity will continue at roughly the same level for the life of the RMPA.

### 10.10.6 Oil Shale and Tar Sands

#### *Methodology*

Analysis of impacts on oil shale and tar sands focuses on the impacts of conservation measures to protect GRSG. These impacts may be direct or indirect. For example, a direct impact would result from closure of an area to oil shale and tar sand development. An indirect impact would result from removal of a road, which could change the economic feasibility of developing a site. Additional actions or conditions that might cause direct or indirect impacts on mineral materials are described under Indicators, below.

#### *Indicators*

Indicators of impacts on oil shale and tar sands are as follows:

- Application of conservation measures for GRSG to existing pending leases
- The amount of land managed as ROW avoidance areas
- The amount of land managed as ROW exclusion areas

#### *Assumptions*

There are no assumptions specific to the analysis of oil shale and tar sands.

## 10.11 Special Designations

### 10.11.1 Methods and Assumptions - Greater Sage-Grouse ACECs

#### *Indicators*

Impacts on ACECs would occur from management actions that protect or impair relevant and important values, including "important historic, cultural, or scenic values, fish and wildlife resources or other natural

systems or processes" (BLM Manual 1613, Areas of Critical Environmental Concern). As such, indicators of impacts are allocations for surface-disturbing activities within existing or potential ACECs that could affect the relevant and important values for which the area was designated.

***Assumptions***

This analysis is based on the assumptions in **Section 4.1.1**. The analysis also includes the following assumptions:

- Management for existing ACECs was determined in the applicable Resource Management Plans to be adequate to support the relevant and important values at the time of their designation. Impacts on these ACECs are not further discussed because the BLM would continue to manage these ACECs to protect their relevant and important values. Management to protect GRSG under the various alternatives could (or would typically) provide additional protections for existing ACECs or provide complementary management.
- Although management actions for most resources and resource uses have rangewide application, ACEC area management prescriptions apply only to those lands within each specific ACEC.
- Permitted activities would not be allowed to impair the relevant and important values for which the ACECs are designated. The exception is locatable minerals; until withdrawn from mineral entry, a mining claim can be filed, and subsequent mining could have an impact.
- ACEC designation provides protection and focused management of relevant and important values beyond that provided through general management of the relevant and important value(s) elsewhere in the rangewide area.
- Any designated ACEC that falls within a Wilderness Study Areas (WSA) would be managed according to BLM Manual 6330, Management of Wilderness Study Areas, unless the ACEC management is more restrictive. Because activities within WSAs must meet the nonimpairment criterion, which generally restricts new surface disturbance, it is assumed that a WSA would generally protect relevant and important values and would have a beneficial effect on overlapping designated and undesignated ACECs. If Congress were to release a WSA from further consideration, the special management in designated ACECs would be designed to protect and enhance the relevant and important values.

## 10.12 Social and Economic Conditions (Including Environmental Justice)

### 10.12.1 Methods and Assumptions

***Indicators***

*Fluid Minerals (Oil and Gas)*

Potential changes in oil and gas production and development due to the BLM management decisions for the protection of GRSG could impact economic and social conditions. The BLM management decisions could change oil and gas production and development by changing the amount of land closed to fluid mineral leasing, the amount of land open to leasing but subject to NSO, CSU, and TL stipulations, and by changing the COAs on fluid mineral exploration and development activities on existing and future leased lands (see **Section 4.9**, Mineral Resources, for more information), and the potential changes in oil and gas production and development could impact economic and social conditions through the following indicators analyzed in this section:

- Change in economic activity, as measured by jobs, income, economic output, and tax revenue and payments to the state and counties.
- Changes to public services associated with potential impacts on tax revenue.

- Changes to way of life, culture, social cohesion, and preservation of nonmarket values, including direct and indirect use and non-use values, for mineral development and production communities of interest, those involved in local governments, local residents, and other communities of interest that may value access to mineral resources.

*Nonenergy Leasable Minerals*

Potential changes in nonenergy leasable mineral extraction due to the BLM management decisions could impact economic and social conditions through the following indicators:

- Change in economic activity and market conditions associated with impacts on nonenergy leasable minerals due to change in the amount of land closed to mineral leasing and the amount of land open to leasing but subject to NSO, CSU, and TL stipulations.
- Changes to way of life, culture, social cohesion, and preservation of nonmarket values, including direct and indirect use and non-use values, for mineral development and production communities of interest, those involved in local governments, local residents, and other communities of interest that may value access to mineral resources.

*Locatable Minerals*

Potential changes in locatable mineral exploration and extraction due to the BLM management decisions could impact economic and social conditions through the following indicators:

- Change in economic activity associated with impacts on locatable minerals due to change in the amount of land withdrawn from mineral entry.
- Changes to way of life, culture, social cohesion, and preservation of nonmarket values, including direct and indirect use and non-use values, for mineral development and production communities of interest, those involved in local governments, local residents, and other communities of interest that may value access to mineral resources.

*Mineral Materials*

Potential changes in mineral materials exploration and extraction due to the BLM management decisions could impact economic and social conditions through the following indicators:

- Change in public access to mineral materials due to changes in the amount of land closed to mineral materials disposal.
- Changes to preservation of nonmarket values, such as access to clean air and water, health and safety impacts, and visitor and viewer enjoyment from changes in air quality associated with potential changes in mineral materials extraction.

*Renewable Energy (Geothermal, Wind, and Solar)*

Potential changes in renewable energy production and development, including geothermal, wind, and solar, due to the BLM management decisions could impact economic and social conditions through the following indicators:

- Change in economic activity associated with geothermal production and development, as measured by jobs, income, economic output, and tax revenue and payments to the state and counties, that are due to changes in amount of land closed geothermal leasing and open to leasing but subject to NSO, CSU, and TL stipulations and changes in COAs on geothermal development activities on existing and future leased lands for the protection of GRSG.

- Change in economic activity associated with wind and solar due to changes in the amount of land managed as ROW avoidance and exclusion areas.
- Change in way of life, culture, visitor and viewer enjoyment, and preservation of nonmarket values, including direct and indirect use and non-use values, for local residents and visitors around renewable energy developments as well as communities of interest that value renewable energy.

*Livestock Grazing*

Potential changes in livestock grazing due to the BLM management decisions, such as changes in acres of land available for livestock grazing, could impact economic and social conditions through the following indicators:

- Change in economic activity, as measured by jobs, income, and economic output, associated with impacts on billed AUMs.
- Change in economic resilience and stability for ranching and farming communities.
- Changes in way of life, culture, social cohesion, and preservation of nonmarket values, including direct and indirect use and non-use values, associated with livestock grazing for ranchers and farmers and their families, local governments, local residents, and other communities of interest that may value livestock grazing on BLM-administered lands.

*Greater Sage Grouse Conservation*

Changes in greater sage grouse conservation measures due to the BLM management decisions could impact economic and social conditions through the following indicators:

- Changes to nonmarket values, including direct and indirect use and non-use values, associated with GRSG conservation and healthy sagebrush ecosystems, with particular importance for habitat and resource conservation communities of interest and other communities of interest that value the protection of GRSG for use and non-use values.
- Changes to ecosystem services associated with healthy sagebrush ecosystems.

*Environmental Justice*

As discussed in Appendix 13, Socioeconomic Baseline Report, and Chapter 3 of this EIS, issues of concern for potential impacts on environmental justice populations were identified (see Appendix 13, Socioeconomic Baseline Report and Section 3.11, Social and Economic Conditions (including Environmental Justice) for more details on the issues of concern). These issues were examined to determine if the BLM-management decisions in each alternative result in adverse and disproportionate impacts on the environment, health, and livelihoods of environmental justice populations.

### *Assumptions and Methodology*

A detailed discussion of the specific methodologies used in the impact analysis is provided in **Appendix 18**, Social and Economic Impact Analysis Methodology. In addition to the assumptions provided in that appendix as well as those provided in **Section 4.1.1**, Analytical Assumptions, this analysis includes the general assumptions described below.

*Economic and Social Conditions and Values*

- Employment and income (especially labor earnings) would continue to be a driver of economic and population change in the socioeconomic study area.
- Activities and resources available in and around the planning area would continue to be important to the quality of life of current and future residents.

- The pace and timing of mineral development activities is dependent on a variety of factors outside the management decisions of BLM and Forest Service. These include national and international energy demand and prices, production factors within the planning area, and business strategies of operators. The RFD scenario projects expected rates of well drilling, completion rates, and production decline curves. Together these parameters allow for projection of future oil and gas production volumes for use in the economic impact analysis. Actual economic impacts could vary if development or production deviates from the projections, if prices change, or if the relationships between industry output, intermediate inputs, and labor productivity change.
- The pace and timing of geothermal, wind, and solar energy development activities is also dependent on a variety of factors outside the management decisions of BLM. These include demand for non-fossil fuel-generated electricity, availability of transmission infrastructure capacity, prices for other energy sources such as coal and natural gas, costs of geothermal, wind and solar energy generation technologies, access and availability of relevant subsidies and incentives, production factors within the planning area, and business strategies of operators. The impacts analysis uses geothermal, wind, and solar deployment scenarios from the RFD. Actual impacts could vary if the rate of development over the study period is different.
- The data collected to calculate projected revenue and well development costs for this impact analysis are based on historical data prior to the passing of the IRA. Revenue and production from new oil and gas leases is expected to change as a result of the changes from the implementation of the IRA, such as the increases in royalty rates and rental rates, which could lead to changes in operational decisions by oil and gas operators.
- While recreation and coal are expected to continue to have impacts on local and regional economic contributions, there are not likely to be impacts on recreation and coal activities and economic contributions across the alternatives from BLM-management decisions related to GRSG. For this reason, economic and social impacts associated with recreation and coal have been dismissed from further analysis. See Section 4.18 and Section 4.9 for more information on BLM-management impacts on recreation and coal, respectively.
- The AML for herd management areas are established in RMPs at the outset of planning and adjusted based on monitoring data throughout the life of the RMP. The BLM management decisions could impact wild horses and burros and the ability of herd management areas to support AMLs within the management areas where management options are restricted for the protection of GRSG; however, aside from the initial removal actions of wild horses and burros, there would be no additional impacts to wild horse and burros within herd management areas, under all alternatives. There could be impacts on wild horses and burros outside of herd management areas in OHMA but in adjacent lands that meander in and out of herd management areas and utilize the resources within, because there is potential for removal of resources, particularly water developments. However, these potential changes due to BLM-management decisions are not expected to impact social conditions or access to social values from wild horses through use and non-use values under all alternatives. For this reason, economic and social impacts on wild horses and burros have been dismissed for further analysis. See Section 4.6, Wild Horses, and Burros, for more information on BLM-management impacts on wild horses and burros.
- Economic and social impacts of BLM-management decisions on oil shale and tar sands was dismissed from further analysis due to the limited amount of oil shale and tar sands extraction on federal lands.

*Environmental Justice*

- Land use planning level decisions do not result directly in development activities. While this analysis looks at impacts on environmental justice populations from potential changes in development activities due to BLM management decisions, any differences in actual development activities from those included in the discussion below could change the impacts on environmental justice populations. Additional site-specific analysis are required prior to implementation of development activities to determine if and where any disproportionate adverse impacts occur for specific identified environmental justice populations.

## 10.13 AIR RESOURCES AND CLIMATE

### 10.13.1 Air Quality

#### *Methodology*

Implementation of GRSG conservation measures may indirectly impact air quality, following the assumption that existing operations would remain unchanged and could continue to affect air quality. Future air impacts will be directly evaluated during their individual NEPA processes and air quality impacts will remain unchanged until a project is implemented. The air quality impact analysis focuses on how changes in allowable uses under each alternative would impact air pollution. Since the air quality impact assessments performed for the previous EISs occurred at different times with sometimes differing technical approaches, this analysis will be primarily qualitative. Potential impacts on air quality from implementing Alternatives 2, 3, 4, and 5 are qualitatively compared to Alternative 1, as the No Action Alternative, to determine what changes, if any, can be expected to air quality under each alternative.

#### *Indicators*

Indicators of impacts on air quality are as follows:

- Acres closed or subject to stipulations on fluid mineral leasing, and resulting changes in oil and gas production.
- Acres closed to nonenergy solid mineral leasing, mineral entry, and sale or disposal of mineral material resources.
- Area of land with the potential for disturbance due to solar and wind energy development and associated facilities, and from other major and minor ROWs.
- Amount of road traffic from construction, daily operation, and road maintenance.
- Changes in the level of livestock grazing, supporting activities, and range maintenance.
- A substantial change in the likelihood or severity of wildland fire (based on level of restrictions on uses that may introduce sources of ignition)

#### *Assumptions*

In addition to the assumptions in **Section 4.1.1**, Analytical Assumptions, this analysis includes the following assumptions:

- Air resource impacts can be localized or regional.
- Weather-related events and wildfires may cause or contribute to local or regional air resource impacts.

### 10.13.2 Climate Change and Greenhouse Gases

***Methodology***

Impacts to climate change depend on changes in emission of GHGs and carbon sequestration of the land. Potential impacts on climate change from implementing Alternatives 2, 3, 4, and 5 are qualitatively compared to Alternative 1, as the No Action Alternative, to determine what changes, if any, can be expected to GHG emissions or carbon sequestration under each alternative.

***Indicators***

Indicators of impacts of climate change include:

- Acres closed or subject to stipulations on fluid mineral leasing, and potential changes in oil and gas production.
- Acres closed to nonenergy solid mineral leasing, mineral entry, and sale or disposal of mineral material resources.
- Area of land managed as open, exclusion, or avoidance areas for renewable energy development and ROWs (e.g., transmission lines).
- Level of road traffic from daily travel and amount of road maintenance and construction activities.
- Changes in permitted AUMs and level of livestock grazing supporting activities (e.g., rangeland improvement or livestock transportation).
- A substantial change in the likelihood or severity of wildland fire (based on level of restrictions on uses that may introduce sources of ignition)

## 10.14 SOIL RESOURCES

### 10.14.1 Methods and Assumptions

***Methodology***

Wide ranging impacts are described because the nature and type of impacts would not change at different levels, though they may be concentrated in different areas based on how surface-disturbing activities are distributed across the landscape and area-specific soil resources. The following activities are considered surface-disturbing and would have similar impacts on soils: minerals development, renewable energy development, and right-of-way (ROW) development.

***Indicators***

Indicators of impacts on soil resources are as follows for assessing soil productivity and erosion:

- Changes in livestock grazing
- Changes in surface-disturbing activities (minerals development, renewable energy development, and ROW development)
- Changes in vegetation treatments, prescribed burns, and potential for wildfire
- Changes in wild horse and burro management

***Assumptions***

This analysis is based on the assumptions in **Section 4.1.1**. Also, the analysis includes the following assumptions:

- Soils on BLM-administered lands will be managed to maintain inherent productivity and promote sustained yields, while keeping erosional mechanism at minimal and acceptable levels thus preventing

physical or chemical degradation. Proposed surface-disturbing projects will be analyzed to determine suitability of soils to support or sustain such projects and will be designed to minimize soil loss.

- Achieving or maintaining Standards for Rangeland Health and Guidelines for Livestock Grazing Management (described in **Section 3.7**, Livestock Grazing) generally are effective in managing the effects on soils from livestock grazing when properly implemented and monitored. Grazing authorizations will be adjusted on a case-by-case basis when site-specific studies indicate changes in management are needed.
- BLM management actions and objectives will be consistent with soil resource capabilities.
- Vegetation treatment projects and planned or unplanned wildland fires that contribute to establishing a more natural fire regime would have long-term benefits to soil health. However, wildfire can have detrimental soil health impacts (e.g. in high intensity or sensitive soil types) in some locations or when the disturbance leads to the establishment of invasive plant species.
- Wild horses and burros exceeding AML can degrade soil resources. However, wild horse and burrow management would reduce the impacts on soils.

## 10.15 WATER RESOURCES

### 10.15.1 Methods and Assumptions

#### *Methodology*

Wide ranging impacts are described because the nature and type of impacts would not change at different levels, though they may be concentrated in different areas based on how surface-disturbing activities are distributed across the landscape and watershed resources. The following activities are considered surface-disturbing and would have similar impacts on water resources: minerals development, renewable energy development, and ROW development.

#### *Indicators*

Indicators of impacts on water resources are as follows for assessing water resource conditions, and water quality and quantity:

- Changes in livestock grazing
- Changes in surface-disturbing activities (minerals development, renewable energy development, and ROW development)
- Changes in vegetation treatments, prescribed burns, and potential for wildfire
- Changes in wild horse and burro management

#### *Assumptions*

This analysis is based on the assumptions in **Section 4.1.1**. Also, the analysis includes the following assumptions:

- Projects that help restore watersheds, desirable vegetation communities, or wildlife habitats (including surface disturbance associated with these efforts) would benefit water resources over the long term.
- The degree of impact attributed to any one disturbance or series of disturbances would be influenced by several factors. These are proximity to running streams, drainages and groundwater wells, location within the watershed, time and degree of disturbance, reclamation potential of the affected area, vegetation present, precipitation, and mitigating actions applied to the disturbance.
- Areas closed to ROWs, mining, or with NSO stipulations would result in less potential for water erosion and sedimentation to surface water.

- Surface-disturbing actions related to fluid mineral development would comply with Gold Book (BLM 2007) surface operating standards (and subsequent updates), and all federal and state water quality standards.
- Fluid mineral operations on existing federal leases, regardless of surface ownership, would be subject to COAs by the BLM Authorized Officer. The BLM can deny surface occupancy on portions of leases with COAs to avoid or minimize resource conflicts if this action does not eliminate reasonable opportunities to develop the lease or does not affect lease rights.
- The quantity of water stored in the landscape either as surface water or groundwater varies over time depending upon precipitation and human extractions of that water. Management measures that reduce or prevent water use involving mineral development, livestock grazing, wild horses and burros, and pinyon-juniper vegetation would have a net benefit on the quantities of water stored in the landscape.

## 10.16 CULTURAL RESOURCES

### 10.16.1 Methods and Assumptions

#### *Methodology*

This section focuses on qualitatively describing the impacts that would result from implementing the alternatives. Impacts are described across the entire planning area because the nature and type of impacts would not change at various levels, though they may be concentrated in different areas based on how potentially surface-disturbing and setting-altering activities and actions that increase use or access are distributed across the landscape.

Impacts on cultural resources would primarily be the product of management actions described in **Chapter 2** that result in surface disturbance or alterations in setting, and actions that result in increased resource use or access. There is overlap between them, and impacts can only be described qualitatively and generally without site-specific project details. The types of actions that can result in these impacts are discussed in more detail in **Section 4.15.2**, Nature and Type of Effects.

#### *Indicators*

Indicators of impacts on cultural resources are as follows:

- Changes in potential for ground disturbance, including erosion and soil removal.
- Changes in potential for vandalism and collection of cultural resources through changes in access or recreation.
- Changes in potential for impacts to site setting, such as landscape fragmentation, visual disturbance, and noise.

#### *Assumptions*

This analysis is based on the assumptions in **Section 4.1.1**. and the following additional assumptions:

- The BLM will follow existing regulatory procedures for the consideration of impacts on cultural resources (for example, Section 106 of the National Historic Preservation Act or relevant program alternatives).
- Nondiscretionary mining notices are not federal undertakings, but 43 CFR 3809 specifically provides for the protection of cultural properties by prohibiting mining operators on claims of any size from knowingly disturbing or damaging these properties.

- Many more sites and resources exist in the planning area than are currently inventoried; this includes traditional cultural properties and other data sets outside existing inventoried cultural data, including but not limited to, knowledge of sites from communities in the planning area.
- Areas of high potential for cultural resource site locations have not been modeled throughout the entire planning area.
- Many sites, inventoried or not, are likely significant for regional and national history, including indigenous sites; however, they have never been evaluated for listing on the National Register of Historic Places.
- This analysis assumes all sites are eligible until evaluated, and they are subject to the impacts discussed.
- Any ground-disturbing activity would be considered a potential threat to cultural resources. Cultural sites are nonrenewable resources, adverse impacts are permanent, and beneficial impacts cannot reverse adverse impacts. Even minor impacts accrue over time, resulting in deteriorating site condition and loss of important scientific data and cultural values.
- Recreation levels and future demand in the planning area are likely to continue increasing (See Section 4.18, Recreation and Visitor Services).
- Implementing the management actions for GRSG would have mostly negligible or beneficial impacts on cultural resources. Impacts from resource use actions would tend to have negligible detrimental effects.
- Degradation of known and undiscovered cultural resources from natural processes (e.g., erosion) would continue regardless of avoidance of human caused impacts.
- Unauthorized or unplanned activities, wildland fire, dispersed recreation, natural processes and unauthorized collection, excavation, and vandalism would lead to impacts that would be difficult to monitor and mitigate. Impacts on traditional cultural properties, sacred sites, historic trails, and some other cultural resources that are significant for reasons other than data potential would be difficult or impossible to mitigate unless the resources and associated settings were avoided.
- Traditional cultural property locations, importance, and nature of use are defined by the communities associated with them. Maintaining access to and reducing impacts on them are responsibilities of the BLM and are important objectives of cultural resource management.

## 10.17 TRIBAL INTERESTS

### 10.17.1 Methods and Assumptions

***Indicators***

The use of indicators in NEPA analysis should provide information on determining the extent or degree to which a tribal interest, resource, or setting is damaged, its physical integrity is lost, or its physical integrity is otherwise adversely affected by a proposed action. However, unlike cultural resources, which have legal criteria for determining the impacts, the impacts on areas or resources of tribal interest and the severity of impacts are dependent upon the perspective and context of the tribe or affected group. In other words, significant impacts would be determined by Indian tribes defining what is culturally or spiritually important to them. When assessing whether the action would have significant impact, the following level-of-effect indicators are carefully considered and consulted upon with tribal representatives:

- Magnitude: The amount of physical alteration or destruction that can be expected. The resultant loss of tribal value is not measurable in quantitative terms, but is described in qualitative summary.
- Severity: The irreversibility of an impact. Impacts that result in an irreversible and irretrievable loss of value are of the highest severity.

- Duration: The length of time an impact persists. Impacts may have short-term or temporary effects, or conversely, more persistent, long-term effects on tribal values.
- Range: The spatial distribution, whether widespread or site-specific, of an impact.
- Frequency: The number of times an impact can be expected. For example, an impact of variable magnitude and severity may occur only once. An impact such as that resulting from annual activities, such as road maintenance, may be of recurring or ongoing nature.

***Assumptions***

In addition to the assumptions in **Section 4.1.1**. this analysis includes the following assumptions:

- Native Americans or other traditional communities may have concerns about federal impacts on cultural resources, religious practices, or natural resource gathering that may occur because of federal actions. In cases where these concerns may be present, consultation would occur with the potentially affected Indian tribes.
- There may be areas of importance to contemporary Native Americans that are not readily identifiable outside of those communities.
- Consultation would continue with Indian tribes to identify any traditional cultural properties or resource uses and address impacts. Through this process, effects would be minimized or eliminated, although residual effects would be possible.

## 10.18 LANDS WITH WILDERNESS CHARACTERISTICS

### 10.18.1 Methods and Assumptions

***Indicators***

Any change in the existing conditions of lands with wilderness characteristics is an indicator of impacts to the inventoried characteristics. Changes in existing conditions could be positive or negative, such as, impacts affecting preservation or degradation of inventoried characteristics.

Indicators of inventoried wilderness characteristics are as follows:

- Size—Projects or management actions that bisect a lands with wilderness characteristics unit so that there are no longer 5,000 acres or more of contiguous BLM lands would change the boundary of the unit and cause the unit to not meet the size requirements. Examples include issuing rights of way and/or constructing or improving roads that would create a wilderness inventory boundary and potentially reduce the size of lands with wilderness characteristics inventoried units.
- Naturalness—Impacts would result from new or a lack of human developments, surface disturbances, or vegetation manipulations that make the area appear to the casual visitor as more or less affected primarily by the forces of nature.
- Outstanding opportunities for solitude or a primitive, unconfined type of recreation—Indicators of impacts that may influence a visitor's solitude include distance between areas of frequent visitation, vegetative screening around the proposed action, topography of the area around the proposed action, attraction of significant additional public visitation, and the ability of visitors to avoid the proposed action and find seclusion in other parts of the inventoried unit. Indicators of impacts that may influence a visitor's opportunity for primitive and unconfined recreation include impairment to the qualities of the primitive and unconfined recreation opportunities to the degree that they would no longer be outstanding. Some examples of primitive and unconfined types of recreation include: hiking, backpacking, fishing, hunting, spelunking, horseback riding, climbing, river running, cross-

country skiing, snowshoeing, dog sledding, photography, bird watching, canoeing, kayaking, sailing, and sightseeing for botanical, zoological, or geological features.

***Assumptions***

The analysis includes the following assumptions:

- All units identified as possessing wilderness characteristics were determined by the BLM to meet the inventory criteria outlined in BLM Manual 6310 (i.e., size, apparent naturalness, and contain outstanding opportunities for solitude or a primitive and unconfined type of recreation).
- All wilderness characteristics inventories will be maintained and will be updated whenever actions are proposed that could impact BLM-administered lands determined to possess wilderness characteristics.
- The BLM can choose to manage lands with wilderness characters for multiple use rather than the preservation of wilderness character. This analysis addresses the impacts on wilderness characteristics.

## 10.19 RECREATION AND VISITOR SERVICES

### 10.19.1 Methods and Assumptions

***Methodology***

This discussion analyzes the impacts that proposed management decisions would have on managing recreation, recreation opportunities, and the SRP program. Visitor use patterns are difficult to estimate and depend on many factors beyond the scope of management (e.g., recreation trends and economy). For this reason, qualitative language—for example, "increase" or "decrease"—is used to describe anticipated impacts. For information on qualitative socioeconomic impacts on recreation, refer to **Section 4.11**, Social and Economic Conditions (Including Environmental Justice).

***Indicators***

Indicators of impacts on recreation resources are as follows:

- Change in the types of recreation activities, experiences, and benefits in the decision area
- Restrictions on the number and type of SRPs issued on an annual basis within the decision area

***Assumptions***

This analysis includes the following assumptions:

- Recreational OHV use will continue to be a recreation activity.
- Recreation activity, particularly recreational OHV use and mountain biking, is expected to increase throughout the life of current RMPs.
- Outside areas where recreation is the management focus, the BLM will manage recreation activities that consist mostly of dispersed activities where users participate in activities individually or in small groups.
- The potential for resource impacts and conflicts between all types of users, but particularly between motorized and nonmotorized users, will increase with increasing use.
- BLM management of areas unsuitable for public utilities (i.e., ROW exclusion areas) preserves recreation opportunities.
- Closure of areas to mineral development decreases the likelihood for conflict with recreation users and maintains desired recreation settings in those areas.

- Outdoor recreation will continue to be an important component of local economies.
- Demand for SRPs will remain steady or gradually increase.
- The BLM will continue to issue SRPs on a discretionary basis.

## 10.20 TRANSPORTATION AND TRAVEL MANAGEMENT

### 10.20.1 Methods and Assumptions

#### *Methodology*

The analysis of impacts on transportation and travel management is a comparison of the acres that would be managed as open, limited, and closed to OHV use based on the HMA designations under each alternative.

#### *Indicators*

The indicator of impacts on transportation and travel management are the acres managed as open, limited, and closed to OHV use.

#### *Assumptions*

There are no assumptions specific to transportation and travel management.

## 10.21 SUMMARY OF ENVIRONMENTAL CONSEQUENCES TABLE

**Table 10-1. Summary of Environmental Consequences**

| Alternative 1 | Alternative 2 | Alternative 3 | Alternative 4 | Alternative 5 | Alternative 6 |
|---|---|---|---|---|---|
| **Greater Sage-Grouse** | | | | | |
| Restrictions on development, such as WEMs, stipulations and avoidance/exclusion areas, would be applied within HMAs. As a result, energy development, mining, ROWs, and other surface disturbing activities would be focused outside of PHMA. The BLM would incorporate adaptive management, mitigation, disturbance caps, buffers, habitat objectives, and monitoring would reduce the total net impact on GRSG. | Alternative 2 allows for more flexibility in the management of activities that can impact GRSG. The BLM would remove SFA in some states. As a result, there would be more acres of GRSG habitat open to mineral development. This would increase potential for impacts on GRSG and habitat, including disturbance and habitat alterations. | Under Alternative 3 all areas for GRSG would be managed as PHMA. Additionally, management actions for PHMA, such as lek buffers, closures to surface disturbing activities, and managing as unavailable for grazing would be more restrictive and designed to promote GRSG conservation to a greater extent. Applying a 3% disturbance cap at the project scale and within HAF fine-scale boundaries would include protection for both the larger population and individual leks and their surrounding habitat. As a result, this alternative would provide the most protection for GRSG and habitat. However, removal of grazing in PHMA could result in a build-up of fine fuels that may exacerbate a large-scale wildfire that would destroy large areas of GRSG habitat. | Impacts under Alternative 4 would be similar to those under Alternatives 1 and 2, with adjustments based on HMA review or other state-specific considerations. A larger acreage would be managed with an NSO stipulation on fluid mineral leasing, which would reduce impacts associated with this use. The requirement for compensatory mitigation to be completed before projects begin would eliminate any time lag between impacts on habitat and when they are restored. | Impacts from Alternative 5 would be similar to those under Alternative 4, though with less acres managed with NSO stipulations, which could allow for greater disturbance to GRSG or its habitat due to fluid mineral development. Further, compensatory mitigation could be completed after a project has started, which would introduce a time lag during with GRSG habitat would be fragmented and reduced in carrying capacity by project impacts. | Impacts would be the same as described for Alternative 5 but reduced due to additional protections associated with management of ACECs. These include reductions in disturbance and habitat loss from fluid mineral leasing and development due to NSO stipulations and closure to nonenergy mineral leasing and salable minerals, as well ROWs due to ACEC management as ROW exclusion areas. |

| Alternative 1 | Alternative 2 | Alternative 3 | Alternative 4 | Alternative 5 | Alternative 6 |
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| **Vegetation, Fish and Wildlife, and Special Status Species** | | | | | |
| Alternative 1 includes restrictions on development, such as land use and surface-disturbing activities that would occur within HMAs and would limit damage to or removal of vegetation; disturbance to fish, wildlife, and special status species; and removal or disturbance to habitats. All states would manage to maintain and enhance sagebrush habitats, which would benefit vegetation as well as some wildlife and special status species which rely on these habitats. | Alternative 2 would result in more areas being open to mineral development and exploration and some areas would remove management of SFAs. This would result in the potential for more impacts on vegetation, fish, wildlife, and special status species from surface-disturbing activities, such as removal, damage, disturbance and habitat fragmentation. | Management of the greatest acreage of PHMA with the most restrictions under Alternative 3 would result in the fewest open acres that could be subject to surface disturbing activities. Such management would decrease the potential for impacts to vegetation, fish, wildlife, and special status species associated with surface disturbing activities. Management of PHMA as unavailable for grazing could benefit biological resources since vegetation would not be trampled or eaten and competition for resources from livestock would be removed. However, the potential for build-up of fine fuels could exacerbate a large-scale wildfire that would destroy large areas of vegetation and habitats. | Impacts under Alternative 4 would be similar to those under Alternatives 1 and 2. With more acres managed as NSO, there would be fewer areas where vegetation could be removed or damaged and fish, wildlife, or special status species could be disturbed or habitats removed or degraded due to fluid mineral leasing and development. Updated management to reflect the latest science would improve management of GRSG habitat and thus vegetation and wildlife and special status species which rely on these habitats. | Impacts would be similar to those under Alternative 4. Under Alternative 5, fewer acres would be managed as NSO, which would allow for more areas where vegetation could be removed or damaged and fish, wildlife or special status species could be disturbed or habitats removed or degraded due to fluid mineral leasing and development. | Impacts would be similar to those under Alternative 5 but reduced due to additional protections associated with management of ACECs. These include reductions in vegetation removal and disturbance and fish, wildlife, and special status species disturbance or habitat removal or degradation from fluid mineral leasing and development due to NSO stipulations and closure to nonenergy mineral leasing and salable minerals, as well ROWs due to ACEC management as ROW exclusion areas. |

| Alternative 1 | Alternative 2 | Alternative 3 | Alternative 4 | Alternative 5 | Alternative 6 |
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| **Wildland Fire Ecology and Management** | | | | | |
| Implementation of a comprehensive strategy for wildland fire management, including use of the FIAT, would improve wildland fire management and target those areas that need the most protection. As a result, the likelihood for wildland fire would be reduced. | Impacts would be the same as described for Alternative 1. | Management of PHMA as unavailable for livestock grazing could limit the BLM's ability to achieve resource objectives, such as the reduction of fine fuels. Such limitations could alter the risk of large-scale wildfires. | Impacts would be the same as described for Alternative 1. | Impacts would be the same as described for Alternative 1. | Impacts would be the same as described for Alternative 1. |

| Alternative 1 | Alternative 2 | Alternative 3 | Alternative 4 | Alternative 5 | Alternative 6 |
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| **Wild Horses and Burros** | | | | | |
| Restrictions on development under Alternative 1 would benefit wild horses and burros where herd management areas overlap these protections. Habitat conditions and forage would be improved in the absence of development. Temporary, or long-term changes to the management of wild horses and burros may be necessary to achieve and maintain the desired habitat condition and could include reducing AMLs, removing designations of herd management areas, and limiting movement patterns and forage access. | Removal of SFAs under Alternative 2 could lead to additional surface disturbance and removal of forage and disturbance of other resources, such as water sources. This would increase impacts on wild horses and burros when compared with Alternative 1. | Removal of wild horses and burros from herd management areas in PHMA under Alternative 3 would have a long-term impact on wild horses and burros. Wild horses and burros outside of herd management areas in PHMA but in adjacent lands could be impacted by changes in management due to the potential for removal of resources, such as water developments for wild horses and burros or livestock. | Impacts on wild horses and burros under Alternative 4 would be similar to those under Alternative 1, with additional management direction to remove reference to SFAs. | Impacts from wild horse and burro management under Alternative 5 would be similar to those described for Alternative 1. Management to the low end of the AMLs could reduce wild horse and burro populations in some areas. | Impacts would be similar to those described for Alternative 5. Additionally, management of ACECs would provide further protection to forage for wild horses and burros and disturbance to wild horses and burros from surface disturbing activities. |

| Alternative 1 | Alternative 2 | Alternative 3 | Alternative 4 | Alternative 5 | Alternative 6 |
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| **Livestock Grazing** | | | | | |
| Alternative 1 includes restrictions on development, such as land use and surface-disturbing activities that would occur within HMAs and would limit disturbance to livestock and reduction in forage availability. | Under Alternative 2, the BLM would remove management of SFAs in some states and would allow more areas open to mineral development and exploration, thus increasing the potential for surface disturbance and impacts on livestock grazing operations and forage quality and quantity. | Alternative 3 would make all acres of livestock allotments inside of PHMA unavailable for grazing. Removing the ability to graze livestock would directly impact permittees/operators through a reduction in income provided by grazing livestock on BLM lands across the rangewide planning area | Impacts would be similar to those described for Alternatives 1 and 2. With more acres managed as NSO, there would be fewer areas where livestock could be disturbed or forage removed due to fluid mineral leasing and development. | Impacts would be similar to those under Alternative 4. Under Alternative 5, fewer acres would be managed as NSO, which would allow for more areas where livestock could be disturbed or forage removed due to fluid mineral leasing and development. | Impacts would be similar to those under Alternative 5 but reduced due to additional protections associated with management of ACECs. These include reductions in disturbance to livestock or removal of forage from fluid mineral leasing and development due to NSO stipulations and closure to nonenergy mineral leasing and salable minerals, as well ROWs due to ACEC management as ROW exclusion areas. |
| **Lands and Realty (Including Wind and Solar)** | | | | | |
| Under Alternative 1, ROWs would be subject to variable restrictions, stipulations, and limitations depending on the state and type of ROW. Impacts in areas where ROWs are restricted would include increased project costs, planning periods, and potential abandonment of future projects. | Impacts would be largely similar to those described for Alternative 1 with some state-specific refinements in HMAs that would change restrictions on ROW developments. | Management of the largest area of PHMA under Alternative 3 compared with the other alternatives and managing PHMA as exclusion for ROWs and renewable energy would prevent ROWs from being developed in many areas and would increase costs or development pressure on neighboring lands. | Impacts associated with Alternative 4 would be less than Alternatives 1, 2, and 3 due to a consistent management approach across the planning area. The impacts would be greater than Alternative 5 due to PHMA and IHMA being managed as avoidance within 0.5 miles of mapped habitat. | Impacts on lands and realty under Alternative 5 would be the least of all of the alternatives due to a consistent approach across the Planning Area and lack of ROW exclusion areas, mitigation measures in corridors, and buffers in areas surrounding HMAs. | Impacts would be similar to those described for Alternative 5. Management of ACECs as ROW exclusion would prevent development in these areas and could increase costs or development pressure in other areas. |

| Alternative 1 | Alternative 2 | Alternative 3 | Alternative 4 | Alternative 5 | Alternative 6 |
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| **Mineral Resources** | | | | | |
| Under Alternative 1, mineral resources would be subject to variable restrictions, stipulations, and limitations depending on the state and type of mineral. Impacts in areas where mineral development is restricted would include increased project costs, planning periods, and potential abandonment of future projects.<br><br>Making PHMA and IHMA NSO would make less land available to mineral entry and leasing. State-specific TLs and lek buffers in GHMA would slow or reduce leasing and development.<br><br>Management of SFAs would impose restrictions or close areas to fluid mineral leasing and development, nonenergy leasable mineral leasing, coal leasing, locatable, mineral materials, and oil and tar sands. | Impacts would be largely similar to those described for Alternative 1 with some state-specific refinements in HMAs and minerals management that would change restrictions on mineral exploration and development.<br><br>In general, Alternative 2 would reduce impacts by allowing for more mineral development. | Alternative 3 would have the greatest impact on mineral resource exploration and development by managing the greatest acreage of PHMA of all alternatives and imposing the greatest restrictions and closures in PHMA. This could prevent minerals from being developed in some areas, could increase costs, and could increase development pressure on adjacent lands. | Impacts would be similar to those described for Alternatives 1 and 2, but impacts would likely be reduced due to a more consistent approach to management across the planning area, Impacts on fluid mineral leasing and development would be greater under Alternative 4 since a greater area would be managed with NSO stipulations, which would limit fluid mineral development or increase costs. | Impacts would be similar to those described for Alternative 4. Impacts on fluid minerals would be less under Alternative 5 since fewer acres would be managed with NSO stipulations. | Impacts would be similar to those described for Alternative 5. Management of ACECs would impose greater restrictions on mineral development in some areas, which may increase costs or push development to other lands. |

| Alternative 1 | Alternative 2 | Alternative 3 | Alternative 4 | Alternative 5 | Alternative 6 |
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| **ACECs and RNAs** | | | | | |
| Management of 2 ACECs and 13 key RNAs with important GRSG conservation values in Oregon would continue, including managing all or portions of them as unavailable to livestock grazing. | Impacts would be the same as described for Alternative 1. | Management of additional ACECs under Alternative 3 would result in the greatest restrictions on activities that could degrade relevant and important values, including restrictions on surface-disturbing activities (including minerals development, renewable energy development, and ROW development), and making PHMA unavailable to grazing. This would result in the greatest protections of any alternative for ACEC relevant and important values in the planning area. | Impacts would be the same as described for Alternative 1. | Impacts would be the same as described for Alternative 1. | Management of additional ACECs under Alternative 6 would be similar to those described for Alternative 3, though restrictions on surface-disturbing activities would be less stringent under Alternative 6. As a result, there would be an increased possibility for degradation of relevant and important values in ACECs under Alternative 6. |
| **Social and Economic Conditions** | | | | | |
| On annual average, oil and gas production revenue and well development expenditures in the analysis areas across 8 states combined is expected to result in a range of about 73,000 to 94,000 total jobs (from 28,000 to 34,000 direct jobs in the drilling oil and gas wells sector and the oil and gas extraction | On annual average, oil and gas production revenue and well development expenditures in the analysis areas across 8 states combined is expected to result in about 325 more jobs (almost 100 additional direct jobs), about $27 million more in total labor income (about $11.5 million in additional | On annual average, oil and gas production revenue and well development expenditures in the analysis areas across 8 states combined is expected to result in about 25,000 to 36,000 fewer total jobs (about 11,000 to 14,000 fewer direct jobs), about $2.0 million to $2.9 billion less in total labor income | On annual average, oil and gas production revenue and well development expenditures in the analysis areas across 8 states combined is expected to result in about 9,000 to 10,000 fewer total jobs (about 4,000 to 5,000 fewer direct jobs), about $702 million to $762 million less in total labor income | On annual average, oil and gas production revenue and well development expenditures in the analysis areas across 8 states combined is expected to result in about 560 fewer total jobs to 150 more total jobs (about 460 to 260 fewer direct jobs), about $34 million less in total labor income to $26 | On annual average, oil and gas production revenue and well development expenditures in the analysis areas across 8 states combined is expected to result in about 226 to 935 fewer total jobs (about 426 to 626 fewer direct jobs), about $3.1 million to $63.6 million less in total labor income (about |

| Alternative 1 | Alternative 2 | Alternative 3 | Alternative 4 | Alternative 5 | Alternative 6 |
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| sector), $5.8 billion to $7.6 billion in total labor income (from $3.0 billion to $3.8 billion in direct labor income), and about $27.6 billion to $34.2 billion in economic output (from $19.0 billion to $22.8 billion in direct economic output).<br><br>The projected oil and gas activity throughout the analysis areas, across 8 states, is expected to result in royalty revenue, severance tax revenue, ad valorem tax revenue, and other oil and gas production tax or fee revenues of about $2.9 billion to $3.4 billion, combined. The tax revenues would continue to support public services offered to the communities.<br><br>Across all states in the planning area, there would continue to be economic and social values associated with nonenergy leasable mineral extraction. There could be economic and social impacts due to current BLM-management decisions | direct labor income), and about $102 million in additional economic output (about $58 million in additional direct economic output) than under Alternative 1.<br><br>Impacts tax revenues and public services would be the same as under Alternative 1, except in Colorado, where the increase in projected oil and gas activity would likely result in an increase in tax revenues. Across the Colorado analysis area, royalty revenue, severance tax revenue, oil and gas conservation fees, and ad valorem taxes combined are expected to be about $8.6 million to $8.7 million more than under Alternative 1.<br><br>Impacts on economic and social conditions from nonenergy leasable minerals is the same as under Alternative 1 for all states in the planning area, except Nevada. In Nevada, BLM-management decisions would improve the availability of non-energy | (about $1.2 million to $1.6 billion less in direct labor income), and about $9.2 billion to $12.8 billion less in economic output (about $6.5 billion to $8.5 billion less in direct economic output) than under Alternative 1.<br><br>The projected oil and gas activity throughout the analysis areas, across 8 states, would result in a large decrease in royalty revenue, severance tax revenue, ad valorem tax revenue, and other oil and gas production tax or fee revenues of about $945 million to $1.3 billion less than under Alternative 1, combined. The reductions in tax revenues would put large strains on local governments' budgets and would impact public services that are offered to the communities.<br><br>Under Alternative 3, all PHMA would be closed to new nonenergy mineral leasing, which would result in the economic and social impacts as discussed in | (about $482 million to $506 million less in direct labor income), and about $3.5 million to $3.7 million less in economic output (about $2.6 to $2.8 million less in direct economic output) than under Alternative 1.<br><br>Impacts tax revenues and public services would be the same as under Alternative 1, except in Colorado and Wyoming. Across the Colorado analysis area, the increase in projected oil and gas activity would likely result in an increase in royalty revenue, severance tax revenue, oil and gas conservation fees, and ad valorem taxes of about $39 million to $61 million more than under Alternative 1, combined. Across the analysis area, in Wyoming, royalty revenue, severance tax revenue, oil and gas conservation tax revenue, and ad valorem taxes combined are expected to be about $249 million less than under Alternative 1. The reductions in tax revenues in Wyoming | million more in total labor income (about $47 million to $23 million less in direct labor income), and about $54 million to $279 million less in economic output (about $141 million to $266 million less in direct economic output) than under Alternative 1.<br><br>Impacts tax revenues and public services would be the same as under Alternative 1, except in Colorado and Wyoming. In the Colorado analysis area, the increase in federal state and local tax revenue and public services from an increase in oil and gas activity would be the same as under Alternative 4. In the Wyoming analysis area, royalty revenue, severance tax revenue, oil and gas conservation tax revenue, and ad valorem taxes combined are expected to be about $42 million less than under Alternative 1. The reductions in tax revenues in Wyoming could put strain on local governments' budgets and could impact public | $42.8 million to $65.5 million less in direct labor income), and about $193 million to $419 million less in economic output (about $241 million to $366 million less in direct economic output) than under Alternative 1.<br><br>Impacts tax revenues and public services would be the same as under Alternative 5, except in Wyoming where the decrease in projected oil and gas activity would likely result in a decrease in tax revenues. Across the analysis area, in Wyoming, royalty revenue, severance tax revenue, oil and gas conservation tax revenue, and ad valorem taxes combined are expected to be about $50 million less than under Alternative 1. The reductions in tax revenues could put strain on local governments' budgets and could impact public services that are offered to the communities.<br><br>Impacts on communities of interest are similar to |

| Alternative 1 | Alternative 2 | Alternative 3 | Alternative 4 | Alternative 5 | Alternative 6 |
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| regarding access to nonenergy leasable mineral extractions; however, it is not anticipated that these impacts would be large.<br><br>Under Alternative 1, all states would recommend the withdrawal of all SFAs, from locatable mineral entry. If these lands were withdrawn, there could be impacts on economic activity and social conditions, as discussed in Nature and Types of Effects; however, it is not anticipated that these impacts would be large.<br><br>Under Alternative 1, PHMA and IHMA would be closed to new mineral material sales, but open for new free use permits, and expansion of existing pits for both free use permits and material sales. However, extraction could take place in other locations outside of GRSG habitat. Given the other opportunities to extract mineral materials in other locations, the impacts on economic activities and | leasable minerals in the planning areas compared to Alternative 1, which could improve economic and social conditions associated with non-energy leasable minerals, such as lifestyle, culture, employment, and economic output.<br><br>Alternative 2 does not include recommendations for the withdrawal of SFAs from locatable mineral entry, except in Montana which would continue the recommendation for withdrawal of SFAs as described under Alternative 1. This would likely result in less impacts to jobs, income, economic output and social conditions, as discussed in Nature and Types of Effects, than under Alternative 1.<br><br>Under Alternative 2, impacts on public access to mineral materials and social and nonmarket values of mineral material extraction would likely be similar to under Alternative 1, for all states except for Idaho | the *Nature and Type of Effects* section.<br><br>Under Alternative 3, all locatable minerals in PHMA would be recommended for withdrawal from locatable mineral entry. This would likely result in a reduction of the economic activities of locatable minerals, compared with under Alternative 1, as described in the Nature and Type of Effects.<br><br>Under Alternative 3, all areas managed for GRSG would be PHMA and salable minerals would be closed to disposal in all PHMA. This would likely result in a reduction of the economic activities of mineral materials, compared with under Alternative 1, as described in the Nature and Type of Effects.<br><br>On annual average, geothermal development in the states in the planning area is expected to result in about 76 fewer total jobs (about 43 fewer direct jobs), $4.3 million less in total | could put strain on local governments' budgets and could impact public services that are offered to the communities.<br><br>Impacts on economic, nonmarket, and social conditions from changes in nonenergy leasable minerals would be the same as under Alternative 1.<br><br>Under Alternative 4, there would be no areas recommend for withdrawal from locatable mineral entry. This would likely result in less impacts to jobs, income, economic output and social conditions, as discussed in Nature and Types of Effects, than under Alternative 1.<br><br>Under Alternative 4, impacts on public access to mineral materials and social and nonmarket values of mineral material extraction would likely be similar to under Alternative 1, for all states, except for Idaho. In Idaho, under Alternative 4, economic and social impacts from proposed management | services that are offered to the communities.<br><br>Impacts on economic, nonmarket, and social conditions from changes in nonenergy leasable minerals would be the same as under Alternative 1.<br><br>Impacts on economic, nonmarket, and social conditions from changes in locatable minerals would be the same as under Alternative 1.<br><br>Impacts on economic, nonmarket, and social conditions from changes in mineral materials would be the same as under Alternative 1.<br><br>Economic contributions from geothermal activities would be the same as Alternative 1.<br><br>Economic contributions from wind and solar activities would be the same as Alternative 1.<br><br>Impacts on economic, nonmarket, and social conditions from changes in livestock grazing would be the same as under Alternative 1. | Alternative 1, with some state analysis area level differences.<br><br>Impacts on economic, nonmarket, and social conditions from changes in nonenergy leasable minerals would be the same as under Alternative 5, except that any existing non-energy leasable operations within ACECs would not be able to expand on federal mineral estate and no new operations would be permitted in ACECs. This limitation on expansion and new operations would result in the economic and social impacts as discussed in the Nature and Type of Effects section. However, the impacts would be limited to areas within ACECs.<br><br>Requiring a plan of operations in ACECs would increase administrative process and cost for operators conducting exploration. This could result in a reduction in exploration in ACECs, compared with Alternative 1, which |

| Alternative 1 | Alternative 2 | Alternative 3 | Alternative 4 | Alternative 5 | Alternative 6 |
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| social conditions associated with mineral materials is likely to be minimal, under Alternative 1.<br><br>On annual average, geothermal development across 7 states in the planning area is expected to result in about 634 total jobs (about 330 direct jobs), $41.2 million in total labor income (about $20.0 million in direct labor income), and about $120 million in economic output (about $28.4 million in direct economic output).<br><br>Under Alternative 1 the entire plan area with the exception of Wyoming would limit lands used for ROWs in PHMA (or IHMA in Idaho) and GHMA for Greater Sage-Grouse (see Appendix X, Reasonably Foreseeable Development Scenario, for more detail). These BLM-management decisions could result in operators relocating development of wind and solar facilities to other locations that are not restricted. However, | and Nevada. BLM-management decisions in Idaho would allow reduce impacts on road conditions and high road maintenance costs on local governments which would no longer have to transport mineral materials required for road maintenance from outside these areas. Impacts would otherwise be the same as described under Alternative 1. Under Alternative 2, BLM-management decisions in Nevada would increase the time to get approval for new mineral material developments but would also provide certainty about the conditions under which exemptions would be granted, and would reduce social and economic impacts.<br><br>Economic contributions from geothermal activities would be the same as Alternative 1.<br><br>Economic contributions from wind and solar activities would be the same as Alternative 1. | labor income (about $2.4 million less in direct labor income), and about $11.5 million less in economic output (about $3.3 million less in direct economic output), compared with Alternative 1.<br><br>Economic contributions from wind and solar activities would similar to Alternative 1, but impacts may be higher than Alternative 1 due to the highest level of restrictions on solar and wind site development.<br><br>On annual average, livestock grazing on allotments where PHMA accounted for at least 15 percent of the acreage in the analysis areas for all states combined is expected to in about 2,000 fewer total jobs (about 841 fewer direct jobs), $120 million less in total labor income (about $67.6 million less in direct labor income), and about $380 million less in economic output (about $204 million less in direct economic output) throughout all states in | and impacts on mineral material development would be the same as described under the Alternative 2 Idaho section.<br><br>Economic contributions from geothermal activities would be the same as Alternative 1.<br><br>Economic contributions from wind and solar activities would be the same as Alternative 1.<br><br>Impacts on economic, nonmarket, and social conditions from changes in livestock grazing would be the same as under Alternative 1.<br><br>Impacts on nonmarket and social conditions from changes in GRSG conservation vary by state analysis area depending on state specific restrictions on development.<br><br>Impacts on communities of interest are similar to Alternative 1, with some state analysis area level differences.<br><br>Under Alternative 4, impacts from BLM- | Impacts on nonmarket and social conditions from changes in GRSG conservation vary by state analysis area depending on state specific restrictions on development.<br><br>Impacts on communities of interest are similar to Alternative 1, with some state analysis area level differences.<br><br>Under Alternative 5, impacts from BLM-management decisions on environmental justice populations through cultural resource disturbance would be similar to Alternative 1.<br><br>Impacts on environmental justice populations from changes in subsistence resource availability would be similar to Alternative 1.<br><br>Impacts on environmental justice populations from air quality impacts would be reduced, compared with Alternative 1, due to BLM-management decisions that promote project designs that avoid, minimize, reduce, | could lead to a reduction in development and production in these areas as well. If this results in a reduction development, there could be impacts on economic and social conditions in the surrounding communities.<br><br>Restrictions on mineral material development in ACECs could result in impacts on economic and social conditions, compared with Alternative 1; however, due to mineral materials being available in other locations, the impacts are not anticipated to be large.<br><br>Economic contributions from geothermal activities would be the same as Alternative 5.<br><br>Economic contributions from wind and solar activities would be the same as Alternative 5.<br><br>Impacts on economic, nonmarket, and social conditions from changes in livestock grazing would be the same as under Alternative 5. |

| Alternative 1 | Alternative 2 | Alternative 3 | Alternative 4 | Alternative 5 | Alternative 6 |
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| relocating wind and solar operations could result in increased costs if access to transmission lines is limited.<br><br>On annual average, livestock grazing on allotments where PHMA accounted for at least 15 percent of the acreage in the analysis areas for all states combined is expected to in about 2,000 total jobs (about 841 direct jobs in the animal production and ranching sectors), $120 million in total labor income (about $67.6 million in direct labor income), and about $380 million in economic output (about $204 million in direct economic output) throughout all states in the planning area combined.<br><br>Management restrictions for grazing may be applied to protect GRSG habitat, with potential to increase time and costs for management. | Impacts on economic, nonmarket, and social conditions from changes in livestock grazing would be the same as under Alternative 1.<br><br>Impacts on nonmarket and social conditions from changes in GRSG conservation would generally be the same as Alternative 1, with some additional differences across states.<br><br>Impacts on communities of interest are similar to Alternative 1, with some state analysis area level differences.<br><br>Impacts on environmental justice populations from BLM-management decisions on cultural resources, access to subsistence resources, air quality, water quality, and climate change would be similar to under Alternative 1, except for areas with fewer restrictions on fluid mineral development, fewer areas withdrawn from locatable mineral entry, more allocable | the planning area combined, compared with Alternative 1.<br><br>Lowest level of support for livestock grazing and WHB non-market values as a result of no permitted use for grazing in PHMA<br><br>Highest level of support for GRSG conservation related non-market values due to limitations on development and resources uses<br><br>Highest potential for impacts to groups associated with development, greatest level of support for those associated with conservation values<br><br>Under Alternative 3, impacts on environmental justice populations from impacts on cultural resources, access to subsistence resources, air quality, water quality, and climate change would be the lowest compared with all other alternatives. | management decisions on environmental justice populations through cultural resource disturbance would be similar to Alternative 1.<br><br>Impacts on environmental justice populations through subsistence resource availability could be reduced due to BLM-management decisions on minerals.<br><br>Under Alternative 4 impacts on air quality from mineral development may increase compared with Alternative 1 due to the wavers, exceptions, and modifications that would be allowed, which would likely result in adverse and disproportionate impacts on environmental justice populations.<br><br>Under Alternative 4 impacts on climate change from mineral development may increase compared with Alternative 1 due to the wavers, exceptions, and modifications that would be allowed, which would | rectify, and compensate for indirect impacts.<br><br>Impacts on environmental justice populations from changes in water quality would be the same as Alternative 4.<br><br>Impacts on environmental justice populations from changes in climate change would be the same as Alternative 4. | Impacts on nonmarket and social conditions from changes in GRSG would be the same as under Alternative 5.<br><br>Impacts from BLM-management decisions on environmental justice populations would be the same as under Alternative 5. |

| Alternative 1 | Alternative 2 | Alternative 3 | Alternative 4 | Alternative 5 | Alternative 6 |
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| Non-market value of GRSG conservation would remain supported at current conditions and would vary by analysis areas depending on the disturbance cap and adaptive management approach.<br><br>Some continued support for conservation based groups on GRSG habitat specific measure. Support for business development due to continued mineral and energy development and livestock grazing.<br><br>Under Alternative 1, there could be impacts on environmental justice populations from BLM-management decisions through impacts on cultural resources, access to subsistence resources, air quality, water quality, and climate change. These impacts would likely result in disproportionate and adverse impacts on environmental justice populations. | permits for salable minerals and/or more exceptions to restrictions on livestock grazing. These impacts could disproportionately and adversely impact environmental justice populations, compared with Alternative 1. | Under Alternative 3, BLM-management decisions regarding restrictions on mineral development and livestock grazing could have adverse impacts on prices and availability of food and household products. These impacts would disproportionately affect low-income environmental justice populations due to food and household products purchases making up a larger percentage of the disposable income and fewer alternative resources available. | likely result in adverse and disproportionate impacts on environmental justice populations. | *(See above.)* | *(See above.)* |

| Alternative 1 | Alternative 2 | Alternative 3 | Alternative 4 | Alternative 5 | Alternative 6 |
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| **Air Resources and Climate Change** | | | | | |
| Alternative 1 would continue current impacts on air quality and climate change. This is because the alternative does not change BLM management that can impact air quality or climate change (through GHG emissions and carbon sequestration). Such management includes livestock grazing, surface-disturbing activities (including minerals development, renewable energy development, and ROW development), and changes in the potential for wildfire. | Alternative 2 would result in increased air quality impacts from fugitive dust generation and exhaust emissions compared with Alternative 1. Alternative 2 would also result in increased climate change impacts due to changes in GHG emissions and carbon sequestration and storage potential of the land, when compared with Alternative 1. This is because this alternative would have fewer restrictions on mineral development and exploration as well as renewable energy development and major ROW projects. This would result in an increase in surface disturbance that creates dust and reduces carbon sequestration and storage of the landscape. In addition, there would be more direct emissions of criteria and hazardous air pollutants and GHGs into the atmosphere. | Alternative 3 has the most restrictions on emission-producing and surface disturbing activities from livestock grazing, minerals exploration and development activities, renewable energy development, roads, and other major ROWs, and changes in potential for wildfire. This would result in the least amount of surface disturbance and dust generations, as well as the smallest emission of criteria and hazardous air pollutants and GHG emissions. Managing PHMA as unavailable for grazing could lead to a build-up of fine fuels that could exacerbate a large-scale wildfire that would result in a reduction in carbon storage potential and an increase in carbon dioxide into the atmosphere. | Alternative 4 would implement an adaptive management approach that is based on the best available data and science and through mitigation and design features that minimize impacts. This could reduce impacts on air quality and climate change in some areas. In addition, a greater acreage would be managed with NSO stipulations under Alternative 4, which would prevent some surface disturbance associated with fluid mineral leasing and development that could cause dust generation and emission of criteria and hazardous air pollutants and GHGs. | Impacts would be similar to Alternative 4. However, Alternative 5 would be less restrictive than Alterative 4 in terms of allowing for mineral and renewable energy development. Therefore, there is the potential for greater dust generation and emission of criteria and hazardous air pollutants and GHGs under Alternative 5. | Impacts would be similar to those under Alternative 5. Management of ACECs under Alternative 6 would restrict some surface-disturbing activities, which could reduce potential sources of pollutants and GHGs. |

| Alternative 1 | Alternative 2 | Alternative 3 | Alternative 4 | Alternative 5 | Alternative 6 |
|---|---|---|---|---|---|
| **Soil and Water Resources** | | | | | |
| Alternative 1 would continue current impacts on soil productivity and erosion and water resource conditions. This is because the alternative does not change BLM management that can impact soil, such as livestock grazing, surface-disturbing activities (including minerals development, renewable energy development, and ROW development), and the potential for wildfire. | Alternative 2 would result in fewer restrictions on activities that could cause soil compaction and erosion compared with Alternative 1. This is because the alternative allows for more flexibility in the management of activities that can impact soil and water, particularly changes in surface-disturbing activities (including minerals development, renewable energy development, and ROW development. | Alternative 3 would result in the greatest restrictions on soil- and water-disturbing activities, particularly surface-disturbing activities (including minerals development, renewable energy development, and ROW development). This would result in the greatest protections of any alternative for soil and water conditions in the planning area. Managing PHMA as unavailable for grazing could lead to a build-up of fine fuels that could exacerbate a large-scale wildfire that would degrade soil and water conditions in many areas. | Impacts would be similar to those described for Alternatives 1 and 2. However, a greater acreage would be managed with NSO stipulations under Alternative 4, which would prevent some surface disturbance associated with fluid mineral leasing and development that could degrade soil and water conditions. | Impacts would be similar to Alternative 4. However, Alternative 5 would be less restrictive than Alterative 4 in terms of allowing for mineral and renewable energy development. Therefore, there is the potential for greater degradation of soil and water conditions under Alternative 5. | Impacts would be similar to those under Alternative 5. Management of ACECs under Alternative 6 would restrict some surface-disturbing activities, which could reduce potential activities that would degrade soil and water conditions. |

| Alternative 1 | Alternative 2 | Alternative 3 | Alternative 4 | Alternative 5 | Alternative 6 |
|---|---|---|---|---|---|
| **Cultural Resources and Tribal Interest** | | | | | |
| Alternative 1 would result in a continuation of current impacts on cultural resources and areas of tribal interest from GRSG management decisions regarding activities such as mineral development, renewable energy development, livestock grazing, and ROW location. Management could shift ground-disturbing activities in the planning area out of GRSG habitat and into other landscapes such as pinyon-juniper vegetation where known concentrations of resources important to tribes are known to exist. | Under Alternative 2, potential for impacts on cultural resources and areas of tribal interest is similar in magnitude, but likely greater than under Alternative 1 due to increased potential for mineral and renewable energy development, as well as increased potential for ROW location in PHMA. This alternative could increase the range and magnitude of impacts on cultural resources and areas of tribal interest as compared to Alternative 1. | Due to the most robust restrictions and highest acreage of PHMA, Alternative 3 would offer the greatest restrictions on surface disturbing activities such as minerals development, renewable energy development, and ROW location. This alternative would result in the lowest potential for impacts on cultural resources and areas of tribal interest in the planning area. | Impacts would be similar to those described for Alternatives 1 and 2. However, a greater acreage would be managed with NSO stipulations under Alternative 4, which would prevent some surface disturbance associated with fluid mineral leasing and development that could degrade cultural resources or areas of tribal interest. | Impacts would be similar to Alternative 4. However, Alternative 5 would be less restrictive than Alterative 4 in terms of allowing for mineral and renewable energy development. Therefore, there is the potential for greater degradation of cultural resources or areas of tribal interest under Alternative 5. | Impacts would be similar to those under Alternative 5. Management of ACECs under Alternative 6 would restrict some surface-disturbing activities, which could reduce potential activities that would degrade cultural resources or areas of tribal interest. |

| Alternative 1 | Alternative 2 | Alternative 3 | Alternative 4 | Alternative 5 | Alternative 6 |
|---|---|---|---|---|---|
| **Lands with Wilderness Characteristics** | | | | | |
| Impacts on lands with wilderness characteristics under Alternative 1 would continue from mineral and ROW development and infrastructure, and livestock grazing. | Alternative 2 would allow more areas to be open to mineral development and ROW authorizations, causing greater impacts on lands with wilderness characteristics when compared with existing management under Alternative 1. | Alternative 3 would have the overall greatest potential to maintain wilderness characteristics on lands with wilderness characteristics when compared to all other alternatives due to the closure of fluid, salable, and nonenergy mineral leasing, ROWs being managed as exclusion, and PHMAs being unavailable for livestock grazing. | Impacts would be similar to those described for Alternatives 1 and 2. However, a greater acreage would be managed with NSO stipulations under Alternative 4, which would prevent some surface disturbance associated with fluid mineral leasing and development that could degrade wilderness characteristics. | Impacts would be similar to Alternative 4. However, Alternative 5 would be less restrictive than Alterative 4 in terms of allowing for mineral and renewable energy development. Therefore, there is the potential for greater degradation of wilderness characteristics under Alternative 5. | Impacts would be similar to those under Alternative 5. Management of ACECs under Alternative 6 would restrict some surface-disturbing activities, which could reduce potential activities that would degrade wilderness characteristics. |

| Alternative 1 | Alternative 2 | Alternative 3 | Alternative 4 | Alternative 5 | Alternative 6 |
|---|---|---|---|---|---|
| **Recreation and Visitor Services** | | | | | |
| Under Alternative 1, existing restrictions on other resource uses would indirectly affect recreation by reducing resource conflicts and preserving recreational experiences.<br><br>Management of ROW avoidance areas would continue to improve recreation experiences in the long-term in PHMA and IHMA as these diminish the naturalness of the physical setting and opportunities for recreation. | Under Alternative 2, additional exceptions to restrictions on other resource uses would indirectly increase recreation conflicts with other resources, which would diminish recreational experiences in those areas. Management of fewer acres of PHMA and IHMA compared to Alternative 1 would restrict fewer acres for the construction of new recreation facilities. | Alternative 3 would impose the greatest restrictions on other resources, which would have the great potential for enhancing and preserving the recreation experience by reducing resource conflicts. More acres of ROW exclusions would prohibit developments over a greater area, maintaining the naturalness and remoteness for recreation experiences. Alternative 3 would also have the greatest acreage of PHMA, thus, prohibiting the greatest area for the construction of new recreation facilities compared to other alternatives. | Like Alternative 1, Alternative 4 would have an indirect effect on recreation by reducing resource conflicts in PHMA, IHMA, and GHMA with existing restrictions on other resource uses, which would preserve the recreational experiences in those areas. ROWs would have additional criteria for avoidance of GRSG, which would enhance naturalness and remoteness for recreation experiences in the area. There would be more acres of PHMA and IHMA compared to Alternative 1 which would restrict more fewer acres for the construction of new recreation facilities. | Impacts on recreation from Alternative 5 would be similar to Alternative 4; however, on ROWs, there would be less restrictive criteria for avoidance of GRSG when compared to Alternative 1. These fewer restrictions would indirectly affect recreation by decreasing the naturalness and remoteness for recreation experiences in the area. | Impacts would be similar to those under Alternative 5. Management of ACECs. Alternative 6 would have greater restrictions on mineral exploration, including fluid minerals, non-energy minerals, and mineral materials as well as major ROWs, wind and solar, which would indirectly decrease the resource conflicts that also affect recreation resources when compared to Alternative 1. |
| **Transportation and Travel Management** | | | | | |
| Management of PHMA as limited to OHV existing routes would continue to restrict OHV travel in these areas. | Since fewer areas would be managed as PHMA, fewer acres would be limited to existing routes under Alternative 2. | Management of the greatest acreage of PHMA under Alternative 3 would result in the greatest acreage where travel would be limited to existing routes. | More acreage would be managed as PHMA compared with Alternatives 1 and 2, which would result in more acres limited to existing routes under Alternative 4 but less than Alternative 3. | More acreage would be managed as PHMA compared with Alternatives 1 and 2, which would result in more acres limited to existing routes under Alternative 5 but less than Alternatives 3 and 4. | Impacts would be the same as Alternative 5. |

# Appendix 11

## Special Status Species

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# Appendix 11. Special Status Species

| Taxa | Common Name | Scientific Name | Preferred Habitat |
|---|---|---|---|
| Amphibians | Great Plains toad | *Anaxyrus cognatus* | Great Plains toads inhabit deserts, grasslands, semidesert shrublands, open floodplains, and agricultural areas, typically in stream valleys. When not active on the surface they usually occupy underground burrows. Breeding sites include rain pools, flooded areas, and ponds and reservoirs that fluctuate in size. Eggs and larvae develop in shallow water (usually clear). Calling males sit along the shoreline or brace themselves on submerged plants. |
| Amphibians | Dixie Valle toad | *Anaxyrus williamsi ssp.* | Found in springs, seeps, streams, and similar inundated areas. Presently thought to be endemic to Dixie Valley and potentially a distinct species of western toad. |
| Amphibians | Woodhouse's toad | *Anaxyrus woodhousii* | Inhabits grasslands, desert and semi-desert shrublands, river valleys and floodplains, and agricultural areas, usually in areas with deep friable soils. When inactive, they burrow underground or hide under rocks, plants, or other cover. These toads live on land except during the brief breeding season. Breeding occurs in marshes, rain pools, ponds, lakes, reservoirs, flooded areas, stream pools or backwaters, and other bodies of water with a shallow margin lacking a strong current, including both permanent and temporary pools, generally in sites with few if any fishes. |
| Amphibians | Inyo Mountains slender salamander | *Batrachoseps campi* | These salamanders occur localized in mesic microhabitats along small permanent desert springs and seeps with riparian vegetation; generally under stones, wood, or in holes or crevices in moist soil near spring seepages and pools; vegetation along water courses consists of willows and wild rose; surrounding slopes are arid, grown to sagebrush, buckwheat, rabbitbrush, and cactus. |
| Amphibians | Plains leopard frog | *Lithobates blairi* | Usually in the vicinity of streams, ponds, creek pools, reservoirs, irrigation ditches, and marshes in areas of prairie and desert grassland, farmland, and prairie canyons. |
| Amphibians | Couch's spadefoot | *Scaphiopus couchii* | Habitat includes arid and semi-arid shrublands, shortgrass plains, mesquite savanna, creosote bush desert, thornforest, cultivated areas, and tropical deciduous forest (Mexico). These toads spend most of their time underground or in rodent burrows, except when rains stimulate activity and bring them to the surface. Females attach eggs to vegetation in shallow ephemeral water resulting from heavy rains. |

| Taxa | Common Name | Scientific Name | Preferred Habitat |
|---|---|---|---|
| Amphibians | Western spadefoot | *Spea hammondii* | This species lives in a wide range of habitats; lowlands to foothills, grasslands, open chaparral, pine-oak woodlands. It prefers shortgrass plains, sandy or gravelly soil (e.g., alkali flats, washes, alluvial fans). It is fossorial and breeds in temporary rain pools and slow-moving streams (e.g., areas flooded by intermittent streams). |
| Amphibians | Great Basin spadefoot | *Spea intermontana* | Mainly sagebrush flats, semi-desert shrublands, pinyon-juniper woodland. Digs its own burrow in loose soil or uses those of small mammals. Breeds in temporary or permanent water, including rain pools, pools in intermittent streams, and flooded areas along streams. Eggs are attached to vegetation in water or placed on bottom of pool. |
| Amphibians | Columbia spotted frog | *Rana luteiventris* | Closely associated with clear or slow-moving or ponded surface waters, with little shade, and relatively constant water temperatures; breeding and egg-laying occurs in waters with floating vegetation and larger ponds, such as oxbows, lakes, stock ponds, and beaver-created ponds. |
| Birds | Grasshopper sparrow | *Ammodramus savannarum* | Breeding habitat includes grasslands of intermediate height and are often associated with clumped vegetation interspersed with patches of bare ground or moderately deep litter and sparse coverage of woody vegetation. |
| Birds | Black-throated sparrow | *Amphispiza bilineata* | Not closely associated with particular plant species or communities, but favors sparsely vegetated desert scrub, including thorn brush, cacti, chaparral, mesquite and juniper. It is most often found on desert uplands, alluvial fans, and hillsides where thorny xeric brush dominates, and sometimes also in dry shrubby washes, but avoids desert valley floors. |
| Birds | Golden eagle | *Aquila chrysaetos* | Golden eagles generally inhabit open and semi-open country such as prairies, sagebrush, arctic and alpine tundra, savannah or sparse woodland, and barren areas, especially in hilly or mountainous regions, in areas with sufficient mammalian prey base and near suitable nesting sites. |
| Birds | Sagebrush sparrow | *Artemisiospiza nevadensis* | This species found in shrubby, open flats and sagebrush plains, with nesting sites usually in or under low shrubs like sagebrush or saltbush. |
| Birds | Short-eared owl | *Asio flammeus* | This species is found in large, open areas with low vegetation, including prairie and coastal grasslands, heathlands, meadows, shrubsteppe, savanna, tundra, marshes, dunes, and agricultural areas; winter habitat is similar, but is more likely to include large open areas within woodlots, stubble fields, fresh and saltwater marshes, weedy fields, dumps, gravel pits, rock quarries, and shrub thickets.; if food is plentiful, winter areas often become breeding areas |

| Taxa | Common Name | Scientific Name | Preferred Habitat |
|---|---|---|---|
| Birds | Burrowing owl | *Athene cunicularia* | Optimum habitat typified by short vegetation and presence of fresh small mammal burrows. Found in open grasslands, sagebrush, and sagebrush-steppe, sometimes in open areas such as vacant lots near human habitation. Spends much time on the ground or on low perches such as fence posts or dirt mounds. |
| Birds | Upland sandpiper | *Bartramia longicauda* | Restricted primarily to extensive, open tracts of short grassland habitat. Nest in native prairie, dry meadows, pastures, domestic hayfields, short-grass savanna, plowed fields, along highway rights-of-way and on airfields, and (in the north) peatlands and scattered woodlands near timberline. Nesting is also known to occur in dry patches of wet meadows and in blueberry barrens. A survey of nesting habitats in Wisconsin suggests that upland sandpipers favor a level topography with a minimum of tall vegetation edges and proportionately high acreages of agricultural crops which duplicate prairie grasslands in terms of structure. |
| Birds | Ferruginous hawk | *Buteo regalis* | Open country, primarily prairies, plains and badlands; sagebrush, saltbush-greasewood shrubland, periphery of pinyon-juniper and other woodland, desert. In the southern Great Plains, common at black-tailed prairie dog colonies in winter. Nests in tall trees or willows along streams or on steep slopes, in junipers (Utah), on cliff ledges, river-cut banks, hillsides, on power line towers, sometimes on sloped ground on the plains or on mounds in open desert. Generally, avoids areas of intensive agriculture or human activity. |
| Birds | Swainson's hawk | *Buteo swainsoni* | This species favors open habitats for foraging; hay and alfalfa fields, pastures, grain crops, and row crops, or perched atop adjacent fence posts and overhead sprinkler systems; they rely on scattered stands of trees near agricultural fields and grasslands for nesting sites. |
| Birds | Cassin's finch | *Carpodacus cassinii* | Open coniferous forest; in migration and winter also in deciduous woodland, second growth, scrub, brushy areas, partly open situations with scattered trees, and sometimes suburbs near mountains. Usually nests in conifer, 3-25 m above ground, on outer end of limb; may sometimes nest in deciduous tree or in shrub. May return to same nesting area in successive years, though this may be unusual. |
| Birds | Veery | *Catharus fuscescens* | Nesting habitat includes swampy forest, especially in more open areas with shrubby understory, as well as second growth, willow or alder shrubbery near water; large tracts of forest are most suitable. Nests usually are on or near the ground, at the base of a shrub, in a clump of herbaceous vegetation, or in a shrub or low tree. In migration and winter this species occurs also in lowland forest, woodland, and scrub. |

| Taxa | Common Name | Scientific Name | Preferred Habitat |
|---|---|---|---|
| Birds | Greater sage-grouse | *Centrocercus urophasianus* | Habitat includes sagebrush steppe; nest in areas with relatively dense cover from big sagebrush; may use areas with rabbitbrush, greasewood, and grassy areas; leks are located in clear areas such as broad ridgetops, grassy swales, dry lakebeds, and sometimes recently burned areas. chick rearing areas include irrigated pastures, wet meadows, and alfalfa fields, in addition to sagebrush. |
| Birds | Mountain plover | *Charadrius montanus* | Nesting habitat includes high plains/shortgrass prairie and desert tablelands, commonly prairie dog towns in some areas, such as sagebrush/blue grama habitats in central Montana. In central and southwestern Montana, southeastern Wyoming, and northeastern Colorado, nesting often occurs in shortgrass prairie with a history of heavy grazing or in low shrub semideserts. Nesting areas are characterized by very short vegetation, significant areas of bare ground, and flat or gentle slopes. Commonly, nesting takes place in barren fields that subsequently are planted with millet or sunflowers, resulting in losses of eggs and chicks. Nests are on the ground in shallow depressions that may be lined with plant material and/or adjacent to dried cattle dung. Adults often take chicks to windmill/water tank areas to forage, but site around tank must be dry. This bird generally avoids moist soils. |
| Birds | Bobolink | *Dolichonyx oryzivorus* | This species generally selects habitat with moderate to tall vegetation, moderate to dense vegetation, and moderately deep litter. Breeding habitat includes tall grass areas, flooded meadows, prairie, deep cultivated grains, and hayfields. |
| Birds | White-tailed kite | *Elanus leucurus* | Found in savanna, open woodland, marshes, partially cleared lands and cultivated fields, mostly in lowland situations. Nests in trees, often near a marsh, usually 6-15 m above the ground in branches near the top of a tree. Generally, builds a new nest for each clutch |
| Birds | Willow flycatcher | *Empidonax traillii* | Breeding habitat is strongly tied to brushy areas of willow and similar shrubs. Found in thickets, open second growth with brush, swamps, wetlands, streamsides, and open woodland. Common in mountain meadows and along streams; also in brushy upland pastures (especially hawthorn) and orchards. The presence of water such as running water, pools, or saturated soils and willow, alder, or other deciduous riparian shrubs are essential habitat elements. |

| Taxa | Common Name | Scientific Name | Preferred Habitat |
|---|---|---|---|
| Birds | Gray flycatcher | *Empidonax wrightii* | Arid woodland and brushy areas. Most commonly associated with pinyon-juniper woodland. In Wyoming, strongly associated with the presence of pinyon pine and higher than expected juniper overstory cover. In western Great Basin, nests in tall, big sagebrush shrublands. Less frequently found in open ponderosa pine or pine-oak woodland. In the last three decades has expanded its range northward into Washington and British Columbia, where it uses open stands of small to medium ponderosa pines exclusively; these stands usually have a scattered shrub or young pine understory. Usually builds nest in fork or branch of a shrub or juniper. In migration and winter also in arid scrub, riparian woodland, and mesquite. |
| Birds | Prairie falcon | *Falco mexicanus* | Primarily open situations, especially in mountainous areas, steppe, plains or prairies. Typically nests in pothole or well-sheltered ledge on rocky cliff or steep earth embankment, 10 to more than 100 meters above base. |
| Birds | American peregrine falcon | *Falco peregrinus anatum* | Various open situations from tundra, moorlands, steppe, and seacoasts, especially where there are suitable nesting cliffs, to mountains, open forested regions, and human population centers. When not breeding, occurs in areas where prey concentrate, including farmlands, marshes, lakeshores, river mouths, tidal flats, dunes and beaches, broad river valleys, cities, and airports. |
| Birds | Pinyon jay | *Gymnorhinus cyanocephalus* | Pinyon-juniper woodland, less frequently pine; in nonbreeding season, also occurs in scrub oak and sagebrush. Nests in shrubs or trees (e.g., pine, oak, or juniper), about 1.5-9 m above ground. |
| Birds | Bald eagle | *Haliaeetus leucocephalus* | Breeding habitat most commonly includes areas close to (within 4 km) coastal areas, bays, rivers, lakes, reservoirs, or other bodies of water that reflect the general availability of primary food sources including fish, waterfowl, or seabirds. |
| Birds | Loggerhead shrike | *Lanius ludovicianus* | Found in open country with short vegetation and well-spaced shrubs or low trees, particularly those with spines or thorns; frequent agricultural fields, pastures, old orchards, riparian areas, desert scrublands, savannas, prairies, golf courses, and cemeteries; are often seen along mowed roadsides with access to fence lines and utility poles. |
| Birds | Ash-throated flycatcher | *Myiarchus cinerascens* | Desert scrub, pinyon-juniper and oak woodland, chaparral, thorn scrub and riparian woodland; in winter also in open deciduous woodland. Usually nests in a tree cavity, a hole in a cactus, in an abandoned woodpecker hole or Cactus Wren nest. |
| Birds | Sage thrasher | *Oreoscoptes montanus* | Sagebrush plains, primarily in arid or semi-arid situations, rarely around towns. Usually breeds between 1300 and 2000 meters above sea level. |

| Taxa | Common Name | Scientific Name | Preferred Habitat |
|---|---|---|---|
| Birds | Mountain quail | *Oreortyx pictus* | Live in dense brush in wooded foothills and mountains; most common in pine-oak woodland, coniferous forest, and chaparral; sometimes in pinyon-juniper woods or in scrub at lower elevations; may be common in areas of second-growth brush after fires or clearcuts; requires dense low thickets for cover; during hot weather, rarely found more than a mile from water. |
| Birds | American white pelican | *Pelecanus erythrorhynchos* | Habitat includes rivers, lakes, reservoirs, estuaries, bays, and open marshes, sometimes inshore marine habitats. Pelicans rest/roost on islands and peninsulas. Nests usually are on islands or peninsulas (natural or dredge spoils) in brackish or freshwater lakes, or on ephemeral islands in shallower wetlands as in the northern Great Plains or on the Texas coast. Nest sites usually are in open areas but often near vegetation, driftwood, or large rocks. Habitats used in winter are mainly coastal but also include also inland waters such as the Salton Sea and some rivers with open water. Suitable sand bars and similar sites for roosting or loafing are important components of winter habitat |
| Birds | Green-tailed towhee | *Pipilo chlorurus* | Breeds in thickets, chaparral, shrublands, riparian scrub, and especially sagebrush. Habitat varies with elevation. Primarily in mountains. Found on mountain slopes, plateaus, and higher valleys of arid West, associated with dense shrubs 0.5 to 1.5 m in height; most commonly uses dry shrubby hillsides and post-disturbance shrubby second growth. Attracted to dwarf mistletoe as a nest, roost or foraging site in southwestern Ponderosa pine forests. Nests on or near ground in shrubby habitat; nest is usually under cover of brush or plant tufts; built by the female. |
| Birds | Purple martin | *Progne subis* | A wide variety of open and partly open situations, frequently near water or around towns. In west and formerly in east nests in tree cavities, abandoned woodpecker holes (including those in saguaro cacti), crevices in rocks. |
| Birds | Bank swallow | *Riparia riparia* | Habitat includes open and partly open situations, frequently near flowing water. Nests are in steep sand, dirt, or gravel banks, in burrows dug near the top of the bank, along the edge of inland water, or along the coast, or in gravel pits, road embankments, etc. Both sexes construct the nest burrow. Pairs usually dig a new burrow each year, but sometimes they use old bank swallow burrows or abandoned cavities of the belted kingfisher. Individuals tends to return to same nesting area in successive years, though they may move several kilometers away, especially if nesting was unsuccessful the previous year; yearlings often return to the natal area or nearby |
| Birds | Broad-tailed hummingbird | *Selasaphorus platycercus* | Habitat includes open woodland, especially pine, pine-oak, pinyon-juniper, and conifer-aspen associations, brushy hillsides, montane scrub, and thickets; in migration and winter, broad-tailed hummingbirds also inhabit open situations in lowlands where flowering shrubs are present. |

| Taxa | Common Name | Scientific Name | Preferred Habitat |
|---|---|---|---|
| Birds | Sharp-tailed grouse | *Tympanuchus phasianellus* | Requires a mosaic of dense grass and shrubs with rich forb and insect foods during nesting and brood-rearing. During winter often relies on riparian areas and other sites that support deciduous trees and shrub for feeding, roosting, and escape cover; also utilizes non-native cultivated grains and hedgerow species. Natural succession of grasslands and shrublands to forests, accelerated or expanded geographically by artificial fire regimes, have influenced habitat quality and populations in several regions. Habitat and distribution is constrained in regions where fire suppression has reduced early and mid-successional vegetation communities. |
| Birds | Columbian sharp-tailed grouse | *Tympanuchus phasianellus columbianus* | Native bunchgrass and shrub-steppe communities. In western Idaho, preferred big sagebrush habitats with moderate vegetative cover, high plant species diversity, and high structural diversity; in general, selected vegetative communities that were least modified by livestock grazing. Deciduous shrubs are critical for winter food and escape cover. Bunchgrasses and perennial forbs are important components of nesting and brood-rearing habitat |
| Birds | Virginia's warbler | *Vermivora virginiae* | Breeding habitat includes arid montane woodlands, oak thickets, pinyon-juniper, coniferous scrub, chaparra. Brushy steep mountain slopes within or near dry coniferous woodlands. In northern part of breeding range, generally use scrubby habitat below pine woodlands; in southern part of range use scrubby habitat islands with coniferous woodlands. Will inhabit ravines or rocky slopes with dense scrub oaks or mountain mahogany. Also found along mountain streams in sagebrush, or cottonwood and willow. |
| Birds | Gray vireo | *Vireo vicinior* | Breeding habitats include warm/hot, semi-arid, shrubby habitats, especially mesquite and brushy pinyon-juniper woodlands; also chaparral and desert scrub. Thorn scrub, oak-juniper woodland, pinyon-juniper, juniper-cholla, mesquite, dry chaparral. |
| Conifers and Cycads | Lodgepole pine | *Pinus contorta* | Thrives in mostly well drained soils but may be found in peat bogs, muskegs or on dry sandy sites. |
| Conifers and Cycads | Limber pine | *Pinus flexilis* | Limber pine dominates on dry rocky sites at many elevations (1500-3600m) within its range. It can occur scattered throughout forested regions on more mesic sites, especially in low density, open areas. At higher elevations, Pinus flexilis can define the boundary of the treeline; occurring in high montane forests, often at the timberline). In these areas (i.e., Utah and the West) it is often very long-lived and slow growing, occurring on dry, harsh sites. In the northern half of its distribution, limber pine is generally found near lower tree line and on dry sites in the montane forests. |

| Taxa | Common Name | Scientific Name | Preferred Habitat |
|---|---|---|---|
| Fishes | Colorado River cutthroat trout | *Oncorhynchus clarkii pleuriticus* | Requires cool, clear water and well-vegetated streambanks for cover and bank stability; instream cover in the form of deep pools and boulders and logs also is important; adapted to relatively cold water, thrives at high elevations. Most remaining populations are fluvial or resident. Occurs also in lakes (Trappers Lake in Colorado formerly had the largest pure population; now hybridized with rainbow trout). Adfluvial populations largely have been eliminated, though reestablished lacustrine stocks have been reported in Wyoming and in Rocky Mountain National Park in Colorado |
| Fishes | Bonneville cutthroat trout | *Oncorhynchus clarkii utah* | Ranges from high-elevation streams with coniferous and deciduous riparian trees to low-elevation streams in sage-steppe grasslands containing herbaceous riparian zones to lakes; in winter, streams may have instream ice that reduces trout habitat; high flows occur in spring from melting snowpack, low flows occur in mid- to late summer, when lethal and sublethal water temperatures may be common. Occurs primarily in small headwater streams; optimum habitat includes areas with a 1:1 pool to riffle ratio and slow, deep water with vegetated streambanks for shade, bank stability, and cover; prefers summer water temperatures of about 55 F but can survive in water up to 70 F; in lakes (e.g., Bear Lake), the littoral and pelagic zones are typically used during most of the year. Beaver ponds likely are important as both summer and winter holding habitat for adults. |
| Flowering Plants | Trans montane abronia | *Abronia turbinata* | This species occurs in sandy soils of desert scrub at elevations ranging from 900 to 2500 m. |
| Flowering Plants | Chaparral sand-verbena | *Abronia villosa var. aurita* | Occurs on sandy soils in creosote bush scrub. Sandy places in coastal-sage scrub, chaparral; Elevation: <1600 m. |
| Flowering Plants | Henderson's ricegrass | *Achnatherum hendersonii* | Dry, rocky, shallow soil. Often associated with Artemisia rigida and occasionally with Pinus ponderosa. Also found in Eriogonum thymoides/Poa secunda community type. |
| Flowering Plants | Nevada needlegrass | *Achnatherum nevadense* | This species is found in open woodlands and sagebrush. |
| Flowering Plants | Wallowa ricegrass | *Achnatherum wallowaense* | Dry, shallow rocky soil. Restricted to non-forested, rocky, shallow soils, dominated by Poa secunda, other bunchgrasses and forbs. Rigid sagebrush (Artemisia rigida) is often present. These communities, often referred to as "scablands", are commonly found on topographic high ground and are particularly exposed to summer heat and dryness. During winter and early spring, the shallow scabland soils are subject to severe water saturation and frost heaving. |
| Flowering Plants | Scrub lotus | *Acmispon argyraeus var. multicaulis* | Pinyon/juniper woodland; Elevation: 1200-1500 m. |

| Taxa | Common Name | Scientific Name | Preferred Habitat |
|---|---|---|---|
| Flowering Plants | None | *Acmispon haydonii* | Pygmy lotus occurs in deserts in creosote-bush scrub and pinyon-juniper woodlands at elevations of 600 to 1,200 m. |
| Flowering Plants | Ivory- spined agave | *Agave utahensis var. eborispina* | Occurs on calcareous outcrops with desert scrub. |
| Flowering Plants | Rabbit Valley gilia | *Aliciella caespitosa* | On Navajo and Wingate sandstone in crevices, Carmel Limestone formations, detrital slopes, and (infrequently) in sandy wash bottoms. Found within open pinyon-juniper communities, often mixed with mountain brush, sagebrush, or ponderosa pine, at 1554 to 2743 m elevation. |
| Flowering Plants | Narrow-stem gilia | *Aliciella stenothyrsa* | Found in open places often in hills of pinyon-juniper, salt desert shrub, sagebrush, and mountain-mahogany communities from 5,003 to 9,318 feet (1,525 to 2,840 meters) elevation. Soils are typically silty to gravelly loams and sandy or clay alkaline, sandstone and siltstone shale or clay barrens all of the Green River and Uinta Formation. |
| Flowering Plants | Asse's onion | *Allium aaseae* | Aase's onion is restricted to a narrow range of habitat conditions. It occurs on open, relatively barren, xeric, gentle to very steep, sandy slopes, generally with a southerly aspect, but ranging from east to west. It is usually associated with relatively sparsely vegetated bitterbrush (Purshia tridentata) or bitterbrush/sagebrush (Artemisia tridentata) communities. |
| Flowering Plants | Constricted Douglas' onion | *Allium constrictum* | Occurs in flat areas with shallow soils, which are often dry and sandy, but are wet or moist in the springtime. The sites tend to be on flat basalt lithosol or around the margins of rocky vernal ponds. It occurs within shrub-steppe vegetation, common associates include scabland sagebrush (Artemisia rigida) and the grass species Poa secunda. It occurs at elevations of 630 - 780 m. |
| Flowering Plants | Spanish needle onion | *Allium shevockii* | Margins of metamorphic rock outcrops and talus slopes at 2000-2500 m elevation. Associates include pinyon pine, western juniper, and canyon live oak. |
| Flowering Plants | Jones' bluestar | *Amsonia jonesii* | This species is growing in dry, gravelly, sandy, loam, or clay soils of washes in pinyon- juniper, desert shrub, mountain brush, blackbrush, semi-desert grasslands, and sandy sagebrush deserts communities at 1,200 to 2,150 m. |
| Flowering Plants | Great Basin angelica | *Angelica kingii* | This species grows in a variety of sites with moist soils including montane or subalpine riparian areas, in wet meadows and seeps within pinyon-juniper woodland and Great Basin scrub. |
| Flowering Plants | Scabrid alpine tarplant | *Anisocarpus scabridus* | Known from metamorphic scree slopes and dry open ridges, within upper montane coniferous forests. |
| Flowering Plants | Meadow pussytoes | *Antennaria arcuata* | Moist meadows, often on hummocks of sedges and rushes that stay drier than the surrounding areas, or at the edges of these meadows. 1500-2400 m. The wet meadows are usually surrounded by sagebrush grassland communities. |
| Flowering Plants | Sticky ringstem | *Anulocaulis leiosolenus var. leiosolenus* | This taxon occurs in desert scrub on calcareous clays and shales and gypsum of low or steeps hills or flat grounds. |

| Taxa | Common Name | Scientific Name | Preferred Habitat |
|---|---|---|---|
| Flowering Plants | Goodrich's columbine | *Aquilegia scopulorum var. goodrichii* | This species is associated with pine, juniper, and mountain brush communities on Green River Shale Formation. |
| Flowering Plants | Goodrich eared rockcress | *Arabis goodrichii* | Occurs on rocky slopes in sagebrush, pinyon-juniper woodlands, oak thicket. |
| Flowering Plants | Fremont County Rockcress | *Arabis pusilla* | This species occurs in coarse soil that has accumulated in cracks and crevices of sparsely vegetated granite-pegmatite outcrops at about 2,350 m elevation. The surrounding plant community is sagebrush grassland. The habitat is exposed to high winds and extreme cold conditions with as few as 30 frost free days annually. |
| Flowering Plants | Park rockcress | *Arabis vivariensis* | Low elevations in the mountains. Granitic soil at upper limit of sagebrush and sandy soils at the bases of cliffs. |
| Flowering Plants | Indian Valley spineflower | *Aristocapsa insignis* | This species occurs in sandy, somewhat open areas within grassland, pine-oak woodland, and juniper woodland communities at elevations of 300 to 600 m. |
| Flowering Plants | Rock tansy | *Artemisia capitata* | This species grows on dry, rocky hills, in shallow, silt loams that are typically limestone-derived overlying rock outcrops. It can be found in exposed sagebrush grassland, desert shrubland, and juniper woodland in the valley and foothill zones. |
| Flowering Plants | Owyhee sagebrush | *Artemisia papposa* | This species grows in meadows, alkaline flats, and sagebrush-juniper slopes. |
| Flowering Plants | Porter's sagebrush | *Artemisia porteri* | Very sparsely vegetated badlands of pale, ashy or tufaceous (volcanic) mudstones and clay slopes. 1615-1980 m elevation. |
| Flowering Plants | Coastal sagewort | *Artemisia pycnocephala* | This species occurs on coastal beaches in rocky or sandy soils. |
| Flowering Plants | Eastwood milkweed | *Asclepias eastwoodiana* | Desert shrub and pinyon-juniper communities on calcareous, tuffaceous, and sedimentary substrates at 3500-7000 feet. |
| Flowering Plants | Dwarf milkweed | *Asclepias uncialis* | This species is often associated with Juniper Woodland and Savanna ecological systems, but it is always found in the prairie or grassland components of these systems. |

| Taxa | Common Name | Scientific Name | Preferred Habitat |
|---|---|---|---|
| Flowering Plants | Gunnison mikevetch | *Astragalus anisus* | This species is found within Sagebrush Shrubland (dominated by Artemisia tridentata ssp. tridentata, Artemisia tridentata ssp. vaseyana, Artemisia tridentata ssp. wyomingensis, or Artemisia cana) and Sagebrush Shrub Steppe ecological system types; primarily within the Dry Sagebrush Shrubland type. It is usually found in fairly open sites where sagebrush shrubs do not form a closed canopy, but sometimes shelters under low sagebrush plants. Sites are characterized by the absence of trees, moderate shrub cover, moderate understory cover, and extensive bare ground. It is found on flats on the floor of the Gunnison Basin and on hillsides. It usually grows on sandy clay to gravelly soils overlying granitic bedrock with parent materials that include rhyolite, tuff, gneiss, and schist. |
| Flowering Plants | Goose Creek milkvetch | *Astragalus anserinus* | Confined to deeply weathered, sandy, white rhyolitic ash of the Salt Lake Formation, sometimes overlain by a thin veneer of black glassy sinter gravel of apparent volcanic origin. It occurs in drainage bottoms, lower to upper slope and crest positions, typically within open Utah juniper, Wyoming big sagebrush, or rabbitbrush communities with Sandberg's bluegrass, and needle and thread grass as well. |
| Flowering Plants | Ash Valley mikvetch | *Astragalus anxius* | Gravelly volcanic soil among pines, sagebrush; 1550 m altitude. |
| Flowering Plants | Lemhi milkvetch | *Astragalus aquilonius* | Shale or clay washes of gullied clay bluffs, on steep eroded canyon banks or on sand bars within the shrub-steppe zones at lower elevations. |
| Flowering Plants | Darwin Mesa mikvetch | *Astragalus atratus var. mensanus* | This species grows in mesas and open flats, dry desert slopes and hillsides, in volcanic clay and gravel, with pinons, usually sheltered under sagebrush at elevations of 1,700-2,350 m. |
| Flowering Plants | Barr's milkvetch | *Astragalus barrii* | In southeastern Montana, this species is restricted to heavy clay knobs, buttes, and barren hilltops. Often only a sparse shrub cover of Artemisia tridentata and/or Atriplex confertifolia is present. Also occurs in silty to sandy, calcareous soils. When an upper overstory is present, usually consists of a sparse cover of Pinus ponderosa and Juniperus scopulorum. Populations of this plant are associated with the harsh edaphic and environmental conditions of badlands areas. Buttes, bluffs, clay hills or sandstone, open barren ground; 900-1450 m. |
| Flowering Plants | San Bernardino milkvetch | *Astragalus bernardinus* | Stony washes and dry mesas, often scrambling up through low bushes, 3000-6700 feet on granite or limestone Joshua tree and pinyon-juniper woods. Gravelly washes and rocky mesas, in granitic rock or rarely calcareous soils, commonly entangled in low shrubs. |
| Flowering Plants | California milkvetch | *Astragalus californicus* | Dry hillsides, stony ridges, and canyon benches, among sagebrush, in open oak woods or in openings of coniferous forests. |

| Taxa | Common Name | Scientific Name | Preferred Habitat |
|---|---|---|---|
| Flowering Plants | Callaway milkvetch | *Astragalus callithrix* | Deep, sandy soil on the valley floor or on dunes in barren openings with Atriplex, Grayia, Chrysothamnus, and Artemisia; 1550 - 1710 m. |
| Flowering Plants | Cima milkvetch | *Astragalus cimae var. cimae* | Mesas and stony hillsides in calcareous soils, commonly among sagebrush. Habitats include Great Basin scrub, Joshua tree woodland, and pinyon and juniper woodland. |
| Flowering Plants | Inflated cima milkvetch | *Astragalus cimae var. sufflatus* | This variety occurs among sagebrush on gentle slopes and flats, open pinon forest, and in calcareous, clay soil at elevations ranging from 5,000 to 6,000 feet. |
| Flowering Plants | Stiff milkvetch | *Astragalus conjunctus var. conjunctus* | This variety occurs in grassland and meadows, stony hilltops, canyon benches, brushy hillsides, sagebrush desert, and rarely into the edge of xeric pine forest on basaltic bedrock at elevations ranging from 2,000 feet to 5,100 feet. |
| Flowering Plants | Margaret Rushy milkvetch | *Astragalus convallarius var. margaretiae* | Grows on rocky slopes and flats beneath sagebrush (Artemisia tridentata) in pinyon-juniper woodland. Associated species include Pinus monophylla, Purshia tridentata, Artemisia tridentata ssp. wyomingensis, Ribes velutinum, Poa secunda, Juniperus osteosperma, Leymus cinereus, Elymus elymoides, and Tetradymia canescens. |
| Flowering Plants | Cronquist's milkvetch | *Astragalus cronquistii* | Occurs on fine-textured, sandy, or gravelly soil, especially with selenium, along ridges and sandy washes, in blackbrush and salt desert shrub communities on sandstone or red sandstone of the Cutler and Morrison formations in southeastern Utah, and on Mancos Shale in southwestern Colorado, at 1340 to 1830 meters (4400 to 6000 feet) elevation. |
| Flowering Plants | Debeque milkvetch | *Astragalus debequaeus* | Found in varicolored, fine-textured, seleniferous, saline soils of the Atwell Gulch Member of the Wasatch Formation, in areas surrounded by pinyon-juniper woodlands and desert shrub. Plants are mostly clustered on toe slopes and along drainages, but many occur on steep sideslopes. Soils are clayey but littered with sandstone fragments. |
| Flowering Plants | Debris milkvetch | *Astragalus detritalis* | Found in pinyon-juniper and mixed desert shrub communities associated with Artemisia, Stipa, Phlox, Trifolium, and cactus species. Often in rocky soils ranging from sandy clays to sandy loams, and on alluvial terraces with cobbles from 5,400 to 7,200 feet (1,646 to 2,195 meters) elevation. |
| Flowering Plants | Sout Fork John Day milkvetch | *Astragalus diaphanus var. diurnus* | Barren, shallow, dark, coarse gravel soils over basalt bedrock, plant associations of Juniperus occidentalis/Artemisia tridentata (western juniper/big sagebrush) or also including Pinus ponderosa (ponderosa pine). Found in openings in juniper woodland at elevations ranging from 760-1100 m (2500-3600 ft). Also occurs on sandbars or sandy banks of intermittent rivers. |
| Flowering Plants | Duchesne milkvetch | *Astragalus duchesnensis* | Found in salt desert shrub and pinon-juniper communities on sandy and gravelly pediments such as sandy mesas or around sandstone or shale outcrops (Goodrich, 1986) from 1430 to 1830 m. |

| Taxa | Common Name | Scientific Name | Preferred Habitat |
|---|---|---|---|
| Flowering Plants | Veyo milkvetch | *Astragalus ensiformis var. gracilior* | Open valley floor in stiff clay soil, sheltering under and growing up through sagebrush, 4900 ft. In Nevada: open washes, valley floors and hillsides, in clay soil, with pinyon-juniper to Artemisia, 4200-5000 ft. |
| Flowering Plants | Horseshoe milkvetch | *Astragalus equisolensis* | Grows on sand and sandy silt soils and is a component of the salt-desert shrub vegetative community. This species occurs on river terrace sand and gravel. Habitat is sagebrush, shadscale, horsebrush, and other mixed desert shrub. |
| Flowering Plants | Walker Pass milkvetch | *Astragalus ertterae* | Sandy loamy granitic soils in a pinyon pine woodland. |
| Flowering Plants | Gilman's milkvetch | *Astragalus gilmanii* | Great Basin scrub, pinyon and juniper woodland; gravelly or rocky. |
| Flowering Plants | Threeleaf or plans milkvetch | *Astragalus gilviflorus* | Barren knolls, stony hilltops, gullied bluffs and badlands, on limestone, shale or sandstoner in sagebrush communities at 5340-6590 feet. |
| Flowering Plants | Isely's milkvetch | *Astragalus iselyi* | Occurs on seleniferous and gypsiferous sandy to gravelly clay slopes of the uranium-rich soils derived from the Morrison (3 locations), Paradox (1 location) and Mancos formations at 1525 to 2010 m elevation in pinyon-juniper and desert scrub communities. |
| Flowering Plants | Long Valley milkvetch | *Astragalus johannis-howellii* | Sagebrush flats; sandy loam soil. Usually found in swales in the vicinity of former or present hot springs activity. |
| Flowering Plants | Lens-pod milkvetch | *Astragalus lentiformis* | Dry sandy soil among sagebrush; sometimes with Jeffrey pines, Great Basin scrub. |
| Flowering Plants | Grand Junction milkvetch | *Astragalus linifolius* | Found in rocky soil on dry hillsides. Many populations occur on the Chinle and Morrison Formations with pinyon-juniper and sagebrush. Often found in drainages and along benches of perennial streams. |
| Flowering Plants | Loa milkvetch | *Astragalus loanus* | Volcanic gravels at 1650-2075 m elevation in sagebrush and pinyon-juniper communities. |
| Flowering Plants | Stiff milkvetch | *Astragalus microcymbus* | Open sagebrush or juniper-sagebrush communities on moderately steep to steep slopes. Often found in rocky areas with a variety of soil conditions from clay to cobbles, gray to reddish in color. |
| Flowering Plants | Least bladdery milkvetch | *Astragalus microcystis* | This species is found in alpine and subalpine areas on limestone and dry, gravelly soils and sandy areas, as well as on riverbanks and in open woods. |
| Flowering Plants | Pauper milkvetch | *Astragalus misellus var. misellus* | Habitat is stony hills and pastures and gravelly clay banks, on basaltic bedrock, with sagebrush and juniper. |
| Flowering Plants | Pauper milkvetch | *Astragalus misellus var. pauper* | This variety occurs on open ridgetops, upper slopes, and shrub-steppe. |
| Flowering Plants | Half-ring milkvetch | *Astragalus mohavensis var. hemigyrus* | Rocky ledges and arid gravelly hillsides on limestone. Carbonate gravels and derivative soils on terraced hills and ledges, open slopes, and along washes in the creosote-bursage, blackbrush, and mixed-shrub zones. Occurs in Mojavean desert scrub and Joshua tree woodland communities. |

| Taxa | Common Name | Scientific Name | Preferred Habitat |
|---|---|---|---|
| Flowering Plants | Curved-pod milkvetch | *Astragalus mojavensis var. hemigyrus* | Rocky ledges and arid gravelly hillsides on limestone. Carbonate gravels and derivative soils on terraced hills and ledges, open slopes, and along washes in the creosote-bursage, blackbrush, and mixed-shrub zones. Occurs in Mojavean desert scrub and Joshua tree woodland communities. |
| Flowering Plants | Mono milkvetch | *Astragalus monoensis* | Great Basin scrub, upper montane coniferous forest; large, well-developed pumice flats, gravelly or sandy, sometimes with Artemisia arbuscula. |
| Flowering Plants | Mulford's milkvetch | *Astragalus mulfordiae* | Mulford's milkvetch occurs on loose, sandy substrates derived from lacustrine and alluvial sediments, including unconsolidated sands, decomposed sandstone, and oolithic limestone. It occurs predominantly on south to west-facing aspects. The slopes may be prone to high rates of erosion. It occurs at elevations between 670 - 1100 meters (2200 -3600 feet). It is found mainly in shrub-steppe and desert shrub communities. |
| Flowering Plants | Ferron's milkvetch | *Astragalus musiniensis* | Gullied knolls and stony clay benches among junipers, on shale, sandstone, or gravelly alluvia, 4700-7000 feet. Weber and Wittmann report the Colorado habitat as sagebrush hills. |
| Flowering Plants | Naturita milkvetch | *Astragalus naturitensis* | This species grows in the cracks and ledges of sandstone cliffs and rim rocks and flat bedrock areas with shallow soil development within pinyon-juniper woodlands at elevations of 1,650 to 2,050 m. |
| Flowering Plants | Picabo milkvetch | *Astragalus oniciformis* | Occurs almost exclusively on the Artemisia tridentata var. wyomingensis/Stipa comata habitat type, an edaphically controlled habitat type restricted to sandy loam soils. |
| Flowering Plants | San Diego rattleweed | *Astragalus oocarpus* | Chaparral and oak woodland and ecotones with meadows. |
| Flowering Plants | Lavin's milkvetch | *Astragalus oophorus var. lavinii* | Occurs barren, arid and open, clay slopes and gravelly hillsides, knolls, badlands, rocky ledges in Creosote bush scrub, pinyon-juniper, sagebrush, Joshua tree woodland communities. Substrates derived from volcanic ash or carbonate, usually on northeast to southeast aspects. |
| Flowering Plants | Pink egg milkvetch | *Astragalus oophorus var. lonchocalyx* | Pinyon-juniper, sagebrush, and mixed desert shrub communities at 1,770 to 2,300 m. Dry gravelly hillsides and stony flats, associated with sagebrush, on limestone. |
| Flowering Plants | Peck's milkvetch | *Astragalus peckii* | Occurs on very dry sites, on loose sandy soil or pumice at ca. 900-1500 m; it is often found in dry water-courses. This species is usually found in barren openings in juniper/sagebrush communities or in openings in lodgepole pine forests. Plants also occur in the forest ecotone and occasionally beneath forest canopy. |
| Flowering Plants | Ames milkvetch | *Astragalus pulsiferae var. pulsiferae* | Sandy or rocky soils (frequently granitic), often occurring with pines or sagebrush. Elevation: 1300-1900 m. |

| Taxa | Common Name | Scientific Name | Preferred Habitat |
|---|---|---|---|
| Flowering Plants | Suksdorf's milkvetch | *Astragalus pulsiferae var. suksdorfii* | Rocky ledges and arid gravelly hillsides in the Creosote Bush Scrub community, Joshua tree woodland, carbonate soil. Great Basin scrub, lower montane coniferous forests, pinyon and juniper woodlands, dry flats in open pine forest and on stony plains, in loose volcanic soils, 1290 m. |
| Flowering Plants | Hare's-foot milkvetch | *Astragalus purshii var. lagopinus* | This variety occurs on dry slopes and plains usually with sagebrush on basalt or pumice. |
| Flowering Plants | Snake River milkvetch | *Astragalus purshii var. ophiogenes* | This variety is found in loosely aggregated sand and gravelly sand deposits on bluffs, talus, dunes and volcanic ash beds with big sagebrush, Indian ricegrass, needle-and-thread grass, and four-wing satlbush, at elevations ranging from 700 to 1,075 meters. |
| Flowering Plants | Racemose milkvetch | *Astragalus racemosus var. treleasei* | Occurs on shale derived substrates on outwash flats and slopes along river valleys. Elevation 6500-7500 (8300) ft. Frequently occurs with thickspike wheatgrass, rubber rabbitbrush, green rabbitbrush and shadscale. |
| Flowering Plants | Bitterroot milkvetch | *Astragalus scaphoides* | Sagebrush-grassland communities on dry slopes at mid- elevations (5000-6000 feet). |
| Flowering Plants | Sandstone milkvetch | *Astragalus sesquiflorus* | On slickrock formations. Mixed desert shrub, pinyon-juniper, and ponderosa pine or aspen communities at 1470-3100 meters. |
| Flowering Plants | Whited's milkvetch | *Astragalus sinuatus* | This species occurs in sagebrush-bunchgrass shrub-steppes on predominantly south facing slopes at 250-610 m elevation. It grows in loess soils with small amounts of volcanic ash. |
| Flowering Plants | Weak milkvetch | *Astragalus solitarius* | Stiff clays of valley floors and mesas, usually in close association with Artemesia arbuscula (Nevada, Oregon) & Sacrobatus (in Oregon). |
| Flowering Plants | Railhead milkvetch | *Astragalus terminalis* | Sagebrush steppe and sparsely vegetated grasslands in the valley, foothills, montane, and alpine zones; 1524-2914 m. |
| Flowering Plants | Toquima milkvetch | *Astragalus toquimanus* | Gravelly/stony hillsides and canyon benches. Often found growing inconspicuously underneath sagebrush in stiff calcareous soil. |
| Flowering Plants | Tygh Valley milkvetch | *Astragalus tyghensis* | This plant occurs on dry rocky soils with a thin overlying sandy layer. Habitats where this species occur include mounded prairies, open bunchgrass grasslands, semi-open juniper communities, and roadsides. |
| Flowering Plants | Currant milkvetch | *Astragalus uncialis* | Dry alkaline soils derived from limestone. With sagebrush in gullied foothills at 1,600-1,825 m in Nevada and in shadscale at 1,400-1,600 m on Sevier Desert in Utah. |
| Flowering Plants | Welsh's milkvetch | *Astragalus welshii* | This species occurs exclusively on igneous gravels, in sagebrush, pinyon-juniper, and sagebrush-aspen communities at elevations of 2,000-2,810 m. |
| Flowering Plants | Duchess springparsley | *Aulospermum duchesnensis* | Found in cold desert shrub, sagebrush, and juniper communities on sandy clay and clay semi-barrens of the Mancos and Morrison shales from 4,700 to 6,800 feet (1,433 to 2,073 meters) elevation. |

| Taxa | Common Name | Scientific Name | Preferred Habitat |
|---|---|---|---|
| Flowering Plants | Sickle-pod rockcress | *Boechera atrorubens* | This species occurs on rocky summits, and sagebrush slopes on sandy loam. |
| Flowering Plants | Bodie Hills rockcress | *Boechera bodiensi* | Occurs at high elevations on rolling to steep topography; found on dry, open, rocky, high or north-facing slopes (often in rock crevices) and exposed rocky ridges and summits. Occurs on granitic, rhyolitic, or andesitic substrates. Occurs in high elevation Great Basin scrub, pinyon and juniper woodland, and subalpine lodgepole pine and whitebark pine forests. Preferred microsites include moisture-accumulating microsites in sagebrush associations, under shrubs, and on disturbed soils of prospector's diggings. |
| Flowering Plants | Bodie Hills rock cress | *Boechera bodiensis* | Occurs at high elevations on rolling to steep topography; found on dry, open, rocky, high or north-facing slopes (often in rock crevices) and exposed rocky ridges and summits. Occurs on granitic, rhyolitic, or andesitic substrates. Occurs in high elevation Great Basin scrub, pinyon and juniper woodland, and subalpine lodgepole pine and whitebark pine forests. Preferred microsites include moisture-accumulating microsites in sagebrush associations, under shrubs, and on disturbed soils of prospector's diggings. |
| Flowering Plants | Sapphire rockcress | *Boechera fecunda* | This species occurs in the ecotone between lower treeline (associated species include Pseudotsuga menziesii, Juniperus scopulorum and/or Pinus ponderosa) and shrub/grasslands (associated species include Artemisia tridentata and/or Cercocarpus ledifolius and Agropyron spicatum. Soils are highly calcareous, sandy to coarsely gravelly, derived from metamorphosed calcium silicate parent materials. Sites are usually sparsely vegetated and on south to west-facing steep, eroding slopes (erosion and a dry, warm microclimate probably help maintain the open habitat). |
| Flowering Plants | Lincoln rock cress | *Boechera lincolnensis* | This species occurs around sagebrush and other shrubs, in gravelly soil and on rocky slopes at elevations ranging from 1,400 to 1,900 meters. |
| Flowering Plants | Blue gramma | *Bouteloua gracilis* | Grows pure stands in mixed prairie associations and disturbed habitats, usually on rocky or clay soils and mainly at elevations of 300-3000 m. |
| Flowering Plants | Green-brand mariposa-lily | *Calochortus macrocarpus var. maculosus* | Dry plains, rocky slopes, sagebrush scrub, and in pine forests. Usually occurring in volcanic soils. |
| Flowering Plants | Cusick's camas | *Camassia cusickii* | Occurs at low to mid elevations on steep, rocky hillsides and ridgetops in moist soils, usually along or near creeks. Often found in sagebrush scrub and among scattered ponderosa pine. |
| Flowering Plants | Baird's camissonia | *Camissonia bairdii* | It occurs in clay soil in pinyon-juniper woodlands. |
| Flowering Plants | Kern River evening-primrose | *Camissonia integrifolia* | Generally, sagebrush slopes; 700-1000 m. |

| Taxa | Common Name | Scientific Name | Preferred Habitat |
|---|---|---|---|
| Flowering Plants | Lewis' River suncup | *Camissonia parvula* | This species is found in areas with sagebrush scrub and sandy soils at elevations ranging from 100 to 2,700 meters. |
| Flowering Plants | Pygmy suncup | *Camissonia pterosperma* | This species occurs on well-drained slopes, often of volcanic origin, with sagebrush and pinyon-juniper, at elevations of 700 to 2600 m, but at 1400 to 2400 m elevation in California. |
| Flowering Plants | Washoe suncup | *Camissonia pusilla* | Dry, open to branchy slopes, flats, and roadsides on sandy soil with Artemisia to pinyon-juniper. Commonly found growing sympatrically with Camissonia parvula and Camissonia pubens (Kartesz 1988). Mixed desert shrub, sagebrush, and mountain brush communities at ca. 1220 to 1830 m. |
| Flowering Plants | Tahoe sedge | *Carex tahoensis* | This species occurs in grasslands, sagebrush as well as open, rocky and sandy slopes, subalpine and alpine meadows, at elevations ranging from 600 to 3,700 meters. |
| Flowering Plants | Rural paintbrush | *Castilleja flava var. rustica* | This variety is mostly found in montane sagebrush habitats with dry soils at elevations ranging from 1,100 to 2,300 meters. |
| Flowering Plants | Mt. Gleason Indian paintbrush | *Castilleja gleasoni* | Lower montane coniferous forest, pinyon-juniper woodland; granitic. |
| Flowering Plants | Thompson's painbrush | *Castilleja thompsonii* | Dry soil, frequently associated with sagebrush. Local on open slopes and bald summits of the surrounding mountains to about 7000 ft. |
| Flowering Plants | Smooth wild cabbage | *Caulanthus crassicaulis var. glaber* | This variety is found in pinyon-juniper woodland and sagebrush scrub at elevations ranging from 1,200 to 2,900 meters. |
| Flowering Plants | Birchleaf Mountain mahogany | *Cercocarpus montanus* | This species is found on sandstone, granite, limestone ridges, rocky slopes, and valley floors, as well as grasslands, savannahs, juniper-oak, pinyon-juniper, yellow pine woodlands, aspen, and pine-fir forests, at elevations ranging from 800 to 3,000 meters. |
| Flowering Plants | Desert or broadflower pincushion | *Chaenactis stevioides* | This species is found in arid or semiarid, gravelly, or sandy, open slopes, flats, and shrublands at elevations ranging from -30 to 2,300 meters. |
| Flowering Plants | Wheeler's skeleton-weed | *Chaetadelpha wheeleri* | This species is found in dunes, sandy soils and alkali flats in sagebrush scrub and creosote bush scrub, at elevations ranging from 800 to 1,800 meters. |
| Flowering Plants | White-bracted spineflower | *Chorizanthe xanti var. leucotheca* | Sandy or gravelly substrates of coastal scrub, Mojavean desert scrub, and pinyon and juniper woodlands. |
| Flowering Plants | Naked-stemmed evening-primrose | *Chylismia scapoidea ssp. scapoidea* | This subspecies occurs in shrublands and rocky, gravelly, or sandy slopes. |
| Flowering Plants | Ownbey's thistle | *Cirsium ownbeyi* | Juniper, sagebrush, and riparian communities. Usually on limestone, talus, or sandy slopes. Weber and Morgan formations. |
| Flowering Plants | Barneby's cryptanth | *Cryptantha barnebyi* | Locally abundant on the domed or gently sloping white shale knolls of the Green River Formation, mostly in shadscale and pinyon-juniper communities at 1850-2400 m elevation. |

| Taxa | Common Name | Scientific Name | Preferred Habitat |
|---|---|---|---|
| Flowering Plants | Tufted cryptantha | *Cryptantha caespitosa* | Populations are usually restricted to rocky or chalky ridgetops in cushion plant communities. Forb-grass, pinyon-juniper, mountain brush, limber pine, and spruce-fir forests at 1950 to 3120 meters. |
| Flowering Plants | Silver-mounded candleflower | *Cryptantha cana* | This species occurs on open slopes in juniper woodlands and valleys, in sandy, calcareous soil, and on sandstone outcroppings and bluffs, at 1219 - 2300 m elevation. |
| Flowering Plants | Narrow-stem cryptantha | *Cryptantha gracilis* | This species is found in joshua tree and pinyon-juniper woodlands, as well as dry slopes, mesas, creosote bush scrub, all in sandy to rocky soils. |
| Flowering Plants | Schoolcraft catseye | *Cryptantha schoolcraftii* | In sagebrush scrub, on white-colored volcanic ash deposits at 837 - 1750 m, most locations are in a basalt mesa area along the west side of Black Rock Desert. |
| Flowering Plants | Silky cryptantha | *Cryptantha sericea* | This species occurs in open pine-juniper woodlands and fir-mountain brush communities, in sandy to gravelly soils, shaley slopes and sandstone outcrops. |
| Flowering Plants | Pine Woods cryptantha | *Cryptantha simulans* | This species found in open conifer forests and shrublands, as well as dry, gravelly sites, slopes, and disturbed areas. |
| Flowering Plants | Snake River cryptanthea | *Cryptantha spiculifera* | This species occurs in dry, open slopes and flats in plains and grasslands, sandy or stony ridges, foothills, valleys, and sagebrush steppe. |
| Flowering Plants | Bodie Hills cusickiella | *Cusickiella quadricostata* | Rocky flats and windswept slopes and ridges; generally in rocky soils, sometimes in clay soils. Sagebrush (Great Basin scrub) and pinyon-juniper woodland communities, 1890-2800 meters. |
| Flowering Plants | Intermountain wavewing | *Cymopterus basalticus* | Reported to occur on bare basaltic, but more often dolomite rocks, barren clays, dolomite outcrops, gravelly hills and alluvial fans, at elevations of 1705 - 2134 meters (5600 - 7000 feet) in desert shrub, pinyon-juniper and sagebrush communities. |
| Flowering Plants | Pinnate spring-parsley | *Cymopterus beckii* | Sandy or stony crevices, ledges, and cliff bases on Navajo Sandstone in pinyon-juniper, mountain brush, and ponderosa pine-manzanita conifer-oak, and Douglas fir communities between 1700-2635 m elevation. |
| Flowering Plants | Uintah Basin springparsley | *Cymopterus duchesnensis* | Found in cold desert shrub, sagebrush, and juniper communities on sandy clay and clay semi-barrens of the Mancos and Morrison shales (Morrison, Uintah, Wasatch and Green River formations) from 4,700 to 6,800 feet (1,433 to 2,073 meters) elevation. |
| Flowering Plants | Evert's wafer-parsnip | *Cymopterus evertii* | Montane populations in Wyoming are on dry, rocky, often disturbed ridges and in meadows with volcanic substrates at 2200-3300 m elevation. Other Wyoming populations are along sandstone ridges with scattered Limber pine (Pinus flexilis) and Utah juniper (Juniperus osteosperma) at elevations of 1770-1800 m. The Utah plants are growing in gravelly soils on limestone outcrops at 2620 m. |

| Taxa | Common Name | Scientific Name | Preferred Habitat |
|---|---|---|---|
| Flowering Plants | Purple cymopterus | *Cymopterus purpurascens* | This species occurs on shrubby slopes. |
| Flowering Plants | Ordate dalea | *Dalea ornata* | Dry sand, shaley barrens, rocky ridges, gullied bluffs, knolls, and canyon washes with Artemisia to yellow pine. |
| Flowering Plants | Santa Suzana tarplant | *Deinandra minthornii* | Within Chaparral and Coastal Sage Scrub communities, in rocky openings, on exposed ridges, and in crevices of sandstone bluffs and outcrops. 280 - 760 meters. |
| Flowering Plants | Kern County larkspur | *Delphinium purpusii* | Talus slopes, cliffs, steep rock outcrops, and on and near large boulders; substrate often carbonate. Found within Chaparral, Foothill/Cismontane Woodland, and Pinyon-Juniper Woodland communities. 300 - 1340 meters. |
| Flowering Plants | Cusick's monkeyflower | *Diplacus cusickii* | This species occurs in canyons, ditches, washes, black volcanic gravel, volcanic ash and sand, sagebrush areas, as well as on sand talus, diatomaceous slopes, and basalt outcrops, at elevations ranging from 800 to 1,000 meters. |
| Flowering Plants | Steamboat monkeyflower | *Diplacus ovatus* | Dry to somewhat moist, often barren, loose, sandy to gravelly slopes derived from siliceous sinter deposited by hot springs in the sagebrush zone, or from highly acidic hydrothermally altered andesite or rhyolite deposits supporting sparse yellow pine woodlands within the pinyon-juniper zone, or possibly on sandy alkaline valley floor deposits in the sagebrush zone, sometimes on adjacent roadsides or washes. |
| Flowering Plants | Many-stemmed dudleya | *Dudleya multicaulis* | Often associated with heavy clay soils in barrens, dry stony places, or thinly vegetated openings, within coastal sage scrub, chaparral, and valley and foothill grassland (e.g. southern needlegrass grassland) communities. |
| Flowering Plants | Panamint dudleya | *Dudleya saxosa ssp. saxosa* | Mojavean desert scrub and pinyon-juniper woodland; granitic or carbonate (limestone) substrate. |
| Flowering Plants | None | *Dudleya viscida* | Grows in dry rocky places, below 1200 ft. elevation in coastal sage scrub. |
| Flowering Plants | Hall's daisy | *Erigeron aequifolius* | Broadleaf upland forest, lower montane coniferous forest, pinyon and juniper woodland, upper montane coniferous forest; rocky, granitic soils. |
| Flowering Plants | Bald daisy | *Erigeron calvus* | Great Basin Sagebrush Scrub and Desert Scrub communities at the foot of the Inyo Mountains. 1200 meters. |
| Flowering Plants | White cushion erigeron | *Erigeron disparipilus* | This species occurs on rocky and gravelly substrates of ridges and slopes, in grassland and sagebrush, at elevations ranging from 600 to 2,200 meters. |
| Flowering Plants | Fan-leaved fleabane | *Erigeron flabellifolius* | Grows on scree and talus. |
| Flowering Plants | Broad fleabane | *Erigeron latus* | Thin, volcanic soils on gravelly or rocky hillsides and outcrops in the sagebrush zone, near juniper woodlands. 1600-2000 meters elevation. |

| Taxa | Common Name | Scientific Name | Preferred Habitat |
|---|---|---|---|
| Flowering Plants | Limestone daisy | *Erigeron uncialis var. uncialis* | This taxon grows in crevices and cracks of limestone outcrops or at the base of cliffs within Great Basin sagebrush scrub, subalpine coniferous forest, or pinyon and juniper woodland at altitudes of 1,900 to 2,900 meters. |
| Flowering Plants | Untermann's daisy | *Erigeron untermannii* | Calcareous shales and sandstones, mainly of the Uinta and Green River formations, in various plant communities at elevations ranging from 2073 to 2890 meters. Pinyon-juniper, mountain mahogany, limber and bristlecone pine, and sagebrush communities on calcareous shales and sandstones of the Uinta and Green River Formations between 7,000 and 9,400 feet elevation |
| Flowering Plants | Ibex buckwheat | *Eriogonum ammophilum* | This taxon occurs in sandy washes, flats, and dunes and stabilized sand in shadscale, horsebrush, winterfat, rabbitbrush, ephedra, and pinyon-juniper communities at 1460 to 1890 meters elevation. |
| Flowering Plants | Windloving buckwheat | *Eriogonum anemophilum* | Wind-loving Buckwheat occurs on bleak, exposed, windswept summits, ridges, and exposed rocky slopes on loose, gravelly to rocky limestone and on volcanic tuff outcrops, and at low elevations on barren clay hills. It occurs in saltbush and sagebrush communities, pinyon-juniper woodlands, and in barren areas, at elevations of 1400-2600 meters. |
| Flowering Plants | Kaye H. Throne's buckwheat | *Eriogonum artificis* | This species occurs in sandy to gravelly soil, on volcanic slows, mixed grassland, sagebrush and juniper woodland communities. |
| Flowering Plants | Beatley buckwheat | *Eriogonum beatleyae* | Dry volcanic outcrops (Reveal 1989). Volcanic tuffaceous soils, sagebrush communities, pinyon-juniper woodlands at 1,700-2,800 meters elevation. |
| Flowering Plants | Short-flowered eriogonium | *Eriogonum brachyanthum* | Creosote bush, other warm desert shrub & shad-scale communities |
| Flowering Plants | Brandegee's buckwheat | *Eriogonum brandegeei* | In general, this species is found on barren outcrops of white to grayish soils within open sagebrush and pinyon-juniper communities. |
| Flowering Plants | Golden buckwheat | *Eriogonum chrysops* | This species is found within the cold desert environment of the Owyhee uplands, typically within the Artemisia arbuscula-Poa sandbergii lithosolic association in rocky scabland areas. It occurs in relatively open sites, on flats, gently sloping ridges, and outcrops. The substrate is dry, barren, shallow, gravelly to rocky soil overlying basalt or rhyolite flows. |
| Flowering Plants | Colorado buckwheat | *Eriogonum coloradoense* | This species has an extremely broad ecological range; it has been documented on every soil texture, slope, and aspect. It has been found on sedimentary, granitic, and volcanic substrates, with Artemisia species (sagebrush) and Bouteloua gracilis (blue grama) and also with alpine cushion plants. It is found on a variety of geomorphic landforms, usually on talus, fellfields, rock shoots, and ridges, but also on roadsides. |
| Flowering Plants | Reveal's buckwheat | *Eriogonum contiguum* | This species occurs on sandy to gravelly flats and slopes, or rocky hills and lower bajadas with Atriplex species. It is found within Creosote Bush Scrub, saltbush, and mesquite communities at elevations of -20 to 900 meters. |

| Taxa | Common Name | Scientific Name | Preferred Habitat |
|---|---|---|---|
| Flowering Plants | Flat top buckwheat | *Eriogonum corymbosum var. smithii* | Occurs in desert shrub communities on red "blowsand" of the Entrada Sandstone at 1400 to 1900 m elevation, but mostly between 1585 m and 1710 m. It is associated with purple-sage, matchweed, ephedra-Indian ricegrass, rabbitbrush communities. It occurs on selenium-rich sands and is associated with dunes. |
| Flowering Plants | Crosbys buckwheat | *Eriogonum crosbyae var. crosbyae* | Light colored, tuffaceous sandstones and (in Nevada) clay outcrops. Typically, on rolling hills dominated by big sagebrush (Artemisia tridentata). 1650-1700 meters elevation. |
| Flowering Plants | Cusick's buckwheat | *Eriogonum cusickii* | occurs on barren flats and hills with dry soil over weathered basalt and welded tuff. Plants in surrounding areas include dwarf sagebrush (Artemesia arbuscula) and western juniper (Juniperus occidentalis). It occurs from 1200 to 1600 m (3940 to 5250 feet) elevation. |
| Flowering Plants | Churchill Narrows buckwheat | *Eriogonum diatomaceum* | Dry, relatively barren and undisturbed, white to yellowish tan, often gysiferous, clay to silty diatomaceous deposits of the Coal Valley Formation, with a variable volcanic cobble overburden, on rounded knolls, low ridges, slopes, and especially small drainages on all aspects at elevations of 1300-1410 m, with Atriplex confertifolia, Stanleya pinnata, Sarcobatus baileyi, Artemisia spinescens, Kochia americana, Tetradymia glabrata, and other shadscale zone associates. |
| Flowering Plants | Ephedra buckwheat | *Eriogonum ephedroides* | Found in juniper and sagebrush-grass communities on white shale of the Green River Shale Formation at 5,700 feet (1,737 meters) elevation. |
| Flowering Plants | Wildrose Canyon buckwheat | *Eriogonum eremicola* | Occurs in sand and gravel of sagebrush, mountain mahogany, and montane conifer woodlands between 2,200 and 3,100 meters elevation. |
| Flowering Plants | Limestone buckwheat | *Eriogonum eremicum* | Occurs in shadscale, desert shrub, saltbush communities, and pinyon-juniper woodlands on calcareous substrates at 1555 to 1925 m elevation; substrates include limestone and dolomite. |
| Flowering Plants | Clokey buckwheat | *Eriogonum heermannii var. clokeyi* | This species occurs in limestone gravelly to rocky flats, slopes, and washes, saltbush, blackbrush, or sagebrush communities, pinyon-juniper and montane conifer woodlands. |
| Flowering Plants | Hoffmann's buckwheat | *Eriogonum hoffmannii var. hoffmannii* | Sandy to gravelly slopes, sagebrush communities, pinyon-juniper woodlands; 1000-1700 meters. |
| Flowering Plants | Robust Hoffmann's buckwheat | *Eriogonum hoffmannii var. robustius* | This species is found on dry slopes in Mojave Desert scrub and pinyon-juniper woodlands, generally in sand in elevations of 100-1700 meters. |
| Flowering Plants | Kern buckwheat | *Eriogonum kennedyi var. pinicola* | Dry exposed open areas of Pinyon Juniper Woodland. Geology is volcanic - andesitic basalt or rhyo/tuff. |

| Taxa | Common Name | Scientific Name | Preferred Habitat |
|---|---|---|---|
| Flowering Plants | Lewis buckwheat | *Eriogonum lewisii* | Dry, exposed, rocky, convex ridge-line knolls and crests underlain by siliceous carbonate, siliceous limestone, or dolomite on all aspects at 1970-2960m elevation. At lower elevations, occasionally found on clay hills derived from silty carbonate or calcium-rich siliceous rock. Co-dominating with Artemisia arbuscula, Chrysothamnus viscidiflorus, Elymus elymoides, and Achnatherum hymenoides. |
| Flowering Plants | Lobb's buckwheat | *Eriogonum lobbii* | Habitat is gravelly to rocky or talus slopes, mixed grassland, buckbrush, manzanita, and sagebrush communities, and montane, subalpine, or alpine conifer woodlands. In the high mountains of northwestern California and southwestern Oregon and the southern portion of the North Coast Range of California, plants are frequently associated with serpentine soils. In the Sierra Nevada of eastern California and west-central Nevada, the species is found almost exclusively on granitic soils and infrequently on volcanic ones. |
| Flowering Plants | Pinyon Mesa buckwheat | *Eriogonum mensicola* | This species occurs on rocky to gravelly flats and slopes, sagebrush and mountain mahogany communities, pinyon-juniper and montane conifer woodlands. |
| Flowering Plants | Panamint Mountains buckwheat | *Eriogonum microthecum var. panamintense* | Occurs on gravelly slopes, in sagebrush communities and pinyon-juniper woodlands. |
| Flowering Plants | Schoolcraft buckwheat | *Eriogonum microthecum var. schoolcraftii* | Sandy to rocky soil, sagebrush communities, pinyon-juniper woodlands; 1400-2200 meters. |
| Flowering Plants | Deeth buckwheat | *Eriogonum nutans var. glabratum* | This taxon occurs in sand on flats and slopes within saltbush and sagebrush communities at elevations 1,500 to 1,900 meters. |
| Flowering Plants | Calcereous buckwheat | *Eriogonum ochrocephalum var. calcareum* | Barren white volcanic ash-clay; associates include Artemisia arbuscula, Chrysothammus nauseosus, Sitanion. |
| Flowering Plants | Craters-of-the-Moon wild buckwheat | *Eriogonum ovalifolium var. focarium* | Occurs on black volcanic gravel on gentle slopes and flats in sagebrush communities, conifer woodlands; 1600-1900 meters. |
| Flowering Plants | Deer Lodge buckwheat | *Eriogonum pharnaceoides var. cervinum* | Occurs on sandy or gravelly slopes, sagebrush and mountain mahogany communities, oak, pinyon-juniper and montane conifer woodlands. |
| Flowering Plants | Scarlett buckwheat | *Eriogonum phoeniceum* | Grows on tuffaceous soils in sagebrush communities and pinyon-juniper woodlands. Grows with Eriogonum microthecum, but there is no evidence of hybridization. Elevation: 1710 - 2040 meters. |
| Flowering Plants | Packard's buckwheat | *Eriogonum shockleyi var. packardiae* | Oolitic limestone outcrops, sandy loess over basalt, and cobbly desert pavement over deep sandy-loam; in shadscale, mixed desert shrub and sagebrush communities; elevations from 760-1300 m; this species is endemic to southwest Idaho along the Snake River and a few tributaries in Ada and Owyhee cos. |

| Taxa | Common Name | Scientific Name | Preferred Habitat |
|---|---|---|---|
| Flowering Plants | Shockey's or matted cowpie buckwheat | *Eriogonum shockleyi var. shockleyi* | Occurs on sparsely vegetated sandy-loams, cobbly desert pavement, and gravelly calcrete on lacustrine sediments; in shadscale, mixed desert shrub and sagebrush communities; elevations from 760-1300 meters. |
| Flowering Plants | Railroad Canyon buckwheat | *Eriogonum soliceps* | This species is found in sagebrush communities with gravelly soil, at elevations ranging from 2,500 to 2,600 meters. |
| Flowering Plants | Frisco buckwheat | *Eriogonum soredium* | Habitat is white limestone (Ordovician) outcrop-surfaces with gravel and scattered rocks and boulders in a pinyon-juniper community at 2,010-2,230 meters elevation. |
| Flowering Plants | Woodside buckwheat | *Eriogonum tumulosum* | This species occurs on gravel and/or clay flats and slopes, sagebrush and saltbush communities, as well as pinyon and/or juniper woodlands at elevations ranging from 1,500 to 2,300 meters. |
| Flowering Plants | Green buckwheat | *Eriogonum umbellatum var. glaberrimum* | Sandy to gravelly slopes, sagebrush communities, aspen and montane conifer woodlands; 1600-2300 meters. |
| Flowering Plants | Clay Hill buckwheat | *Eriogonum viridulum* | This species occurs in sandy, silty, or clay flats, slopes, and hills, sagebrush or saltbush, and pinyon-juniper woodlands at elevations ranging from 1,400 to 2,200 meters. |
| Flowering Plants | Limestone monkeyflower | *Erythranthe calcicola* | Grows in Pinyon-juniper woodland, Joshua Tree woodland, and creosote bush scrub on talus and scree slopes. |
| Flowering Plants | Carson Valley monkeyflower | *Erythranthe carsonensis* | This species occurs in open areas of Great Basin sagebrush/bitterbrush scrub in coarse granite soils on gentle to moderate slopes (0-15 percent), usually on north aspects but also occasionally on south to southwest aspects. Elevation 1400-1580 m (4600-5200 ft). |
| Flowering Plants | Ackerman's green gentian | *Frasera ackermaniae* | Ackerman Green Gentian is locally endemic to foothills of the Uintas, in the Uinta Basin. It occurs on yellowish clay soil with paleosol inclusions and selenite gypsum fragments. It occurs mixed with Utah juniper, mountain brush and desert scrub. |
| Flowering Plants | Cathedral Bluff dward gentian | *Gentianella tortuosa* | Found in sagebrush through spruce-fir forests on shale outcrops of the Green River Formation at 8,500 to 10,800 feet (2,591 to 3,292 meters) elevation. |
| Flowering Plants | Cronquist's forget-me-not | *Hackelia cronquistii* | North-facing gentle to moderate slopes, with the majority of plants occurring on mid or lower slope areas. Soils are sandy. Usually found with a plant association that includes big sagebrush and indian ricegrass. |
| Flowering Plants | Jaeger's hesperdianthus | *Hesperidanthus jaegeri* | Pinyon and juniper woodland, subalpine coniferous forest; rocky crevices, cliffs, and limestone clefts. |
| Flowering Plants | Cooper's rubber-plant | *Hymenoxys cooperi var. canescens* | This variety is found in open areas, edges of juniper/pine forest, and on roadsides at elevations ranging from 1,000 to 3,500 meters. |
| Flowering Plants | Spreading gilia | *Ipomopsis polycladon* | This species is found in gravelly or sandy soils in pinyon-juniper woodlands, plains, washes, mesas, and desert shrublands. |

| Taxa | Common Name | Scientific Name | Preferred Habitat |
|---|---|---|---|
| Flowering Plants | Rock purpusia | *Ivesia arizonica var. saxosa* | Rock Purpusia occurs in crevices of cliffs and on boulders on volcanic (granitic or ash-flow tuff) and possibly carbonate rocks in the upper mixed-shrub, sagebrush, and pinyon-juniper zones, at elevations of 1500 - 2100 meters. |
| Flowering Plants | Ash Creek ivesia | *Ivesia paniculata* | Shallow, rocky soils on open volcanic ridges, gravelly flats, and openings within Sagebrush Scrub, Northern Juniper Woodland, Yellow Pine Forest, Lodgepole Forest, and Red Fir Forest communities. |
| Flowering Plants | Kingston Mountains ivesia | *Ivesia patellifera* | Crevices of granitic rocks within Pinyon-Juniper Woodland communities. 1400 - 2100 meters. |
| Flowering Plants | Pine Nut Mountains mousetails | *Ivesia pityocharis* | This species occurs in seasonally saturated soils of sagebrush flats at 2100 to 2700 meters elevation. |
| Flowering Plants | Grimy ivesia | *Ivesia rhypara var. rhypara* | Populations of Grimy Ivesia are found on either light-colored ash-tuff or on outcrops of volcanic ash deposited with riverbed gravels. Habitat is low sagebrush or barren without canopy cover and is very dry. |
| Flowering Plants | Plumas ivesia | *Ivesia sericoleuca* | Meadows and alkaline flats/gentle slopes, usually on volcanic substrates, sometimes on mixed-alluvium Eocene lake deposits. Habitat is generally vernally moist, drying later in the season; species sometimes also found around vernal pools or seeps. These open habitats are found within Sagebrush Scrub and Yellow Pine Forest communities. 1300 - 2200 meters. |
| Flowering Plants | Least rush | *Juncus hemiendytus var. abjectus* | This variety occurs in damp open habitats such as vernal depressions, swales in sagebrush flats, streambeds, forest clearing and alpine meadows at elevations ranging from 1,400 to 3,400 meters. |
| Flowering Plants | Borrego Balley pepper-grass | *Lepidium flavum var. felipense* | This variety is found in sandy or alkaline soils on roadsides, washes, floodplains, sagebrush scrub, and mesas, at elevations ranging from 600 to 1,600 meters. |
| Flowering Plants | Huber's pepperplant | *Lepidium huberi* | In sand or silty sands derived from the Navajo formation, Shinarump member of the Chinle and Moenkopi formations, and Park City and Weber sandstone formations. Found within a variety of shrub-dominated and coniferous forest/woodland communities, including ponderosa pine, lodgepole pine, Douglas fir, spruce-fir, sagebrush, black sagebrush, snowberry, and mountain mahogany communities at 2225 - 2960 meters. |
| Flowering Plants | Ostler pepperplant | *Lepidium ostleri* | This species occurs in pinyon-juniper communities, often in shaded sites on Ordovician limestone outcrops with scattered rocks and gravel at elevations of 1,765 to 2,075 meters elevation. |
| Flowering Plants | Fremont's bladderpod | *Lesquerella fremontii* | Rocky limestone slopes and ridges in cushion plant-bunchgrass (Festuca idahoensis) communities and in montane meadows with scattered limber pine (Pinus flexilis). Often associated with three-tip sagebrush (Artemisia tripartita). |

| Taxa | Common Name | Scientific Name | Preferred Habitat |
|---|---|---|---|
| Flowering Plants | Mountain bladderpod | *Lesquerella montana* | This species is found on banks, rock outcrops, from plains into benchland into stony slopes and mountains, in sagebrush, open scrub oak, ponderosa pine, pinyon-juniper woodlands, and Douglas fir on granitic, often gravelly, non-calcareous soils. |
| Flowering Plants | Prostrate bladderpod | *Lesquerella prostrata* | Rangewide habitats include plains, hills, and slopes in sagebrush, grass, and juniper communities, mainly on calcareous substrates, but it can also occur on igneous substrates, it occurs at 1800-2500 m (5900-8200 feet) elevation. |
| Flowering Plants | None | *Lessingia glandulifera var. tomentosa* | Desert slopes and arroyos, grassland, hillsides, roadsides, generally sandy soil; Elevation: 900 meters. |
| Flowering Plants | Common starlily | *Leucocrinum montanum* | This species is found in sandy to rocky places, short-grass prairie, scrub flats, sagebrush deserts to open montane forests, at elevations ranging from 800 to 2,400 meters. |
| Flowering Plants | Marquire bitterroot | *Lewisia maguirei* | This species occurs in dry, sparsely vegetated carbonate scree or shallow gravelly-clay soils on steep slopes and ridgelines of all aspects. In the pinyon-juniper zone at elevations of 2,240 to 2,525 meters. |
| Flowering Plants | Pioneertown linanthus | *Linanthus bernardinus* | Joshua tree or pinyon-juniper woodland, mixed scrub, in gravelly granitic soils; Elevation: 1100-1550 meters. |
| Flowering Plants | Granite prickly phlox | *Linanthus pungens* | This species is found in open, dry, rocky, or sandy areas, from plains to sagebrush desert, to moderate elevations in the drier mountains. |
| Flowering Plants | Sagebrush pygmyleaf | *Loeflingia squarrosa ssp. artemisiarum* | Occurs in dry soils and loose sands of washes, areas bordering clay slicks, and stabilized, low sand dunes. Found in Great Basin scrub and Sonoran Desert scrub most often under Gilia and Linanthus. |
| Flowering Plants | Taper-tip desert-parsley | *Lomatium attenuatum* | Volcanic or limestone-derived scree and thin soil in sagebrush-grassland, grassland, open Douglas-fir (Pseudotsuga menziesii), and creek bottom communities. |
| Flowering Plants | Bentonite biscuitroot | *Lomatium bentonitum* | This species occurs in pinon-juniper woodlands and clay badlands. |
| Flowering Plants | Fringed desert-parsley | *Lomatium foeniculaceum ssp. fimbriatum* | This subspecies occurs in pine woodlands and sagebrush scrub. |
| Flowering Plants | Ochoco lomatium | *Lomatium ochocense* | Open, barren scabland with Artemisia rigida/Poa secunda plant association. |
| Flowering Plants | Packard's desert parsley | *Lomatium packardiae* | This species is found within sagebrush communities, on dry, open, rocky clay soils derived from rhyolite or volcanic ash, at elevations of 730 - 2300 meters. |
| Flowering Plants | Raven's lomatium | *Lomatium ravenii var. ravenii* | This taxon typically grows on alkaline soils of flats in sagebrush of Great Basin Scrub at elevations of 1,615 to 1,775 meters. |
| Flowering Plants | Adobe lomatium | *Lomatium roseanum* | Open, dry, basalt talus and scree overlying clay soils on gentle slopes; also occurs directly on black adobe soil. Usually found within low sagebrush vegetation. |

| Taxa | Common Name | Scientific Name | Preferred Habitat |
|---|---|---|---|
| Flowering Plants | Hoover's Desert parsley | *Lomatium tuberosum* | This species is often found on loose basalt talus and rocky slopes in sagebrush steppe, typically on north to east facing slopes, but it can also be found in channels or open ridgetops on south to southwest facing slopes. |
| Flowering Plants | Culter's spurred lupine | *Lupinus caudatus var. cutleri* | Occurs sagebrush plains and in pinyon-juniper woodlands, at elevations of 1800 - 2560 meters. |
| Flowering Plants | Paradox lupine | *Lupinus crassus* | Occurs in Pinyon-juniper woodland or sagebrush, on Mancos shale derived soils in the Naturita area, on quaternary alluvium derived from the Chinle Formation in the Paradox Valley, on sparsely vegetated soil, particularly in draws and dry hillsides. It is occasionally found on loamy to clayey soils and even on adobe hill. |
| Flowering Plants | Mono Lake lupine | *Lupinus duranii* | Dry volcanic pumice, sand, and gravel within Sagebrush Scrub and coniferous forest communities. |
| Flowering Plants | Springs Bush Mountain lupine | *Lupinus excubitus var. medius* | Pinyon and juniper woodland, Sonoran Desert scrub, desert washes. |
| Flowering Plants | McGee Meadows lupine | *Lupinus magnificus var. hesperius* | Based on occurrence descriptions, this species occurs on foothills on coarse, granite sand or loose, sand slopes surrounded by black oak or in sagebrush community. |
| Flowering Plants | Nevada lupine | *Lupinus nevadensis* | Hillsides and valley floors, on dry, sandy, and stony soil with pinyon-juniper and sagebrush; 4400-7000 feet. |
| Flowering Plants | Inchhigh lupine | *Lupinus uncialis* | This species is found on limestone, rhyolite, volcanic gravels in open areas, barrens, and talus in sagebrush and pinyon/juniper woodland, at elevations ranging from 1,300 to 1,600 meters. |
| Flowering Plants | Entrada rushpink | *Lygodesmia grandiflora var. entrada* | This species occurs in deep sandy soils of Juniper and mixed desert shrub communities at 1340-1465 meters elevation. |
| Flowering Plants | Dolores River skeletonplant | *Lyodesmia grandiflora var. doloresensis* | Occurs in dry open places on sandy soils, reddish purple, sandy alluvium and colluvium of the Cutler Formation between the canyon walls and the river in juniper, shadscale, and sagebrush communities, at 1364 - 2032 meters elevation. Some occurrences are along roads, and there are fewer plants away from disturbed roadsides. |
| Flowering Plants | Ventana stickleaf blazingstar | *Mentzelia congesta* | This species occurs in sagebrush scrub, disturbed slopes, pine forests, and pinyon/juniper woodlands, at elevations ranging from 1,200 to 2,700 meters. |
| Flowering Plants | Royal Gorge blazingstar | *Mentzelia densa* | Occupies dry open areas in washes, roadsides, naturally disturbed sites, and steep rocky slopes. Plants grow in gravel, scree, or on cliffs formed from Precambrian granodiorite and gneiss. The species occurs in pinyon-juniper woodland and lower montane shrubland communities with a poorly developed understory and an open canopy. |

| Taxa | Common Name | Scientific Name | Preferred Habitat |
|---|---|---|---|
| Flowering Plants | Goodrich's blazingstar | *Mentzelia goodrichii* | Steep, white, marly, calciferous shale outcrops of the Green River Formation with scattered limber pine, pinyon pine, Douglas fir, mountain mahogany, and rabbitbrush, along escarpment of Willow and Argyle canyons, at 2470-2685 m, mostly southern exposures. |
| Flowering Plants | Inyo blazingstar | *Mentzelia inyoensis* | Documented on a variety of substrates including carbonate rocks/gravel, calcareous pumice sand, whitish ash deposits, and clay soils of hillsides, occurs in habitats that include sagebrush scrub, shadscale scrub, and pinyon-juniper woodlands. |
| Flowering Plants | Horse Canyon stickleaf | *Mentzelia multicaulis var. librina* | Occurs on barren gray clay soils, on steep shale slopes at elevations 1700 - 2100 meters, in sagebrush, rabbitbrush and pinyon-juniper communities on Manicos Shale and Price River formations. |
| Flowering Plants | Polished blazingstar | *Mentzelia polita* | Occurs in open areas in mixed desert shrub communities, in dry washes, arroyos, and steep slopes, on clayey or gravelly limestone or less commonly gypsum soils, at 450-1370 m elevation in Nevada; 1200-1500 m elevation in California. |
| Flowering Plants | Roan Cliffs blazingstar | *Mentzelia rhizomata* | This species is known only from steep, shaley talus slopes derived from the Parachute Creek Member of the Green River Formation. The plants are commonly associated with Gambel oak, western chokecherry, mountain mahogany and Utah juniper |
| Flowering Plants | Nodding silver-puffs | *Microseris nutans* | This species is found in various soils in brushlands, grasslands, woodlands, and coniferous forests at elevations ranging from 100 to 3,000 meters. |
| Flowering Plants | Disappearing monkeyflower | *Mimulus evanescens* | Grows in sagebrush-juniper plant associations, among rocky rubble and boulders in vernally moist, heavy gravel. It is generally restricted to a narrow ecotone on fluctuating banks of intermittent streams or pools, between sagebrush on the upper bank and emergent, wetland species on the lower bank. |
| Flowering Plants | Narrow-leaved mondardella | *Monardella angustifolia* | Rhyolitic ash tuff outcrops between 850- and 1400-meters elevation. These relatively barren areas consist of azonal soils. Surrounding vegetation includes sagebrush steppe and big sagebrush shrubland. |
| Flowering Plants | Boyd's monardella | *Monardella boydii* | Desert scrub, juniper woodland, on canyon bottoms and rocky slopes; Elevation: 1400-1650 meters. |
| Flowering Plants | Clark Mountain monardella | *Monardella eremicola* | Limestone (occasionally granite) outcrops in pinyon/juniper woodland, canyons, slopes, wash margins; Elevation: 1500-2100 meters. |
| Flowering Plants | Robison mondardella | *Monardella robisonii* | Found in Pinyon and Juniper woodland. |

| Taxa | Common Name | Scientific Name | Preferred Habitat |
|---|---|---|---|
| Flowering Plants | Annual dropseed | *Muhlenbergia minutissima* | This species is found on rocky slopes and flats, in sandy, gravelly drainages, road cuts, and open sites, as well as pinyon-juniper woodlands, yellow pine and oak-pine forests, pinyon-juniper woodlands, thorn-scrub forests, and oak-gramma savannahs, at elevations ranging from 1,200 to 3,000 meters. |
| Flowering Plants | Rigid threadbush | *Nemacladus rigidus* | Desert scrub, juniper or pinyon-juniper woodland, sandy and gravelly wash bottoms, volcanic ash, mostly below 2200 meters. |
| Flowering Plants | Rock-loving neoparrya | *Neoparrya lithophila* | Grows on volcanic substrates, in cracks or shelves usually with minimal talus. It is seen in moderate to steep rock outcrops, or outcrops of volcanic soils. It also occurs on sedimentary rock derived from extrusive volcanics (Dry Union Formation at Salida). The surrounding habitat is typically grasslands or pinon-juniper woodlands. |
| Flowering Plants | Holmgren smewlowskia | *Nevada holmgrenii* | This species occurs in cracks, cervices, ledges, rubble, talus, or small soil pockets on rock outcrops and cliffs, from high-elevation ridges to north facing walls at lower elevations, on various rock types (e.g. calcareous rock, schist, metamorphic rock, igneous rock). Sites are found in the lower alpine, subalpine conifer, mountain sagebrush, and upper pinyon-juniper zones. |
| Flowering Plants | Murdock's evening primrose | *Oenothera murdockii* | Pinyon-juniper woodlands, clay, silty barrens. |
| Flowering Plants | Short-joint beavertail | *Opuntia basilaris var. brachyclada* | Joshua tree "woodland", Mohavean desert scrub, pinyon and juniper woodland, sandy soils of slopes just above the desert, mostly at 900- 1800 m. Desert-edge phase of California Chaparral. |
| Flowering Plants | Tufted cryptanth | *Oreocarya caespitosa* | Populations are usually restricted to rocky or chalky ridgetops in cushion plant communities. Forb-grass, pinyon-juniper, mountain brush, limber pine, and spruce-fir forests at 1950 to 3120 meters. |
| Flowering Plants | Rollins' crypthantha | *Oreocarya rollinsii* | Known from white shale slopes of the Green River Formation; in pinyon-juniper woodlands and cold desert shrubland communities at 5,300 to 5,800 feet (1,615 to 1,768 meters) elevation. |
| Flowering Plants | Trotter's oreoxis | *Oreoxis trotteri* | This species grows in crevices or in sandy pockets on the Moab Tongue and (occasionally) the Slick Rock members of the Entrada Sandstone. It is found in the open, although usually on sites with a northern aspect, and, less frequently, in alcoves and along shaded cliff bases. It grows in mixed juniper and warm desert shrub community at 1,359 to 1,573 m elevation. |
| Flowering Plants | Osterhout's cryptanthia | *Oreocarya osterhoutii* | This species is found in dry barren sites in shale or reddish-purple decomposed sandstone, or in dry sandy soil in the desert, in blackbrush, mixed desert shrub, oak brush, salt bush, and pinyon-juniper communities at 1,370 to 2,000 meters. |
| Flowering Plants | Shasta orthocarpus | *Orthocarpus pachystachyus* | Ultramafic alluvium with sagebrush and native bunchgrasses. 775 - 975 meters. |

| Taxa | Common Name | Scientific Name | Preferred Habitat |
|---|---|---|---|
| Flowering Plants | Rollin's crypanthia | *Oreocarya rollinsii* | Known from white shale slopes of the Green River Formation; in pinyon-juniper woodlands and cold desert shrubland communities at 5,300 to 5,800 feet (1,615 to 1,768 meters) elevation. |
| Flowering Plants | Bessey locoweed | *Oxytropis besseyi var. obnapiformis* | This taxon grows on barrens, sand dunes, bluffs, hilltops, or knolls in fine-textured or sandy soils or shaley talus in pinyon-juniper and sagebrush communities. |
| Flowering Plants | Challis crazyweed | *Oxytropis besseyi var. salmonensis* | Occurs within the shrub-steppe in sandy wash or open lower slopes on fine talus and ash. |
| Flowering Plants | Wanapum crazyweed | *Oxytropis campestris var. wanapum* | This taxon grows in open sagebrush communities on volcanic-ash substrates described as whitish clay-silt soils below white ashy layer that are found at the summit of a north-facing ridgeline. |
| Flowering Plants | Colorado feverfew | *Parthenium ligulatum* | Barren or semibarren calciferous or gypsiferous outcrops of the Green River, Uinta, Ferron, Summerville, and Carmel formations in salt desert shrub, serviceberry, rabbitbrush, Indian rice-grass, greasebush, galleta, black sagebrush, pygmy sagebrush, and pinyon-juniper communities at 1705-2135 meters. |
| Flowering Plants | Dwarf lousewort | *Pedicularis centranthera* | Sagebrush scrub, alluvial fans; 1300 - 1500 meters. |
| Flowering Plants | Meadow lousewort | *Pedicularis crenulata* | This species occurs in moist grassy, alpine meadows, and sagebrush basins at elevations ranging from 1,500 to 3,200 meters. |
| Flowering Plants | Snowball cactus | *Pediocactus nigrispinus* | Sagebrush, grasslands, and coniferous forests; usually below 1500 meters elevation. |
| Flowering Plants | Simpson's hedgehof cactus | *Pediocactus simpsonii* | Pinyon-juniper woodlands, sagebrush, montane and prairie grasslands, and coniferous forests; usually above 1500 meters elevation. |
| Flowering Plants | Tuhy's breadroot | *Pediomelum aromaticum var. tuhyi* | Found in pinyon-juniper and mixed desert shrub communities at elevations between 5,600 to 6,500 feet. |
| Flowering Plants | Kane breadroot | *Pediomelum epipsilum* | Pinyon-juniper woodland at ca. 1670 meters. on Chinle and Moenkopi formations. |
| Flowering Plants | Stemless beardtongue | *Penstemon acaulis* | This species occurs on semi-barren substrates in pinyon-juniper and sagebrush-grass communities elevations of 1,676 to 2,504 meters. |
| Flowering Plants | Stemless penstemon | *Penstemon acaulis var. acaulis* | This species occurs on semi-barren substrates in pinyon-juniper and sagebrush-grass communities elevations of 1,676 to 2,504 meters. |
| Flowering Plants | Yampa beardtongue | *Penstemon acaulis var. yampaensis* | This species grows in sandy or gravelly or rocky soils of barren or semi-barren shale ridges or slopes, dry, sparsely vegetated limestone outcrops, gypsum hills, and shale ridges, or deposition fans from eroded slopes and alluvial fans in sparsely vegetated areas of pinyon-juniper and sagebrush-grass communities at elevations of 1,780 to 2,200 meters. |

| Taxa | Common Name | Scientific Name | Preferred Habitat |
|---|---|---|---|
| Flowering Plants | White River beardtoung | *Penstemon albifluvis* | Habitat is desert shrub communities or pinyon-juniper woodlands on substrates composed of fine textured soils and shale fragments, weathered from the Green River Formation. |
| Flowering Plants | Neese narrowleaf penstemon | *Penstemon angustifolius var. dulcis* | Four-winged saltbush, sagebrush-Eriogonum, and juniper communities of sand dunes. |
| Flowering Plants | Rosy two-toned beardtongue | *Penstemon bicolor ssp. roseus* | This subspecies is found on gravelly soils,and roadsides, as well as juniper woodlands, desert scrub, talus slopes, and arroyos. |
| Flowering Plants | Tunnel Springs beardtongue | *Penstemon concinnus* | Endemic to the Great Basin occurring in pinyon-juniper, blue grama, mountain mahogany, cliff rose, and sagebrush communities. Found on calcareous or igneous gravels, usually on pale, limestone-derived substrates. |
| Flowering Plants | Franklin's penstemon | *Penstemon franklinii* | Occurs in grass-forb-sagebrush and in three-awn, needlegrass, matchweed, and black sagebrush communities on sandy-gravelly and sandy soils across a gently sloping landscape.at 1,650 to 1,800 meters elevation. |
| Flowering Plants | Death Valley beardtongue | *Penstemon fruticiformis var. amargosae* | This species is found in creosote shrublands at elevations ranging from 900 to 1,900 meters. |
| Flowering Plants | Blue-leaved penstemon | *Penstemon glaucinus* | At mid-elevations in open understory of pine forests, usually lodgepole or white-bark, occasionally ponderosa. Also, in open areas dominated by shrub-grasses on exposed slopes, rims and ridges at higher elevations. |
| Flowering Plants | Harrington's beardtongue | *Penstemon harringtonii* | Open sagebrush or, less commonly, pinyon-juniper habitats, on gentle slopes. Soils are typically rocky loams and rocky clay loams derived from coarse calcareous parent materials. |
| Flowering Plants | Janish's beardtongue | *Penstemon janishiae* | Hillsides and slopes on clay soil derived volcanic rock with Artemisia to pinyon-juniper. |
| Flowering Plants | Bright penstemon | *Penstemon luculentus* | This plant is found on partly barren, arid benches and slopes in sandy clay loams of the Uinta Formation and Green River shale in sagebrush communities with Amelanchier, Chrysothamnus, and Holodiscus. |
| Flowering Plants | Pahute Mesa beardtongue | *Penstemon pahutensis* | In loose soil and rock crevices among boulders in pinyon-juniper woodlands and sagebrush shrublands. 1770-2285 meters elevation. |
| Flowering Plants | Beautiful penstemon | *Penstemon perpulcher* | Sandy or loamy soils on the lower and middle Snake River Plains and surrounding, rolling, sagebrush-dominated foothills. 630-2000 meters elevation. |
| Flowering Plants | Closed-throated beardtongue | *Penstemon personatus* | Conifer forests, often moist and with a substantial Shasta red fir component. In semi-shade or open places, such as dry hillsides, forest openings and edges, and disturbed places such as clearcuts and roadsides; sometimes within Montane Chaparral areas. Often on metavolcanic substrates. 1065 - 2120 meters. |

| Taxa | Common Name | Scientific Name | Preferred Habitat |
|---|---|---|---|
| Flowering Plants | Pinyon penstemon | *Penstemon pinorum* | Pinyon-juniper, mountain-mahogany, ephedra, oak, sagebrush, and less commonly greasewood communities on Tertiary Claron Formation, i.e., quartzite cobble conglomerate and sandstone to calcareous sandstone and sandy limestone (soils are reddish and gravelly to cobble-like), across slopes of varying degree and aspect (predominately northerly) between 1713 meters and 2072 meters. |
| Flowering Plants | Bashful beardtongue | *Penstemon pudicus* | Occurs on steep, rocky slopes in Pinyon-Juniper woodlands, especially along partially shaded washes, at 2300-3050 m (7500 - 10000 feet) elevation. The species occurs in crevices, soil pockets, and coarse rocky soils of felsic volcanic outcrops, boulder piles, on steep protected slopes, and drainage bottoms, mostly on north and east aspects, in the subalpine sagebrush, mountain mahogany, and upper pinyon-juniper zones. |
| Flowering Plants | Wassuk beardtongue | *Penstemon rubicundus* | Occurs in desert scrub, sagebrush, pinyon-juniper ecosystems on rocky to gravelly soils on perched tufa shores, steep decomposed granite slopes, rocky slopes, rocky drainage bottoms, disturbed but recovering areas with enhanced runoff, including slopes that were recently burned, where it can be abundant. |
| Flowering Plants | Neese's Blue Mountain beardtongue | *Penstemon scariosus var. cyanomontanus* | Occurs in pinyon-juniper or sagebrush-grassland communities, on sandy soil or in sandstone crevices. |
| Flowering Plants | Short-lobed penstemon | *Penstemon seorsus* | This species is found in juniper woodlands and sagebrush shrublands at elevations ranging from 1,000 to 2,100 meters. |
| Flowering Plants | Stephens' beardtongue | *Penstemon stephensii* | Rocky (usually carbonate) areas, including rock crevices, limestone cliffs, rocky slopes, and washes with sandy conglomerate. Predominantly within Creosote Bush Scrub and Pinyon-Juniper Woodland communities, occasionally within Shadscale Scrub or Sagebrush Scrub. 1160 - 1850 meters. |
| Flowering Plants | Susanville beardtongue | *Penstemon sudans* | This species grows in open, sagebrush or woodland dominated, rocky slopes on volcanic or other igneous substrates at elevations of 1,200 to 1,700 meters elevation. |
| Flowering Plants | Jaeger beardtongue | *Penstemon thompsoniae ssp. jaegeri* | Gravelly limestone soils on knolls and slopes, in drainages, and under conifers, from the pinyon-juniper to the subalpine conifer zones. |
| Flowering Plants | Ward's penstemon | *Penstemon wardii* | This species grows on semi-barren, light-colored clays (often calcareous or gypsiferous) in desert shrub and pinyon-juniper communities at 1,645 to 2,075 meters elevation. |
| Flowering Plants | Yampa penstemon | *Penstemon yampaensis* | This species grows in sandy or gravelly or rocky soils of barren or semi-barren shale ridges or slopes, dry, sparsely vegetated limestone outcrops, gypsum hills, and shale ridges, or deposition fans from eroded slopes and alluvial fans in sparsely vegetated areas of pinyon-juniper and sagebrush-grass communities at elevations of 1,780 to 2,200 meters. |

| Taxa | Common Name | Scientific Name | Preferred Habitat |
|---|---|---|---|
| Flowering Plants | White River beardtongue | *Penstemon scariosus var. albifluvis* | Habitat is desert shrub communities or pinyon-juniper woodlands on substrates composed of fine textured soils and shale fragments, weathered from the Green River Formation. |
| Flowering Plants | Wild crabapple | *Peraphyllum ramosissimum* | Oak-sagebrush, pinyon-juniper, mountain brush, and ponderosa pine communities at 1500 to 2500 meters. |
| Flowering Plants | Inyo rock daisy | *Perityle inyoensis* | Dry, rocky, often carbonate, slopes, within Pinyon-Juniper Woodland and Great Basin Scrub communities. 1800 - 2710 meters. |
| Flowering Plants | Alcove rock-daisy | *Perityle specuicola* | Occurs on dry sites in alcoves, cliffs, cliff bases, and narrow, protected canyons on Navajo Sandstone and Cedar Mesa sandstone formations, and in Permian limestone. It is found within desert shrub and hanging garden communities along streams and near seeps within pinyon-juniper in Navajo Sandstone and Cedar Mesa sandstone formations, and in Permian limestone, along the Colorado and San Juan rivers at 1125-1500 m elevation. |
| Flowering Plants | Hanaupah rock daisy | *Perityle villosa* | Occurs in rock crevices in pinyon and juniper woodlands. |
| Flowering Plants | Cooke's phacelia | *Phacelia cookei* | Open areas, including disturbed roadsides, seedling conifer plantations, and recently burned sites, on loose volcanic sand. Found within Great Basin (Sagebrush) Scrub and Yellow Pine Forest communities, often with a scattered ponderosa pine-juniper overstory. |
| Flowering Plants | Cronquist's phacelia | *Phacelia cronquistiana* | Limited to the gypsum-rich Carmel Formation, it occurs on clay outcrops in pinyon-juniper-sagebrush and ponderosa pine communities. |
| Flowering Plants | Clarke phacelia | *Phacelia filiae* | Grows on pale-colored outcrops and calcareous substrates, gypsiferous sandstone, siltstone, tuffaceous claystone, or limestone of foothills, low knolls, or valley floors above the playas in creosote-bursage, shadscale, mixed-shrub, and blackbrush zones. |
| Flowering Plants | Death Valley round-leaved phacelia | *Phacelia mustelina* | This species occurs in Mohavean desert scrub, pinyon and juniper woodland on carbonate or volcanic soils that are gravelly or rocky. |
| Flowering Plants | Charlotte's pharcelia | *Phacelia nashiana* | Joshua tree "woodland", Mohavean desert scrub, pinyon and juniper woodland, granitic soils. |
| Flowering Plants | Nine Mile Canyon phacelia | *Phacelia novenmillensis* | This species grows in dry, open areas with sandy to gravelly soils, typically granitic or metamorphic, on disturbed banks within Pinyon-Juniper Woodland, Foothill/Cismontane Woodland, Red Fir Forest, and Mixed Evergreen Forest communities at elevations of 1,280 to 2,350 meters. |
| Flowering Plants | None | *Phacelia perityloides var. jaegeri* | Dry rocky habitats, usually with carbonate substrate, including cliff crevices, rock crevices, rock walls, and rocky slopes. Found predominantly within Pinyon-Juniper Woodland communities, including pinyon-littleleaf mountain-mahogany and sagebrush-pinyon-juniper assemblages. |

| Taxa | Common Name | Scientific Name | Preferred Habitat |
|---|---|---|---|
| Flowering Plants | Mount Diablo phacelia | *Phacelia phacelioides* | This species occurs in rocky places, including rocky slopes, peaks, and crests, in the open or in the partial shelter of shrubs. It is found within Chaparral and Foothill/Cismontane Woodland communities. |
| Flowering Plants | Atwood's pretty phacelia | *Phacelia pulchella var. atwoodii* | Occurs on thin gypsiferous strata or alluvium contaminated by gypsum in pinyon-juniper, oak, sagebrush, single-leaf ash, and serviceberry communities at 1550 to 1680 meters elevation. |
| Flowering Plants | Dward phacelia | *Phacelia tetramera* | This species is found in sagebrush steppe communities, meadows, vernal pools, alkaline flats, and washes. |
| Flowering Plants | Sunbright | *Phemeranthus parviflorus* | This species occurs in a wide variety of habits including woodlands, grasslands, chaparral, scrub, canyon washes, mountain slopes and ledges, on sandy, rocky soils, or on outcrops. It can grow at elevations of 0 to 2,700 meters above sea level. |
| Flowering Plants | Spinescent fameflower | *Phemeranthus spinescens* | Basaltic outcrops and scablands in sagebrush deserts. |
| Flowering Plants | Thompson's talinum | *Phemeranthus thompsonii* | Occurs in shallow, gravelly soils comprised mainly of rounded, silicious pebbles of the Buckhorn Conglomerate of the Cedar Mountain Formation in pinyon-juniper, sagebrush, and ponderosa pine communities. |
| Flowering Plants | Chambers' twinpod | *Physaria chambersii* | This species is found in reddish clay, limestone gravel, on dolomite ridges and roadsides, as well as in sagebrush and pinyon-juniper habitats at elevations ranging from 1,500 to 3,200 meters. |
| Flowering Plants | Dorn's twinpod | *Physaria dornii* | Dry, sparsely vegetated, calcareous-shaley slopes and ridges dominated by mountain mahogany and rabbitbrush at 1980-2200 meters elevation. |
| Flowering Plants | Cobre bladderpod | *Physaria kingii ssp. cobrensis* | This variety occurs in limestone gravel, silt, rocky places with low sagebrush at elevations ranging from 500 to 1,000 meters. |
| Flowering Plants | Middle Butte bladderpod | *Physaria obdeltata* | This species grows on clay, silt, or gravel over basal lava flows on barren areas, playas, or in sagebrush at elevations of 1,300 to 1,700 meters. |
| Flowering Plants | Piceance bladderpod | *Physaria parviflora* | This species is endemic to outcrops of the Green River Shale Formation in the Piceance Basin. It grows on ledges and slopes of canyons in open areas of pinon juniper communities. |
| Flowering Plants | Uncompaghre bladderpod | *Physaria vicina* | This species grows on Mancos shale at the ecotone between pinyon-juniper woodland and salt desert scrub. It also has been found in sandy soils derived from Jurassic sandstones and in sagebrush steppe. |
| Flowering Plants | Elusive Jacob's-ladder | *Polemonium elusum* | Occurs where vegetation transitions from sagebrush and mountain mahogany to Douglas-fir woodland. |
| Flowering Plants | Washington polemonium | *Polemonium pectinatum* | Occurs in riparian or vernally moist areas, usually in bottomlands, but occasionally on benches and mid-slope depressions. Primarily within sagebrush/bunchgrass communities; and previously within Palouse grasslands. |

| Taxa | Common Name | Scientific Name | Preferred Habitat |
|---|---|---|---|
| Flowering Plants | Fremont's combleaf | *Polyctenium fremontii* | This species is found in shallow soil on basalt, sagebrush areas, dry meadows, edge of vernal pools, gravel bars, rocky wash, mud flats, dry streambeds and swales, at elevations ranging from 1,000 to 2,700 meters. |
| Flowering Plants | Desert prenanthella | *Prenanthella exigua* | This species occurs in gravelly, sandy, or clay soils, in desert washes and open slopes to steppes of sagebrush-juniper, at elevations ranging from 20 to 1,900 meters. |
| Flowering Plants | Beartooth large-flowered goldenweed | *Pyrrocoma carthamoides var. subsquarrosa* | Grassland or sagebrush grassland, often on calcareous soils. |
| Flowering Plants | Bugleg goldenweed | *Pyrrocoma insecticruris* | Mountain meadows, sagebrush/grass; 5000-6000 feet elevation. |
| Flowering Plants | Snake River goldenweed | *Pyrrocoma radiata* | A grazing-modified sagebrush/grassland community. Usually, a specific soil type that is slightly to very calcareous and often overlays a shale formation. |
| Flowering Plants | Rough pyrrocoma | *Pyrrocoma scaberula* | Occurs in grasslands of the Snake River Canyons/Camas Prairie region. |
| Flowering Plants | California chicory | *Rafinesquia californica* | This species is found in open areas in chaparral, coastal sage scrub, and oak woodlands at elevations ranging from 100 to 1,500 meters. |
| Flowering Plants | Bartonberry | *Rubus bartonianus* | At least partially shaded in shrub communities on higher riparian terraces along streams and in shrub-dominated ephemeral stream beds, so water is available in abundance at least seasonally. Also, occasionally on lower slopes in mixed shrub communities, but never far from the riparian zone. Soils derived from basalt parent materials. |
| Flowering Plants | Death Valley sage | *Salvia funerea* | This species is associated with creosote bush. |
| Flowering Plants | Orocopia sage | *Salvia greatae* | Dry washes and fans, below 600 ft, creosote bush scrub. |
| Flowering Plants | Blaine pincushion | *Sclerocactus blainei* | Greasewood, galleta grass, shadscale, and sagebrush communities on limestone and igneous gravels with a clay matrix. 1460-1830 meters elevation. |
| Flowering Plants | Dawson's hookless cactus | *Sclerocactus dawsonii* | Populations occur primarily on alluvial benches along the Colorado and Gunnison Rivers and their tributaries. |
| Flowering Plants | Colorado hookless cactus | *Sclerocactus glaucus* | Populations occur primarily on alluvial benches along the Colorado and Gunnison Rivers and their tributaries. |
| Flowering Plants | Great Basin fishhook cactus | *Sclerocactus pubispinus* | Rocky hillsides of woodland and upper desert mountains. Shadscale, sagebrush, winterfat, rabbitbrush, and pinyon-juniper communities on calcareous and dolomitic gravels and outcrops at 1800 to 1955 meters. |
| Flowering Plants | Bolander's catchfly | *Silene hookeri ssp. bolanderi* | Usually occurs in grassy openings, sometimes dry rocky slopes, canyons, or roadsides on serpentine and non-serpentine soils. |
| Flowering Plants | Lost River silene | *Silene scaposa var. lobata* | Subalpine grassy, gravelly, or rocky slopes, ponderosa pine forests, juniper scrub, sagebrush. |

| Taxa | Common Name | Scientific Name | Preferred Habitat |
|---|---|---|---|
| Flowering Plants | Jones globemallow | *Sphaeralcea caespitosa var. caespitosa* | This species is found mainly on the Sevy Dolomite Formation on shallow, calcareous soil or on calcareous or dolomitic gravels, at 1370 to 2000 meters elevation in mixed desert shrub, typically with shadscale, matchweed, rabbitbrush, winterfat and in grass (Indian ricegrass and galleta) communities. |
| Flowering Plants | Railroad Valley globemallow | *Sphaeralcea caespitosa var. williamsiae* | Railroad Valley Globemallow occurs in shadscale, Sarcobatus and mixed shrub zones on dry, open, flat to gently sloped, gravelly carbonate soils on alluvium and valley fill, often more abundant on recovering disturbances such as washes and roadsides. |
| Flowering Plants | Psorlea globemallow | *Sphaeralcea psoraloides* | Salt and mixed desert shrub communities and pinyon-juniper communities; can occur in areas where vegetation is sparse. Occurs on clayey, silty, sandy, and gravelly semibarrens, often under alkaline conditions. |
| Flowering Plants | Tall dropseed | *Sporobolus compositus var. compositus* | This variety occurs in meadows, prairie, plains, and pastures, as well as open woodlands and savannas. |
| Flowering Plants | Hairy prince's-plume | *Stanleya tomentosa var. runcinata* | This variety is found in sagebrush communities, knolls, as well as on rocky limestone hillsides, steep grassy banks, and stony clay slopes at elevations ranging from 1,300 to 2,300 meters. |
| Flowering Plants | Woolly stenotus | *Stenotus lanuginosus var. lanuginosus* | This variety occurs on basaltic or granitic soils, in open pine forests, alpine meadows, and on sagebrush steppe, at elevations ranging from 300 to 2,900 meters. |
| Flowering Plants | Long-flowered snowberry | *Symphoricarpos longiflorus* | This species is found in sagebrush, pinyon-juniper communities, and rocky mountain slopes. |
| Flowering Plants | Slender-flowered evening-primrose | *Tetrapteron graciliflorum* | This species occurs in clay soil, grasslands, brushy or open slopes, as well as Yucca, juniper and oak shrublands at elevations ranging from 0 to 800 meters. |
| Flowering Plants | Alpine greenthread | *Thelesperma subnudum var. alpinum* | Pinyon-juniper, mountain brush, and western bristlecone pine communities at 2100 to 2745 meters (6890 to 9006 ft). |
| Flowering Plants | Kanab thelypody | *Thelypodiopsis ambigua var. erecta* | Occurs in pinyon-juniper and mixed desert shrub communities, on clay hilsides, practically always on degraded purple Chinle shales and mudstones, at 1512 to 1701 meters (4960 to 5580 feet) elevation. |
| Flowering Plants | Arrow-leaf thelypody | *Thelypodium eucosmum* | Under or around western juniper in canyons, seasonal creek drainages, and springs. |
| Flowering Plants | Howell's thelypodium | *Thelypodium howellii var. howellii* | This species is known from desert shrub communities, alkaline ground. |
| Flowering Plants | Purple thick-leaved thelypody | *Thelypodium laciniatum var. streptanthoides* | Found in sagebrush scrub communities. |
| Flowering Plants | Lone Mountain goldenheads | *Tonestus graniticus* | This species occurs in crevices in granite cliffs and on bedrock outcrops within pinyon pine woodlands. |
| Flowering Plants | Hooker's townsend-daisy | *Townsendia hookeri* | This species is found in grasslands, sagebrush steppe, coniferous woodlands; plains, valleys, and montane habitats. |

| Taxa | Common Name | Scientific Name | Preferred Habitat |
|---|---|---|---|
| Flowering Plants | Sevier townsendia | *Townsendia jonesii var. lutea* | Found in salt desert and mixed desert shrub and juniper-sagebrush communities. |
| Flowering Plants | Mountain townsendia | *Townsendia montana* | Grows on sandy calcareous soil of grasslands, sagebrush steppe, and woodlands at lower elevations. |
| Flowering Plants | Scapose daisy | *Townsendia scapigera* | This species is found in openings in sagebrush at elevations ranging from 1,400 to 3,400 meters. |
| Flowering Plants | Hairy townsend daisy | *Townsendia strigosa* | This species occurs in junipers, pinyons, desert scrub, and open places, with shales, sands, and clays at elevations ranging from 1,500 to 2,000 meters. |
| Flowering Plants | Frisco clover | *Trifolium friscanum* | This species is restricted to calcareous (Ordovician limestone, dolomite) and volcanic gravels, usually on relatively steep slopes, within pinyon-juniper woodland communities (often with mountain mahogany). |
| Flowering Plants | Dedecker's clover | *Trifolium kingii ssp. dedeckerae* | Often in cracks of granite outcrops and on gravelly slopes at 2100-3500 m. in pinyon-juniper woodlands, lower and upper montane coniferous forests, and subalpine coniferous forests. |
| Flowering Plants | Owyhee clover | *Trifolium owyheense* | Owyhee Clover occurs on barren slopes, ridges and mounds composed of talus and loose, coarse-grained, crumbly soils derived from rhyolitic ash or diatomaceous tuff at 830- 1650 m elevation within sagebrush-steppe or desert shrub vegetation. |
| Flowering Plants | Sand puffs | *Tripterocalyx micranthus* | Creosote bush, blackbrush, sandy desert shrub, and mixed desert shrub, usually in sand. |
| Insects | Large aegialian scarab | *Aegialia magnifica* | Known only from low, red sand hills and sand blow-outs in an area of ca. 12 km sq that extends South of Mormon Mesa ridge and North and East of the Meadow Valley Wash - Weiser Wash - Muddy River drainage system from the Longandale - Overton exchange on Interstate 90 southward ca. six km to Longandale, Nevada. Site is comprised by typical Mojave Desert vegetation characterized by creosote bush, Mojave yucca, white bur sage, brittlebush, Opuntia cactus, and Atriplex sp. |
| Insects | Morrison bumblebee | *Bombus morrisonii* | Typically found in open dry scrub. |
| Insects | Suckley's cuckoo bumblebee | *Bombus suckleyi* | The habitats of its known host species, Bombus occidentalis open grassy areas, urban parks and gardens, chaparral and shrub areas, and mountain meadows. |
| Insects | Barry's hairstreak | *Callophrys gryneus chalcosiva* | Juniper woodland, abandoned pastures, old fields, barrens, glades, coastal thickets and scrub; with its larval hosts, Juniperus virginiana, J. scopulorum. |
| Insects | Mattoni's blue | *Euphilotes pallescens mattonii* | Found primarily in the upper and lower Sonaran Zones, prairies, and sand dunes; found in pinyon-juniper woodlands and rolling prairie grasslands; host plant for the larvae is the buckwheat (Eriogonum microthecum nutt. Var. laxiflorum). |
| Insects | Mono Basin skipper | *Hesperia uncas giulianii* | This species occurs in single leaf pinyon woodlands and Great Basin sage scrub on gently rolling hills with sandy soil between 6,800 and 7,500 ft in elevation. |

| Taxa | Common Name | Scientific Name | Preferred Habitat |
|---|---|---|---|
| Insects | MacNeill sooty wing skipper | *Hesperopsis gracielae* | Requires stands of quailbush (Atriplex lentiformis) near nectar producing plants, such as heliotrope; often found on quailbush with high leaf water content resulting from shallow groundwater or irrigation runoff.; desert washes, alkali flats, and arid canyons, particularly if they support scrub or chaparral vegetation. |
| Insects | Coronis fritillary | *Speyeria coronis coronis* | Various: chaparral, sage lands, open pine forest, canyons, meadows. Hosts are in genus Viola, and oak woodlands. |
| Lichens | Ciliate strap-lichen | *Heterodermia leucomelos* | On bark in Sitka spruce and shore pine forests, shrub communities, windswept headlands, edges of dense thickets. Extending further inland in California and southwards, where it occurs on oaks, other trees, and sometimes associated with old-growth forest. |
| Lichens | Lichen | *Hypotrachyna riparia* | This species primarily occurs on twigs on shrubs, as well as on twigs and boles of deciduous trees. |
| Lichens | Idaho Range lichen | *Xanthoparmelia idahoensis* | Calcareous badlands, barren to sparsely covered with vascular vegetation. Slopes are approximately 45% or less. Surrounding vascular vegetation is shrub steppe, dominated by Artemisia or Atriplex. |
| Mammals | Nelson's antelope squirrel | *Ammospermophilus nelsoni* | Habitat consists of dry flat or rolling terrain, with slopes less than 10-14 degrees, on alluvial and loamy soils, soils with sandy or gravelly texture, or fine-grained soils that are nearly brick-hard when dry. The species inhabits grassy, sparsely shrubby ground (shrubs include saltbush, ephedra, bladder pod, goldenbush, snakeweed, etc.); it also occurs in areas lacking shrubs where giant kangaroo rats are present. |
| Mammals | Pygmy rabbit | *Brachylagus idahoensis (Sylivalagus idahoensis)* | This rabbit generally occurs in dense stands of big sagebrush growing in deep loose soils. It is highly dependent on sagebrush for food and shelter throughout the year. Unlike most other rabbits, it digs burrows, which are around 3 inches in diameter; a burrow may have multiple entrances. Pygmy rabbits occasionally use of burrows abandoned by other species and may occur in areas of shallower or more compact soils if these sites support sufficient shrub cover |
| Mammals | Gray wolf | *Canis lupus* | No particular habitat preference. Minimum of 10,000-13,000 sq km (with low road density) might be necessary to support a viable population. Young are born in an underground burrow that has been abandoned by another mammal or dug by wolf. In Northwest Territories, dens were most commonly located within 50 km of northern tree line, which resulted in maximal availability of caribou during the denning and pup rearing period; within the tundra zone, dens were not preferentially located near caribou calving grounds. |

| Taxa | Common Name | Scientific Name | Preferred Habitat |
|---|---|---|---|
| Mammals | Wolverine | *Gulo gulo luscus, Gulo gulo luteus* | Alpine and arctic tundra, boreal and mountain forests (primarily coniferous). Limited to mountains in the south, especially large wilderness areas. Usually in areas with snow on the ground in winter. Riparian areas may be important winter habitat. May disperse through atypical habitat. When inactive, occupies den in cave, rock crevice, under fallen tree, in thicket, or similar site. Terrestrial and may climb trees. Young are born in a den among rocks or tree roots, in hollow log, under fallen tree, or in dense vegetation, including sites under snow. |
| Mammals | Gunnison's prairie dog | *Cynomys gunnisoni* | Gunnison's prairie dogs establish their colonies on gently sloping grasslands and semi-desert and montane shrublands, at elevations ranging from 4,600 to 12,000 feet (1,400 to 3,660 meters). |
| Mammals | White-tailed prairie dog | *Cynomys leucurus* | This loosely colonial species inhabits open shrublands, semidesert grasslands, and open valleys. It lives at higher elevations and in meadows with more diverse grass and herb cover than do black-tailed prairie dogs. Young are born in underground burrows. |
| Mammals | Black-tailed prairie dog | *Cynomys ludovicianus* | Habitat consists of dry, flat or gently sloping, open grasslands with low, relatively sparse vegetation, including areas overgrazed by cattle. The species occurs in open vacant lots at town edges in some areas. Young are born in underground burrows. |
| Mammals | Utah prairie dog | *Cynomys parvidens* | Utah prairie dogs are only found in southwestern and central Utah in open habitats. Habitat consists of swale-type formations where herbaceous vegetation is available. The species requires well, drained deep soil for burrowing. |
| Mammals | Short-nosed kangaroo rat | *Dipodomys nitratoides brevinasus* | Habitat for this species includes friable sandy or silty soils in areas with no to moderate shrub cover and scattered herbaceous plants: sparsely vegetated alkali sink communities where soils are generally sandy or silty; valley grassland; saltbush and sink scrub. The species does not tolerate irrigation or cultivation but may re-invade fields no longer under cultivation. |
| Mammals | Big brown bat | *Eptesicus fuscus* | Habitats range from high mountains to low deserts, including cities. Summer roosts generally are in buildings, bridges, hollow trees, spaces behind exfoliating bark, rock crevices, tunnels, or cliff swallow nests, in sites that do not get too hot. Maternity colonies may form in attics, barns, rock crevices, or tree cavities. Most adult females return to the same maternity roost site in successive years. Caves, mines, and especially buildings and human-made structures are used for hibernation. |

| Taxa | Common Name | Scientific Name | Preferred Habitat |
|---|---|---|---|
| Mammals | Spotted bat | *Euderma maculatum* | This species occurs in various habitats from desert to montane coniferous stands, including open ponderosa pine, pinyon-juniper woodland, canyon bottoms, riparian and river corridors, meadows, open pasture, and hayfields. Active foraging may be mostly in open terrain, including forest clearings, meadows, and open wetlands, sometimes in open areas near buildings. |
| Mammals | Western red bat BAT, | *Lasiurus blossevillii* | In California, roosting habitat includes forests and woodlands from lowlands up through mixed conifer forests of mountains; foraging habitat includes grasslands, shrublands, open woodlands and forests, and croplands, but not deserts. Red bats in California appear to be strongly associated with riparian habitats, particularly mature stands of cottonwood/sycamore in the Central Valley and lower reaches of the large rivers that drain the Sierra Nevada (Pierson et al. 2006). They sometimes use orchards, tamarisk, or other non-native trees; the degree to which sprayed orchard trees serve as viable habitats (versus population sinks) is unknown. In spring and summer, females occur primarily in lowland riparian habitat, whereas males more often are found at higher elevations. |
| Mammals | Black-tailed jackrabbit | *Lepus californicus* | Inhabits open plains, fields and deserts, open country with scattered thickets or patches of shrubs. Rests by day in shallow depression (form). |
| Mammals | White-tailed jackrabbit | *Lepus townsendii* | Open grasslands and sagebrush plains. At higher elevations found in open areas adjacent to pine forests and in alpine tundra. Rests by day usually in shallow depressions (forms) at base of bush or beside or in cavity in snow. Young are born in a well concealed depression in the ground or in burrows abandoned by other animals. |
| Mammals | Dark kangaroo mouse | *Microdipodops megacephalus* | In loose sands and gravel. Found in Shadscale Scrub, Sagebrush Scrub, and Alkali Sink plant communities in the Upper Sonoran life zone. May occur in sand dunes near margins of range. Underground when inactive. |
| Mammals | Desert Valley kangaroo mouse | *Microdipodops megacephalus albiventer* | Prefer loose sands and gravel and are found in shadscale scrub, sagebrush scrub, and alkali sink plant communities in the Upper Sonoran life zone. They may occur in sand dunes near the margins of their range (eol.org). Found among bushes growing in soils covered with gravel or on sand dunes. |
| Mammals | Fletcher dark kangaroo mouse | *Microdipodops megacephalus nasutus* | Prefer loose sands and gravel and are found in shadscale scrub, sagebrush scrub, and alkali sink plant communities in the Upper Sonoran life zone. They may occur in sand dunes near the margins of their range. Found among bushes growing in soils covered with gravel or on sand dunes. |
| Mammals | Pale kangaroo mouse | *Microdipodops pallidus* | Habitat is nearly restricted to fine sands in alkali sink and desert scrub dominated by Atriplex confertifolia (shadscale) or Artemisia tridentata (big sagebrush). This mouse often burrows in areas of soft, windblown sand piled at the bases of shrubs. |

| Taxa | Common Name | Scientific Name | Preferred Habitat |
|---|---|---|---|
| Mammals | Owens Valley vole | *Microtus californicus vallicola* | Found in rush/sedge meadow, native meadow, riparian scrub, and ungrazed irrigated pasture. |
| Mammals | Ash Meadows montane vole | *Microtus montanus nevadensis* | This species occurs in Inter-Mountain Basins Semi-Desert Shrub Steppes, Inter-Mountain Basins Semi-Desert Grasslands, and North American Arid West Emergent Marsh. |
| Mammals | Shaw Island vole | *Microtus townsendii pugeti* | This species occurs in marshes (fresh, brackish, and salt water) under driftwood on beaches, as well as in underground burrows in open grasslands, forests, and dry and agricultural fields. |
| Mammals | California myotis | *Myotis californicus* | These bats occur in various habitats, including seacoasts, desert scrub, oak-juniper woodlands, montane and humid coastal forests, mountain meadows, canyons, riparian woodlands, grasslands, rural residential areas, and towns. Night roosts are in a wide range of sheltered sites, including trees, shrubs, mines, caves, bridges, and buildings. They roost by day in crevices of various kinds, including rock fissures, tree cavities, spaces behind loose tree bark, and nooks in bridges and buildings; occasionally they roost on small desert shrubs or on the ground. Hibernation sites include caves (including lava tubes), mines, tunnels, or buildings; often in buildings in the Pacific Northwest. Maternity colonies are in rock crevices, tree cavities, under bark, or in crevices of bridges or buildings. Reproductive females often change roost sites among different trees. Foraging occurs in a wide range of habitats: over meadows/grassland, shrubland, and wooded areas; over water; and around streetlights. |
| Mammals | Western small-footed myotis | *Myotis ciliolabrum* | These bats generally inhabit desert, badland, and semiarid habitats; more mesic habitats in the southern part of the range); also, woodlands and dry open forests, riparian zones, and areas near cliffs and outcrop. In Utah, they occur in lowland riparian, desert shrub, juniper-sagebrush, juniper, piñon-juniper, sagebrush-rabbitbrush, sagebrush-greasewood (near piñon-juniper), highland riparian in lodgepole pine forest, montane forest and woodland (Douglas-fir-aspen), and montane grassland (grass-aspen). |
| Mammals | Long-eared myotis | *Myotis evotis* | These bats occupy a diverse array of habitats, including lowland, montane, and subalpine woodlands, forests, shrublands, and meadows, wooded stream courses, and areas over water bodies. Within a particular region, the range of occupied habitats may be more restricted. Daytime roosts are in buildings, railroad trestles, snags and hollow trees, spaces behind loose bark of trees or stumps, mines, caves, rock crevices (including those on the ground), erosional cavities and channels in the ground, and similar sites. |

| Taxa | Common Name | Scientific Name | Preferred Habitat |
|---|---|---|---|
| Mammals | Fringed bat | *Myotis thysanodes* | These bats occur primarily at middle elevations in desert, riparian, grassland, and woodland habitats, but they have been recorded at 2,850 meters in spruce-fir habitat in New Mexico, and at low elevations along the Pacific Coast. |
| Mammals | Long-legged myotis MYOTIS, LONG-LEGGED | *Myotis volans* | These bats occur primarily in mountainous areas wooded with coniferous trees, but also may be found in riparian and desert (Baja California) habitats. They may change habitats seasonally. Hibernacula are in caves and mines, but winter habits are poorly known. Warm-season daytime roosts are in tree hollows or under loose bark, in crevices among rocks or in cliffs, or in buildings, but apparently not in caves or mines (these may be used at night). |
| Mammals | Yuma myotis MYOTIS, YUMA | *Myotis yumanensis* | This species is more closely associated with water than most other North American bats. It is found in a wide variety of upland and lowland habitats, including riparian, desert scrub, moist woodlands, and forests, usually near open water. Foraging occurs over water or in open spaces over land. Warm-season roosts are in caves, cliff crevices, bridges, buildings, and tunnels, as well as abandoned cliff swallow nests and cavities and nooks in large live trees near water. |
| Mammals | Allen's chipmunk | *Neotamias senex* | Coniferous forests and chaparral slopes; Transition and Canadian life zones. Does not readily climb trees. |
| Mammals | Monterey dusky-footed woodrat | *Neotoma macrotis luciana* | Habitat includes riparian, shrubland, chapparal, and forested woodlands. |
| Mammals | Big free-tailed bat | *Nyctinomops macrotis* | Habitat in the southwestern United States and Mexico includes rocky areas in rugged or hilly country in both lowland and highland areas, including evergreen forest, woodlands, desert scrub, river floodplain-arroyo associations, and stream courses in areas of mixed tropical deciduous forest and thorn forest. These bats apparently roost primarily in vertical or horizontal crevices near the tops of cliffs, but sometimes they are found in buildings, caves, or occasionally tree cavities. |
| Mammals | Grasshopper Tulare mouse | *Onychomys torridus tularensis* | Habitats include compact soils with a sparse growth of perennial grasses; blue oak savanna (where rare); desert scrub associations composed of grasses and shrubs; valley sink and saltbush scrub communities dominated by one or more shrubs; Coast Range saltbush scrub; Great Valley mesquite scrub on the valley floor; and valley grassland. |
| Mammals | Mountain goat | *Oreamnos americanus* | Alpine and subalpine habitat; steep grassy talus slopes, grassy ledges of cliffs, or alpine meadows. Usually at timberline or above. May seek shelter and food in stands of spruce or hemlock in winter. Young are born on rock ledges or steep cliffs. |

| Taxa | Common Name | Scientific Name | Preferred Habitat |
|---|---|---|---|
| Mammals | Desert bighorn sheep | *Ovis canadensis nelsoni* | Bighorn sheep occur in mesic to xeric, alpine to desert grasslands or shrub-steppe in mountains, foothills, or river canyons. Many of these grasslands are fire-maintained. Suitable escape terrain (cliffs, talus slopes, etc.) is an important feature of the habitat. In winter, Rocky Mountain Bighorns spend as much as 86% of their time within 100 meters of escape terrain, and usually stay within 800 meters of escape terrain throughout the year. Mineral licks are more important in the range of Rocky Mountain Bighorn than in the range of "California" Bighorn, presumably because the soils in the range of the former are generally lower in mineral content. Distribution is correlated with low precipitation levels, especially in winter and spring. Elevation varies considerably, both geographically and seasonally, from as low as 450 meters to over 3,300 meters. |
| Mammals | Canyon bat | *Parastrellus hesperus* | Habitat includes desert mountain ranges, desert scrub flats, shrub-steppe, rocky canyons, and associated riparian zones, particularly in areas with cliffs and most often (but not always) close to water. In some areas, these bats range into coniferous forest/woodland at higher elevations. Roosts include crevices in cliffs, rock outcrops, caves, mines, and buildings, and possibly sometimes rodent burrows and spaces under rocks. Night roosts may include sagebrush shrubs. The bats hibernate in caves, mine tunnel, or rock crevices. Typically, they visit water and drink immediately after emergence each evening. Young are born in rock crevices or in buildings. |
| Mammals | Silky pocket mouse | *Perognathus flavus* | Sandy, sometimes rocky, soils in arid grasslands, shrublands, and pinyon-juniper woodland, in valley bottoms, hillsides, and mesas, sometimes in rather barren areas. |
| Mammals | San Joaquin pocket mouse | *Perognathus inornatus* | Dry, open, grassy or weedy ground. Arid annual grasslands, savanna, and desert-shrub associations with sandy washes or finely textured soil. Found in low densities in grassland-blue oak savannas up to 1500 ft on east side of San Joaquin Valley. Occurs in alkali sink associations on the floor of the Tulare Basin and in Atriplex and Ephedra associations in the northwestern portion of the Tulare Basin. |
| Mammals | Palm Springs pocket mouse | *Perognathus longimembris bangsi* | Habitat consists of creosote bush scrub, on sandy soils, on an west aspect. Habitat consists of desert scrub and riparian, dominated by C. linearis, Larrea tridentata, E. farinosa, A. dumosa, and H. salsola. Site has 20-80% shrub cover on coarse, sandy soils (loosely pucked). Habitat consists of desert scrub, dominated by Larrea tridentata, H. salsola, and E. farinosa; 20% shrub cover on coarse sandy soil with light gravel. |

| Taxa | Common Name | Scientific Name | Preferred Habitat |
|---|---|---|---|
| Mammals | Yellow-eared pocket mouse | *Perognathus mollipilosus xanthonotus* | These mice have been found in Joshua tree woodland, desert scrub, pinyon-juniper, mixed and montane chaparral, sagebrush, and bunchgrass habitats, primarily in sandy soils with sparse to moderate shrub cover. |
| Mammals | Coast mole | *Scapanaus orarius schefferi* | Agricultural land, coastal dunes, grassy meadows, coniferous and deciduous forest and woodland, along streams. Fossorial, occasionally active on surface (especially dispersing juveniles in summer). Quickly recolonizes formerly flooded areas. Breeding nests are located about 15 cm below the surface of the ground. The nest cavity is lined with coarse grass. It is about 20 cm across and has several entrances. |
| Mammals | Pygmy shrew | *Sorex hoyi* | Found in a variety of habitats. Appears to prefer grassy openings of boreal forest. Moist habitats are preferred over dry areas. |
| Mammals | Merriam's shrew | *Sorex merriami* | Habitats include various grasslands, including grasses in sagebrush scrub and pinyon-juniper woodland, as well as mountain mahogany shrublands and mixed woodlands. |
| Mammals | Preble's shrew | *Sorex preblei* | Recorded habitats include arid and semiarid shrub-grass associations, openings in montane coniferous forests dominated by sagebrush (Washington), willow-fringed creeks, marshes (Oregon), bunchgrass associations, sagebrush-aspen associations (California), sagebrush-grass associations (Nevada), alkaline shrubland (Utah). |
| Mammals | Inyo shrew | *Sorex tenellus* | Habitats include riparian zones and canyon bottoms; rocky mountain habitat in areas with logs, boulders, or sagebrush scrub); and red fir communities. This species may be more tolerant of dry habitat than are closely related shrews. In Great Basin National Park, this shrew was found at 3,000 m elevation in habitat dominated by Engelmann spruce. |
| Mammals | Brazilian free-tailed bat | *Tadarida brasiliensis* | Habitat ranges from lowland deserts, shrublands, woodlands, and forests to high mountains. Major roosts are primarily in caves in the southwestern United States; generally, buildings (generally old ones) in the southeastern United States (sometimes in hollow trees), along the U.S. West Coast, and in Jamaica; in both buildings and caves in Puerto Rico. Individuals may roost in cliff faces and other rock crevices, under bridges, on signs, or in cliff swallow nests during migration. Generally, these bats roost high (at least 3 meters) above the ground to allow the amount of free fall required to attain flight. Large maternity colonies inhabit buildings and caves; culverts and bridges may also serve as maternity sites. Individuals tend to return to their natal cave to breed. Foraging bats make use of agricultural landscapes and natural habitats; in Texas, the latter were most important in late summer. |

| Taxa | Common Name | Scientific Name | Preferred Habitat |
|---|---|---|---|
| Mammals | Fish Spring pocket gopher | *Thomomys bottae abstrusus* | This species occurs in the lowlands of central, southern, and western Nevada, USA, including the Fish Springs Valley in Nye County. The lowlands consist of primarily of sagebrush, and grasses. |
| Mammals | San Antonio pocket gopher | *Thomomys bottae curatus* | Associated with a wide range of vegetation and soil types. Residents of open habitats and meadows, where soils are deep enough to maintain permanent burrow systems. Two subspecies of priority interest are isolated to two valleys, T. b. abstrusus in Fish Spring valley (also known as Litle Fish Lake Valley) in Nye County, and T. b. curtatus in Big Smoky Valley. A third isolate occurs near Eastgate. |
| Mammals | Wyoming pocket gopher | *Thomomys clusius* | This is a fossorial species. Distribution modeling indicates that T. clusius is limited to areas with Gardner's saltbush, particularly in association with other moderately halophytic species such as winterfat. This suggests an association between T. clusius and salt desert scrub communities typically found in relatively flat areas of fine-textured saline substrates in and near the Great Divide Basin. Within south-central Wyoming, any area containing measurable cover of Gardner's saltbush, particularly on shallow slopes and in combination with winterfat, could be potential habitat for T. clusius. Although habitats characterized by Gardner's saltbush are more common within the range of T. clusius than adjacent areas of Wyoming, they represent a very limited area of potential habitat within a landscape largely dominated by big sagebrush. |
| Mammals | Idaho pocket gopher | *Thomomys idahoensis* | Open sagebrush, grassland plains, and subalpine mountain meadows. Fossorial. |
| Mammals | Merriam's ground squirrel | *Urocitellus canus* | Mainly in high desert (sagebrush, shadscale, greasewood, western juniper), grasslands, pastures; also, in river valley bottomland. Generally, in well-drained soils, especially embankments. Often around desert springs and irrigated fields. Makes extensive burrow systems. Young are born in a nest chamber in an underground burrow. |
| Mammals | Southern Idaho ground squirrel | *Urocitellus endemicus* | Southern Idaho Ground Squirrel populations occur in a mosaic of shrubland and grassland habitats common to foothills rangelands and pastures. They are also frequently associated with mowed fields, primarily alfalfa, found in drainage and valley bottoms. |
| Mammals | Piute ground squirrel | *Urocitellus mollis* | Mainly in high desert (sagebrush, shadscale, greasewood). In southwestern Idaho, highest densities were in winterfat-Sandberg's bluegrass communities, with intermediate densities in big sagebrush-dominated communities and lowest densities in shadscale communities; scarce in communities dominated by exotic annuals. |

| Taxa | Common Name | Scientific Name | Preferred Habitat |
|---|---|---|---|
| Mammals | Townsend's ground squirrel | *Urocitellus townsendii* | Townsend's ground squirrel historically occurred primarily in native shrub steppe, grasslands, and large patches of sagebrush at the lower edges of forest. A variety of human-modified habitats are now also occupied, including pastures, abandoned fields, orchards, vineyards, hop fields, canal banks, and sites adjacent to irrigated fields and springs. Occupied sites must have ample soil depths to provide space for burrow construction. |
| Mammals | Kit fox | *Vulpes macrotis* | Primarily open desert, shrubby or shrub-grass habitat. In central California, found in alkali sink, valley grassland, foothill woodland. In Mohave Desert, occurs in creosote bush; in Great Basin, in shadscale, greasewood and sagebrush. Young are born in an underground den. Den usually has multiple entrances (3 or more) and may be 3-6 m long, reaching 127 cm in depth. In Utah, most dens were on flat, well-drained uplands. Several dens may be used, especially in summer. |
| Mammals | Swift fox | *Vulpes velox* | Habitat includes open prairie and arid plains, including areas intermixed with winter wheat fields. Viable populations exist in shortgrass prairie-sagebrush steppe transition habitat in southeastern Wyoming. Dens are in burrows. A fox may dig a burrow or use a burrow made by another mammal (e.g., marmot, prairie dog, badger), usually in sandy soil on high ground in open prairies, along fencerows, occasionally in plowed field. An individual may use several different dens throughout the year. |
| Mammals | Mohave ground squirrel | *Xerospermophilus mohavensis* | This ground squirrel inhabits desert areas with flat or moderately sloping topography, deep sandy or gravelly friable soils, and an abundance of annual herbaceous vegetation (may be scant during droughts). Habitats include alluvial fans where desert pavement is absent, as well as desert sink shrublands and occasionally rocky areas. |
| Mammals | Palm Springs round-tailed ground squirrel | *Xerospermophilus tereticaudus chlorus* | The most favorable habitat appears to be areas where hummocks of sand accumulate at the base of large shrubs that provide burrow sites and adequate cover. The ground squirrels also may occur in areas of coarse sands associated with washes. In some areas, they are numerous in the transition between dunes and creosote bush scrub. |
| Reptiles | Mohave Desert glossy snake | *Arizona elegans candida* | This species occurs in barren open sandy desert, desert scrub, rocky washes, and grasslands, with loose soil for easy burrowing. |
| Reptiles | Desert glossy snake | *Arizona elegans eburnata* | This species occurs in barren open sandy desert, desert scrub, rocky washes, and grasslands, with loose soil for easy burrowing. |
| Reptiles | Colorado checkered whiptail | *Aspidoscelis neotesselata* | This whiptail occurs in valleys, arroyos, canyons, and on hillsides, in areas dominated by plains grassland or juniper woodland, including areas such as parks with frequent human use and habitat disturbance. |

| Taxa | Common Name | Scientific Name | Preferred Habitat |
|---|---|---|---|
| Reptiles | Northern rubber boa | *Charina bottae* | Habitat includes woodlands, forest clearings, patchy chaparral, meadows, and grassy savannas, generally not far from water, also riparian zones in arid canyons and sagebrush in some areas. Generally, this snake is found in or under rotting logs or stumps, under rocks or in crevices, or under the bark of dead fallen trees. |
| Reptiles | Western banded gecko | *Coleonyx variegatus* | This lizard occurs in a wide range of habitats, including creosote bush and sagebrush desert, pinyon-juniper woodland, and catclaw-cedar-grama grass associations in the eastern part of range and chaparral areas in the west; it occurs in both rocky areas and barren dunes. Refuges during inactivity include rocks, burrows, and spaces beneath vegetative debris or trash. |
| Reptiles | Miget faded rattle snake | *Crotalus viridis concolor* | This species occurs in sagebrush communities, and needs rocky outcrops for cover, variable thermal conditions, and hibernation. |
| Reptiles | Ring-necked snake | *Diadophis punctatus* | This snake occurs in forests, woodlands, grassland, chaparral, and riparian corridors in arid regions. Habitats are moist, at least seasonally. One or multiple individuals often are found near abandoned buildings and in junk piles in wooded areas. During daylight hours, this snake generally hides underground, in or under logs, or under rocks, stumps or other surface cover. Eggs are laid (often communally) underground or under logs or rocks. |
| Reptiles | Panamint alligator lizard | *Elgaria panamintina* | This lizard occurs in regions dominated by scrub desert, Joshua-tree woodland, and the lower edge of the pinyon-juniper belt. Most known locations are in canyon riparian zones below permanent springs; but individuals may range into talus slopes some distance from the immediate riparian zone. |
| Reptiles | Long-nosed leopard lizard | *Gambelia wislizenii* | Found in sandy and gravelly desert and semidesert areas with scattered shrubs or other low plants (for example, bunch grass, alkali bush, sagebrush, and creosote bush), especially areas with abundant rodent burrows. Occurs from sea level to approximately 6,000 feet (BLM 2017). |
| Reptiles | Mesa Verde nightsnake | *Hypsiglena chlorophaea loreala* | Found in a variety of habitats, often arid areas, from chaparral, Sagebrush flats, deserts, suburban lots and gardens, mountain meadows, grassland. Most commonly found in areas with abundant surface cover. |
| Reptiles | California kingsnake | *Lampropeltis californiae* | This primarily terrestrial snake occurs in a wide range of habitats, including forest, woodland, shrubland, swamps, marshes, river bottoms, grassland, semidesert, desert, and farmland. Periods of inactivity are spent in crevices or burrow, or under rocks, logs, stumps, vegetation, or other cover. |
| Reptiles | Sonoran Mountain kingsnake | *Lampropeltis pyromelana* | Habitats are primarily rocky, montane, and often near streams or springs, but also include lower elevations in mesic canyons. Vegetation may include pinyon-juniper woodland, oak-juniper woodland, pine-oak woodland, pine-Douglas-fir woodland, or chaparral. During daylight hours, this snake may be found among rocks, logs, or dense clumps of vegetation, under objects, or exposed. |

| Taxa | Common Name | Scientific Name | Preferred Habitat |
|---|---|---|---|
| Reptiles | California Mountain kingsnake | *Lampropeltis zonata* | Typical habitat of this species consists of moist open coniferous forests, oak woodlands, riparian woodland, chaparral, coastal sage scrub, and openly wooded areas where there are rocks or rotting logs. During periods of inactivity, individuals seek shelter under rocks, logs, bark, or underground. |
| Reptiles | Western threadsnake | *Leptotyphlops humilis* | Habitats range from deserts and desert-grasslands to brush-covered mountain slopes, including rocky hillsides, canyon bottoms or washes near stream courses, riparian zones, areas near springs, sandy areas above ocean beaches, and sometimes gardens and farmland. This secretive, fossorial snake sometimes can be found under rocks, wood, or debris, among plant roots, or in crevices, often in loose damp soil. |
| Reptiles | Desert rosy boa | *Lichanura trivirgata* | Habitats are diverse and include desert, arid scrub, brushland, sandy plains, rocky slopes, and chaparral-covered foothills, particularly where moisture is available, as around springs, streams, and canyon floors (but these snakes are not dependent on permanent water). This is a mainly terrestrial species, but it sometimes climbs into shrubs. |
| Reptiles | Smooth greensnake | *Opheodrys vernalis* | Habitats include meadows, grassy marshes, moist grassy fields at forest edges, mountain shrublands, stream borders, bogs, open moist woodland, abandoned farmland, and vacant lots. This snake has been found hibernating in abandoned ant mounds. Eggs are laid under rotting wood, underground, or under rocks. |
| Reptiles | Coast horned lizard | *Phrynosoma blainvillii* | This species occurs in a variety of habitats, including scrubland, grassland, coniferous woods, and broadleaf woodlands; typically, it is found in areas with sandy soil, scattered shrubs, and ant colonies, such as along the edges of arroyo bottoms or dirt roads. |
| Reptiles | Pygmy short-horned lizard | *Phrynosoma douglassii* | Semiarid plains of sagebrush and bunch grass, to pinyon-juniper woodlands, to pine forests in high mountains. It is usually found in open, shrubby, or openly wooded areas with sparse vegetation at ground level. The soil may vary from rocky to sandy to hardpan, but pockets of fine loose soil or sand are typically present for burrowing. Occurs from 1,000 to 7,200 feet. |
| Reptiles | Greater short-horned lizard | *Phrynosoma hernandesi* | Ranges from semiarid plains to high mountains (2,000 to 10,500 feet); occupies a variety of habitats, including sagebrush, open pinyon-juniper woodland, and pine-spruce and spruce-fir forests. Substrate may be stony, sandy, or firm, but some fine, loose soil is usually present. |
| Reptiles | Southern Desert horned lizard | *Phrynosoma platyrhinos calidiarum* | Found on sandy flats, alluvial fans, along washes, and at the edges of dunes. Sometimes found on hardpan or among rocks, but patches of sand are generally present. Associated with sagebrush, saltbush, and greasewood in the Great Basin. Elevational range extends from below sea level in desert sinks to about 6,500 feet. |

| Taxa | Common Name | Scientific Name | Preferred Habitat |
|---|---|---|---|
| Reptiles | Northern Desert horned lizard | *Phrynosoma platyrhinos platyrhinos* | Found on sandy flats, alluvial fans, along washes, and at the edges of dunes. Sometimes found on hardpan or among rocks, but patches of sand are generally present. Associated with sagebrush, saltbush, and greasewood in the Great Basin. Elevational range extends from below sea level in desert sinks to about 6,500 feet. |
| Reptiles | Coronado skink | *Plestiodon skiltonianus interparietalis* | Habitats include grassland, chaparral, pinyon-juniper woodland, open pine or pine-oak woods, and rocky areas near streams. This species is partial to open wooded foothills and is usually associated with rocks, under which it takes shelter (also digs burrows in soil). Eggs are laid in burrows or areas excavated by the female under rocks and stones. |
| Reptiles | Longnose snake | *Rhinocheilus lecontei* | Typical habitats include deserts, dry prairies, arid river valleys, thornbush, and shrubland; sometimes oak-hackberry woodland. This snake retreats underground or under rocks by day. Eggs are laid underground or under rocks. |
| Reptiles | Northern sagebrush lizard | *Sceloporus graciosus graciosus* | This species occurs in areas of sagebrush and other types of shrublands, mainly in the mountains, preferring open, sunny areas with scattered low bushes. |
| Reptiles | Desert spiny lizard | *Sceloporus magister* | This lizard inhabits arid and semiarid regions, from plains to lower mountain slopes, including desert shrubland and woodland, mesquite-yucca grassland, juniper and mesquite woodland, shrubby areas along arroyos and playa edges, and cottonwood/willow zones along rivers. |
| Reptiles | Desert night lizard | *Xantusia vigilis* | This lizard lives in arid and semiarid habitats among fallen leaves and trunks of yuccas, agaves, cacti, Joshua trees, and other large plants, also in crevices of rock outcroppings and under logs and bark of foothill pines; it ranges locally into pinyon-juniper, sagebrush-blackbrush, and chaparral-oak. |
| Snails | Harney Basin duskysnail | *Colligyrus depressus* | This species occurs in shallow, cold springs, and spring runs with rocky substrates and moderate to steep slopes, in sage scrub desert. |
| Snails | Poplar Oregonian | *Cryptomastix populi* | This species is found primarily on moderately xeric basalt talus in canyons, typically in open situations rockslides and bushy draws, and less often on steep, cool lower slopes of major river basins. The surrounding vegetation is generally sage scrub or cottonwood. |
| Snails | Trinity shoulderband | *Helminthoglypta talmadgei* | This species is found in areas with young, sparse conifer cover and more grass; also found in recently burned areas. |
| Snails | Eureka mountainsnail | *Oreohelix eurekensis* | An important habitat factor is the presence of limestone talus, outcrops, or high calcium soils. The species also requires shade from vegetation and a well-developed litter layer. This can be found under shrub or tree cover. |
| Snails | Dalles mountainsnail | *Oreohelix variabilis ssp.* | This species occurs in areas of talus and basalt with limited vegetation cover. |

| Taxa | Common Name | Scientific Name | Preferred Habitat |
|---|---|---|---|
| Snails | Whorled mountainsnail | *Oreohelix vortex* | This species is restricted mostly to large-scale, xeric basalt taluses and boulder fields. Sites are typically dry and open; the most common vegetation is grasses. The species prefers low to medium elevations in large stream valleys; dry open to brushy areas; vicinity of springs; basalt talus. Grasses are common at preferred sites, with some forbs and shrubs. This species occurs in association with basalt boulder fields and talus in xeric habitat. Grasses and occasionally shrubs or forbs are the most common plant associates. |
| Snails | Lava rock mountainsnail | *Oreohelix waltoni* | It is associated with basalt (particularly type locality) but also mixed schist/alluvium in rather dry, open areas of sage scrub vegetation. Common plants found at sites are grasses and shrubs including Artemisia, and Celrus; Sorbus, Prunus, and Physocarpus occur locally. It is associated with xeric habitat in basalt talus and mixed schist/alluvium. Dominant plants in the areas include sagebrush, netleaf hackberry, and grasses. This habitat occurs primarily along the Salmon River corridor and in the southwestern portion of the section. Much of this habitat occurs in wilderness. |

Source: BLM 2006; BLM 2017; NatureServe 2023

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# Appendix 12

## Reasonably Foreseeable Development Scenario

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## ACRONYMS AND ABBREVIATIONS

| | Full Phrase |
|---|---|
| °F | degrees Fahrenheit |
| 2015 CO Plan | 2015 Northwest Colorado Greater Sage-Grouse Proposed LUPA/Final EIS |
| 2015 ID Plan | 2015 Idaho and Southwestern Montana Greater Sage-Grouse Proposed LUPA/Final EIS |
| 2015 SD Plan | 2015 South Dakota Proposed LUPA/Final EIS |
| 2015 WY Plan | 2015 Wyoming Greater Sage-Grouse Land Use Plan Amendment |
| ACEC | Area of Critical Environmental Concern |
| BCF | billion cubic feet |
| BLM | Bureau of Land Management |
| CBNG | Coal Bed Natural Gas |
| CHMA | connectivity habitat management area |
| CSU | controlled surface use |
| DOE | United States Department of Energy |
| DOI | United States Department of Interior |
| DRECP | Desert Renewable Energy Conservation Plan |
| EGS | enhanced geothermal systems |
| EIS | Environmental Impact Statement |
| EPCA | Energy Policy and Conservation Act |
| FLPMA | Federal Land Policy and Management Act of 1976 |
| FO | Field Office |
| GHMA | general habitat management area |
| GIS | geographic information system |
| GRSG | Greater Sage Grouse |
| HMA | habitat management area |
| IHMA | important habitat management area |
| Kwh | kilowatt hours |
| LCHMA | Linkage/Connectivity Habitat Management Area |
| LUPA | Land Use Plan Amendment |
| MCF | thousands of cubic feet |
| MMBO | million barrels of oil |
| MMBTU | millions of British thermal units |
| MW | megawatt |
| NDOM | Nevada Division of Minerals |
| NEPA | National Environmental Policy Act |
| NSO | No Surface Occupancy |
| OHMA | other habit management area |
| ONNR | Office of Natural Resource Revenue |
| P&A | plugged and abandoned |
| PEIS | Programmatic Environmental Impact Statement |
| PHMA | priority habitat management area |
| RFD | reasonably foreseeable development |
| RHMA | restoration habitat management area |
| RMP | resource management plan |
| RMPA | resource management plan amendment |
| ROW | right-of-way |
| US | United States |
| WEMs | waivers, exemptions, and modifications |

# Appendix 12. Reasonably Foreseeable Development Scenario

This document was developed to support the Greater Sage Grouse planning effort. It is intended to provide a reasonable projection of future activity associated with mineral exploration and development in the planning area under each of the proposed alternatives, in order to assist in the analysis of impacts resulting from proposed actions. It is intended to provide an update to information in previous Greater Sage Grouse planning efforts. Information from these previous efforts was gathered, examined against development trends, advances in technologies, and economic conditions since the time of publication. This was examined in consultation with various Bureau of Land Management (BLM) resource specialists to determine the need for changes or updates to the assumptions and information used to develop expectations regarding mineral exploration and development in the planning area. Once any revisions were completed the information was used to analyze the impact of the proposed alternatives during the 20-year planning period.

## 12.1 Fluid Minerals – Colorado

### 12.1.1 Methodology

BLM mineral resource experts examined the reasonably foreseeable development (RFD) document produced for the 2015 Northwest Colorado Greater Sage Grouse (GRSG) Land Use Plan Amendment (LUPA) and Environmental Impact Statement (EIS) as well as development trends and data from development since that time and determined that the methodology and trends that were used to produce the projections did not need modifications given the lack of significant changes in trends surrounding fluid mineral development. Assumptions and methodology used to develop the updated projections below are the same assumptions and methodology described in Appendix N of the 2015 Northwest Colorado Greater Sage-Grouse Proposed LUPA/Final EIS (2015 CO Plan). These were used along with new information to revise the projections provided to the current date and to analyze the proposed Alternatives. Limited data on how the 2015 projections were created is available, but because the trend of the projections is consistent with conditions since that time, they were able to be extended into the future. The projections by alternative taken from Table N.17 were compared to the current Alternatives, to determine the closest matches of alternatives from the two plans using management direction. Alternative 1 would continue management from the 2015 CO Plan. Alternative 2 would continue management from the 2018 Northwest Colorado GRSG Proposed Resource Management Plan Amendment/Final Environmental Impact Statement which would open to leasing approximately 224,200 acres closed under Alternative 1 and add an allowance for exceptions to NSO stipulations; the 2018 Plan did not provide projections of future development, but this management is very similar to what was proposed under Alternative D in the 2015 Plan. Alternative 3 would close all GRSG habitat to leasing, which is similar management to Alternative C in the 2015 CO Plan which proposed closing occupied habitat areas to fluid mineral leasing and applied NSO to the majority of the remaining area; so Alternative C projections were used for Alternative 3. Alternatives 4 and 5 would make approximately 751,000 acres of PHMA open to leasing with NSO stipulations and apply NSO buffers around Leks in the 786,000 acres of GHMA, NSO stipulations would allow for waivers, exemptions, and modifications (WEMs) under this Alternative. When comparing against the 2015 CO Plan Alternatives, this proposed management falls between Alternative D which proposed NSO stipulations on 1,347,400 acres, and Alternative A which proposed NSO stipulations on 350,300 acres (2015 CO Plan Table 2.6). The average of the projections

for Alternatives A and D was calculated for use as the projections for Alternative 4 and 5. Alternative 6 would apply the same management as Alternative 5 except that it would consider the designation of certain areas as areas of critical environmental concern (ACECs), however much of the designated ACEC acreage is already closed to leasing from management of other resources so the ACEC designations were determined to be unlikely to cause major changes to projections.

Projections created for the 2015 CO Plan included wells and production from Federal Minerals under Forest Service surface, however Federal Minerals under Forest Service surface are not part of the decision area in the current planning effort, so these areas were removed from the projections by calculating the proportion of the 2015 decision area that was Federal Minerals under Forest Service surface and then reducing the projections by that proportion.

The 2015 projections of production of oil and gas by Alternative in Table N.18 in the 2015 CO Plan were used for current plan projections using the same match-up between the 2015 and current Alternatives as described for the well projections above. These production amounts were also reduced by the proportion of Federal Minerals under Forest Service surface in the GRSG habitat areas, the Forest Service was not involved in the current planning effort so federal mineral estate located under Forest Service surface estate, which require consent of the Forest Service before BLM can lease, were not included in the decision area and their impact was removed from the projection results.

It was noted that the projected 20-year oil production projections in the 2015 CO Plan were significantly higher than the peak production from the entire state of Colorado despite the analysis area not containing the highest producing fields in the state. According to Energy Information Administration[1] Colorado had a peak production of 192,238 thousand barrels in 2019 (192,238,000 * 20 years = 3,844,760,000 barrels), under the Proposed plan in Table N.18 the 20-year production from Federal, State, and Fee Minerals, All Surface is listed as 44,879 million (44,879,000,000) barrels under the low case scenario and 72,617 million (72,879,000,000) barrels under the high case scenario. Because of this and based on production history from the counties containing the GRSG habitat, it was determined that the projections had been incorrectly converted and were off by a factor of 100, so projected barrels of production were converted by this amount (i.e., 35,903,966,373 barrels became 359,039,664 barrels).

Surface disturbance was calculated by the number of new wells under the high development scenario for each Alternative. Short-term disturbance calculations used the number of wells drilled, and long-term disturbance calculations used the number of wells completed for each Alternative. The disturbance acreage per well was derived from Tables 1 and 2 in the Reasonably Foreseeable Development (RFD) Scenario for Oil and Gas for Grand Junction Field Office,[2] which was chosen because it was the most recent RFD completed in the Planning area. Short term disturbance per well, which is the disturbance that occurs during drilling, was multiplied by the number of wells drilled for each Alternative. The long-term disturbance per well, which is the remaining disturbance necessary for the production of oil and gas after areas of disturbance only needed for drilling and completion of well have been reclaimed, was multiplied by the number of completed wells under each Alternative. Wells that are drilled but not completed would be plugged and abandoned, and the disturbance would be fully reclaimed.

[1] Energy Information Administration. 2023. Petroleum & Other Liquids- Colorado Field Production of Crude Oil. https://www.eia.gov/dnav/pet/hist/LeafHandler.ashx?n=pet&s=mcrfpco1&f=a

[2] Reasonably Foreseeable Development Scenario for Oil and Gas, Grand Junction Field Office, Colorado. United States Department of the Interior, Bureau of Land Management. June 18, 2012.

Both a high and a low scenario are presented. The high scenario is based on RFDs from each field office in the decision area and is designed as a high case scenario, by assuming that both the number of wells drilled and production per well would be on the high side of what is likely to occur, in order to analyze the impacts of an increase in the rate of drilling and production. The low scenario adjusts projections based on actual spud information from the Automated Fluid Minerals Support System and production levels and is considered a more realistic scenario.

### 12.1.2 Oil and Gas

The oil and gas potential rankings created in response to the Energy Policy and Conservation Act (EPCA) were overlaid with GRSG habitat management areas (HMAs) using a geographic information system (GIS) to analyze the likelihood of development in priority habitat management area (PHMA) and general habitat management area (GHMA). While more recent assessments of oil and gas development potential are available for many states, the EPCA potential rankings were chosen for use because they are the most recent assessment that covers the entire GRSG planning area, this is desirable because it allows for comparison of development potential across different states. High potential areas are most likely to be developed, medium potential areas are the second most likely to be developed, and low potential areas are the least likely to be developed. The boundaries of HMAs vary slightly by alternative so the Alternative 4 boundaries were used for the purposes of calculation but the distribution of potential by HMA area does not vary significantly across the proposed Alternatives.

**Table 1: EPCA Potential for Oil within Colorado GRSG HMAs**

| Alternative 4 | Acres |
|---|---|
| *GHMA* | *786,000* |
| LOW | 361,000 |
| MEDIUM | 149,000 |
| HIGH | 277,000 |
| *PHMA* | *751,000* |
| LOW | 326,000 |
| MEDIUM | 104,000 |
| HIGH | 321,000 |
| **Grand Total** | **1,538,000** |

Source: EPCA 2018, BLM GIS 2023

**Table 2: EPCA Potential for Gas within Colorado GRSG HMAs**

| Alternative 4 | Acres |
|---|---|
| *GHMA* | *786,000* |
| LOW | 317,000 |
| MEDIUM | 211,000 |
| HIGH | 258,000 |
| *PHMA* | *751,000* |
| LOW | 344,000 |
| MEDIUM | 128,000 |
| HIGH | 280,000 |
| **Grand Total** | **1,538,000** |

Source: EPCA 2018, BLM GIS 2023

#### *Existing Oil and Gas Leasing Activity*

Existing leases, which could still be developed under the management associated with the resource management plan (RMP) which the lease was issued under, even in areas which would be closed or have

more restrictive stipulations applied under the proposed plan, were overlaid with potential and HMA type in GIS to show how much of the oil and gas in the planning area might not be impacted by the proposed new management.

**Table 3: Colorado EPCA Potential for Gas within GRSG HMAs with Existing Oil and Gas Lease Status**

| Alternative 4 | Acres |
|---|---|
| *GHMA* | *101,000* |
| LOW | 21,000 |
| Authorized | 17,000 |
| Interim | 0 |
| Pending | 3,000 |
| MEDIUM | 48,000 |
| Authorized | 44,000 |
| Interim | 0 |
| Pending | 3,000 |
| HIGH | 33,000 |
| Authorized | 32,000 |
| Interim | 0 |
| Pending | 0 |
| *PHMA* | *135,000* |
| LOW | 63,000 |
| Authorized | 55,000 |
| Interim | 1,000 |
| Pending | 7,000 |
| MEDIUM | 26,000 |
| Authorized | 26,000 |
| Pending | 0 |
| HIGH | 46,000 |
| Authorized | 38,000 |
| Pending | 8,000 |
| **Grand Total** | **236,000** |

Source: EPCA 2018, BLM GIS 2023

***Projected Drilling Activity by Alternative***

Projections of future oil and gas development contained in Appendix N of the 2015 Colorado GRSG Final EIS were used with details about the new proposed alternatives to create the following updated projections for the development of oil and gas in the planning area under the new proposed alternatives.

**Table 4: Number of Oil and Gas Well Projected to be Drilled and Completed on BLM-managed Federal Minerals in the Planning Area During the 20-year Forecast Period**

| Alternative | Low Scenario | High Scenario |
|---|---|---|
| **Alternative 1-wells drilled** | 8,635 | 16,963 |
| **Alternative 1-wells completed** | 8,204 | 15,910 |
| **Alternative 2- wells drilled** | 8,760 | 17,088 |
| **Alternative 2-wells completed** | 8,322 | 16,026 |
| **Alternative 3- wells drilled** | 8,687 | 12,716 |
| **Alternative 3-wells completed** | 8,253 | 11,997 |
| **Alternative 4- wells drilled** | 9,018 | 17,533 |
| **Alternative 4-wells completed** | 8,567 | 16,422 |

| Alternative | Low Scenario | High Scenario |
|---|---|---|
| **Alternative 5- wells drilled** | 9,018 | 17,533 |
| **Alternative 5-wells completed** | 8,567 | 16,422 |
| **Alternative 6-wells drilled** | 9,018 | 17,533 |
| **Alternative 6-wells completed** | 8,567 | 16,422 |

Source: Derived from 2015 Colorado GRSG Final EIS Table N.17

***Projected Surface Disturbance Due to Oil and Gas Activity by Alternative***

**Table 5: High Scenario Projected 20-year Surface Disturbance from Well Pads, Roads, and Pipelines**

| Alternative | Short term disturbance* (acres) | Long term disturbance* (acres) |
|---|---|---|
| **Alternative 1-wells drilled** | 61,729 | - |
| **Alternative 1-wells completed** | - | 19,895 |
| **Alternative 2- wells drilled** | 62,181 | - |
| **Alternative 2-wells completed** | - | 20,040 |
| **Alternative 3- wells drilled** | 46,272 | - |
| **Alternative 3-wells completed** | - | 15,001 |
| **Alternative 4- wells drilled** | 63,804 | - |
| **Alternative 4-wells completed** | - | 20,535 |
| **Alternative 5- wells drilled** | 63,804 | - |
| **Alternative 5-wells completed** | - | 20,535 |
| **Alternative 6-wells drilled** | 63,804 | - |
| **Alternative 6-wells completed** | - | 20,535 |

Source: Derived using data from Table 1 and Table 2 in the Grand Junction Field Office RFD (2012) and high scenario oil and gas well projections above.
*Short term disturbance is generated by pads for all wells drilled, and construction of roads and pipelines. Long term disturbance is generated by pads for completed wells, and road and pipeline disturbance remaining after reclamation of areas disturbed by construction, well pads for wells that are not completed are reclaimed.

***Projected Production by Alternative***

**Table 6: Projected 20-Year Oil and Gas Production by Alternative**

| Alternative 1 | | Alternative 2 | | Alternative 3 | | Alternative 4 | | Alternative 5 | | Alternative 6 | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Gas (BCF)** | **Oil (MMBO)** | **Gas (BCF)** | **Oil (MMBO)** | **Gas (BCF)** | **Oil (MMBO)** | **Gas (BCF)** | **Oil (MMBO)** | **Gas (BCF)** | **Oil (MMBO)** | **Gas (BCF)** | **Oil (MMBO)** |
| ***Low Scenario*** | | | | | | | | | | | |
| ***Federal Minerals Below All Surface except Forest Service*** | | | | | | | | | | | |
| 13,100 | 183.79 | 13,288 | 186.44 | 12,962 | 138.61 | 13,715 | 203.50 | 13,715 | 203.50 | 13,715 | 203.50 |
| ***High Scenario*** | | | | | | | | | | | |
| ***Federal Minerals Below All Surface except Forest Service*** | | | | | | | | | | | |
| 25,406 | 356.44 | 25,591 | 359.04 | 18,842 | 201.49 | 26,288 | 389.95 | 26,288 | 389.95 | 26,288 | 389.95 |

Sources: Derived from the 2015 Colorado GRSG Final EIS table N.18.
BCF = billion cubic feet; MMBO = million barrels of oil

### 12.1.3 Geothermal

Although the potential for geothermal development is high in some areas, there currently is no ongoing geothermal power generation on BLM lands in Colorado. Recent increased interest and technological advancements increase the likelihood of its development in the future.

The 2015 and 2018 Sage Grouse Plans did not project the occurrence of geothermal development. Because there is no existing development and no previous estimates to use, the following assumptions are made to analyze the impacts of geothermal development and associated surface disturbance. For the purposes of analysis, it is assumed that under all Alternatives except Alternative 3 up to one 20 megawatt (MW) geothermal power generation facility would be developed on BLM-managed lands in GRSG habitat over the next 20 years. This facility would disturb up to 6 acres for the drilling of up to 6 thermal gradient wells and would disturb up to 24 acres for the drilling of up to 8 production and injection wells. Construction of pipelines would disturb up to 14 acres, and an additional 10 acres could be disturbed for the construction of the generating plant. An assumed 10 miles of road would disturb approximately 50 acres, and 8 miles of power line would disturb approximately 40 acres. Under Alternative 3, it is assumed that no geothermal power development would occur on BLM-managed lands in GRSG habitat because under this alternative all GRSG habitat would be closed to fluid mineral leasing.

## 12.2 Fluid Minerals – Idaho

### 12.2.1 Methodology

Assumptions and methodology used to develop the updated projections below are the same assumptions and methodology described in Appendix O of the 2015 Idaho and Southwestern Montana Greater Sage-Grouse Proposed LUPA/Final EIS.[3] These were used along with new information to revise the projections provided to the current date and to analyze the proposed Alternatives.

Tables O-1 and O-2 from Appendix O of the 2015 Idaho and Southwestern Montana Greater Sage-Grouse Proposed LUPA/Final EIS (2015 ID Plan) were used as the basis for updating projections. Dillion Field Office is located in Montana and was removed from the data for Idaho and moved to the Montana projections for the current planning effort. The proposed management in the current Alternatives was compared to the management in the proposed 2015 ID Plan Alternatives. Alternative 1 would continue the Proposed Plan management from the 2015 ID Plan. Based on the information in the 2015 ID Plan, it is reasonably foreseeable that under this Alternative 15 new oil and gas exploratory wells would be developed on federal fluid mineral estate in the decision area in the next 20 years. Under Alternative 2, areas within PHMA and important habitat management area (IHMA) will be open to mineral leasing, development, and geophysical exploration, subject to NSO stipulations with limited exception, GHMA will be open to mineral leasing and development and geophysical exploration subject to controlled surface use stipulations. Compared to Alternative 1, Alternative 2 would allow for exceptions to NSO stipulations in certain situations if approved by the BLM Authorized Officer but would otherwise apply the same management. It is reasonably foreseeable for planning purposes that 20 new oil and gas exploratory wells would be developed on federal fluid mineral estate in the decision area within the next 20 years under Alternative 2. Alternative 3 is similar to the 2015 Plan Alternative C and would close GRSG to habitat to fluid mineral leasing. Under this Alternative, 13 new oil and gas exploratory wells are projected to be developed on federal fluid mineral estate in the decision area within the next 20 years. Alternative 4 would apply NSO in PHMA and IHMA with WEMs available, and an NSO buffer around Leks in GHMA with WEMs available. Compared to Alternative A from the 2015 Plan this would have fewer acres closed to leasing, but more acres managed

[3] https://eplanning.blm.gov/eplanning-ui/project/103344/510

with NSO stipulations and would allow waivers, exceptions, and modifications (WEMs) to NSO stipulations if approved by the BLM Authorized Officer. It is reasonably foreseeable for planning purposes that 25 new oil and gas exploratory wells would be developed on federal fluid mineral estate in the decision area within the next 20 years. Compared to Alternative 4, Alternative 5 would decrease the number of acres open with standard stipulations by approximately 1.65 million acres and increase the number of acres open with moderate stipulations by approximately 1.28 million. Acres managed as closed to leasing would have a small decrease and acres managed as open with major stipulations would increase slightly. Moderate stipulations typically have a minimal impact, especially in exploratory drilling, where minor changes in drill location have little consequence (versus established fields where drill locations established in layouts located to maximize resource recovery). It is reasonably foreseeable for planning purposes that 24 new oil and gas exploratory wells would be developed on federal fluid mineral estate in the decision area within the next 20 years under Alternative 5. Alternative 6 would apply Alternative 5 management and in addition designate certain areas as ACECs, which would be closed to leasing. However, most of the area that would be designated as ACECs are already closed or under NSO stipulations under the Alternative 5 management, so changes in development due to the ACEC designation would be minimal. Disturbance estimates were based on the projected number of wells under each alternative using the estimated disturbance associated with each well provided in Table O-2 in Appendix O of the 2015 ID Plan.

Geothermal projections were based on information provided in Appendix O of the 2015 ID Plan and on Table O-3 in the plan, as well as information about geothermal development provided in the more recent Four Rivers Resource Management Plan (2020). It was assumed that up to 70MW of geothermal generations could be developed during the 20-year planning period, surface disturbance associated with that level of development was calculated based on information provided in Table O-3 of the 2015 ID Plan and information from the Four Rivers Resource Management Plan (2020).

### 12.2.2 Oil and Gas

Over 180 oil and gas wells have been drilled in Idaho of which 19 were drilled between 2015 and 2022. Currently there is only one region with active Federal oil and gas leases in the state, the Southwest Idaho oil and gas play near Payette, Idaho. Until 2008, no commercially viable oil or gas resources had been found in Idaho, despite the drilling of around 150 wells throughout the state by that time. In 2008, a natural gas field named Willow Field was discovered in the Southwest Idaho oil and gas play and then in 2015, commercial production began from six wells on private lands. The resource is a relatively small, conventional deposit. The reservoir includes porous sand, is accessed via vertical and directional drilling, and does not require hydraulic fracturing (also referred to as fracking). The field was discovered largely due to recent advances in three-dimensional seismic technology.[4]

All 8,858,000 acres of Sage Grouse HMA in Idaho designated under Alternatives 4 and 5 are ranked as having a low development potential for both oil and gas by the EPCA. There are no existing or pending leases anywhere within the Sage Grouse HMA boundaries proposed under Alternatives 4 and 5.

#### *Projected Drilling Activity by Alternative*

The total estimated future surface disturbance for wells, roads, and well pads by Alternative is shown in the table below. These estimates were derived based on information from Table O-1 in Appendix O of the 2015 Idaho and Southwestern Montana Greater Sage-Grouse Proposed LUPA/Final EIS. The proposed alternatives were compared to the proposed management in that document. Alternative 1 proposed approximately the

[4] https://www.blm.gov/programs/energy-and-minerals/oil-and-gas/about/idaho

same management as the Proposed Plan from the 2015 document. Alternative 2 was based on the Proposed Plan from the changes made to GRSG management in Idaho in 2019 and 2020, the management allows for more mineral leasing and development, and geophysical exploration than Alternative 1. Alternative 3 is substantially similar to Alternative C from the 2015 Idaho and Southwestern Montana Greater Sage-Grouse Proposed LUPA/Final EIS. Alternative 4 would have fewer closed acres than Alternative 1, would manage PHMA and IHMA as open to leasing with No Surface Occupancy (NSO) stipulations that allow exceptions, and apply a NSO lek buffer around leks in GHMA. Alternatives 5 and 6 would apply similar management as Alternative 4 but would decrease the number of acres open with standard stipulations and increase the number of acres open with moderate stipulations. The application of moderate stipulations (CSU and/or timing limitations) typically have a minimal impact, especially in exploratory drilling where minor changes in drill location have little consequence (versus established fields where drill patterns are often carefully designed to maximize resource recovery). Alternative 6 will also designate some areas as ACECs which would be managed as closed to leasing.

**Table 7: Reasonably Foreseeable Development Scenario for the Idaho in the next 20 years.**

| Alternative | Total Wells | Acres of Drill Pads[1] | Miles of Road[2] | Acres of Roads[3] |
|---|---|---|---|---|
| **Alternative 1** | 15 | 45 | 30 | 150 |
| **Alternative 2** | 20 | 60 | 40 | 200 |
| **Alternative 3** | 13 | 39 | 26 | 130 |
| **Alternative 4** | 25 | 75 | 50 | 250 |
| **Alternative 5** | 24 | 72 | 48 | 240 |
| **Alternative 6** | 24 | 72 | 48 | 240 |

Source: updates to data from Table O-1 in Appendix O of the 2015 Idaho and Southwestern Montana Greater Sage-Grouse Proposed LUPA/Final EIS based on changes to management under the proposed Alternatives.
[1] Assumes 3 acres each.
[2] Miles of road per exploration well varies by RFDS. Miles of road for step-out wells equals one mile per well (in accordance with Idaho well spacing rule).
[3] Assumes 5 acres per mile.

### 12.2.3 Geothermal Summary

The only utility scale geothermal power development in the state of Idaho is the Raft River geothermal project located in Cassia County Idaho, at a former United States Department of Energy (DOE) geothermal site.

The project was acquired by US Geothermal in 2002 and construction began in June 2006. The plant began commercial operation in January 2008 and utilizes a binary-cycle water cooled system. The Raft River Plant was acquired by Ormat in 2018 and provides about 11MW of net capacity.[5]

The Raft River Geothermal Power plant in the Raft River Valley in Idaho expanded onto public land in GHMA between the 2015 Sage Grouse Plan and the 2018 Sage Grouse Plan Amendment.

[5] https://oemr.idaho.gov/sources/re/geothermal/

According to the Proposed Four Rivers RMP and Final EIS[6] based on the geothermal potential for the planning area, it is reasonable to assume that a 50 MW plant might be developed in those areas determined to have high potential for indirect use. It is reasonable to assume that a 20-MW geothermal power plant might be developed anywhere along a fault zone that trends northwest from east of Mountain Home, Idaho to the Oregon Border, particularly on the southwest (valley) side of the fault zone, over the 20-year life of the plan. This northwest trending fault zone has a medium to high geothermal potential. According to the Proposed Four Rivers RMP and Final EIS, cumulative disturbance associated with development of a 50 MW plant is anticipated to be between 147 and 181 acres, while disturbance associated with developing a 20 MW plant is anticipated to be between 60 and 75 acres. This development includes the construction of drill pads to support the drilling of 20 temperature-gradient wells and 25 production and injection wells, road construction, power plant development, and pipeline and transmission line construction. Much of this disturbance would be reclaimed after each phase of development, such that once the power plant is operational, the actual disturbance would be considerably less than the cumulative total. Development is likely to occur in stages, however this is not always the case. Surface disturbances associated with direct use activities are expected to be much less than those anticipated for indirect use.

***Projected Activity by Alternative***

Geothermal projections and surface disturbance were developed based on the geothermal section of the RFD in the 2015 ID Plan[7] and additional information contained in the 2020 Four Rivers RMP Geothermal RFD,[8] as well as existing conditions and recent development as described in the summary above.

**Table 8: Reasonably Foreseeable New Generating Capacity and Total Disturbance Acreage by Alternative for Geothermal Resources over the next 20-years**

| Alternative | Alternative 1 | Alternative 2 | Alternative 3 | Alternative 4 | Alternative 5 |
|---|---|---|---|---|---|
| MW Predicted | 70 | 70 | 35 | 70 | 70 |
| Acres Disturbed by Thermal Gradient Drilling (1 acre per well) | 20 | 20 | 10 | 20 | 20 |
| # of Prod/ Inj. Wells Predicted | 25 | 25 | 13 | 25 | 25 |
| Acres of Drill Pads (3 acres each) | 75 | 75 | 39 | 75 | 75 |
| Total Miles of Road | 19 | 19 | 9.5 | 19 | 19 |
| Acres of Roads (5 acres Per mile) | 95 | 95 | 47.5 | 95 | 95 |

[6] Bureau of Land Management. 2020. Four Rivers Field Office, Proposed Resource Management Plan and Final Environmental Impact Statement, Four Rivers Field Office, Boise District, Idaho (Volume 2), Appendix T – Fluid Minerals Reasonably Foreseeable Development Scenario. https://eplanning.blm.gov/public_projects/lup/1250/20012897/250017691/Four_Rivers_Field_Office_Proposed_Resource_Management_Plan_and_Final_Environmental_Impact_Statement_Volume_2.pdf

[7] Bureau of Land Management. 2015. Idaho State Office, Idaho and Southwestern Montana Greater Sage-Grouse Approved Resource Management Plan Amendment. https://eplanning.blm.gov/public_projects/lup/103344/143603/176718/2015_IDMT_ARMPA.pdf

[8] Bureau of Land Management. 2020. Four Rivers Field Office, Proposed Resource Management Plan and Final Environmental Impact Statement, Four Rivers Field Office, Boise District, Idaho (Volume 2), Appendix T – Fluid Minerals Reasonably Foreseeable Development Scenario. https://eplanning.blm.gov/public_projects/lup/1250/20012897/250017691/Four_Rivers_Field_Office_Proposed_Resource_Management_Plan_and_Final_Environmental_Impact_Statement_Volume_2.pdf

| Alternative | Alternative 1 | Alternative 2 | Alternative 3 | Alternative 4 | Alternative 5 |
|---|---|---|---|---|---|
| Acres of Powerplant Construction (1/2 acre per MW) | 35 | 35 | 17.5 | 35 | 35 |
| Pipeline Construction disturbance (acres) | 48 | 48 | 24 | 48 | 48 |
| Transmission Line Construction (5 acres per mile) | 16 miles = 80 acres | 16 miles = 80 acres | 8 miles = 40 acres | 16 miles = 80 acres | 16 miles = 80 acres |
| Total Permanent Disturbance (acres) | 353 | 353 | 178 | 353 | 353 |

Source: updates to data from Table O-3 in Appendix O of the 2015 Idaho and Southwestern Montana Greater Sage-Grouse Proposed LUPA/Final EIS, based on changes to management under the proposed Alternatives.

## 12.3 FLUID MINERALS – MONTANA

### 12.3.1 Methodology

BLM mineral resource experts examined the RFD projections in plans produced for the 2015 GRSG planning effort, including the Miles City, HiLine, Billings, Lewistown, and Southwest Montana Plans. They also looked at updates such as the 2021 Lewistown RMP Revision, as well as development trends and data from development since that time and determined that the methodology and trends that were used to produce projections did not need significant modifications given the minimal changes in trends surrounding fluid mineral development in the state.

Assumptions and methodology used to develop the updated projections below are the same assumptions and methodology described in the RFDs developed for the Billings, Hi-Line, Lewistown, Miles City, Dillon, and Butte Field Offices. The Upper Missouri River Breaks National Monument is also part of the planning area but is withdrawn from all forms of entry, location, selection, sale, or leasing or other disposition under the public land laws, however it does have some legacy leases which predate the monument designation that could be developed. All of the above information was used, along with new information, to revise the projections provided to the current date and to analyze the proposed Alternatives.

To develop updated projections for Montana for the current planning effort the projections from all the field office plans that were created in 2015 were collected. These projections were then examined and updated to remove developments that did not occur and modify information on developments that have not met the level of development previously expected. This included removing all project coalbed natural gas wells, because development of that type in the planning area ended with limited success and resulted in poor returns, so planned projects were abandoned, and no coalbed natural gas development has occurred recently. The Bowdoin Natural Gas Project Area in the HiLine District was also removed because specialists reported that it had been developed and was played out with no further wells expected.

The Alternatives from the current planning effort were then compared to earlier Alternatives to determine how the projections would vary by Alternative. Based on the proposed management of PHMA and GHMA including the acres of closed to leasing, open to leasing with additional NSO stipulations, open to leasing with additional minor stipulation or open with standard stipulations. It was determined that the Alternatives 1, 2, 4, 5, and 6 are substantially similar to each other, and to the proposed plan or preferred alternatives from the various 2015 plans in their management of fluid mineral resources (HiLine Alternative E, Billings Pompey Alternative D, Lewistown Alternative C2, Miles City Alternative E, [Dillon did not project any oil and gas production under any Alternative]). Alternative 3 from the current plan is similar to the various

lowest development alternatives from the 2015 plans (Alternative B for all plans). The Billings Pompey, and Dillon RMPs did not differentiate the projected number of wells by alternatives, due to low levels of development expected, the projections from these plans were carried forward into the update without differentiation by alternative. The projections for the total number of wells, surface disturbance, and production of oil and gas projected to occur under the Alternatives in each of the field offices that were most similar in management to the current alternatives being considered were added together to get totals for each of the current Alternatives.

Because there is no geothermal development ongoing or planned within the planning area and no earlier projections of geothermal development are available, no projections were developed for this planning effort.

### 12.3.2 Oil and Gas

#### *Oil and Gas Development Potential*

The tables below show the development potential ranking for oil and gas resources in the planning area by proposed GRSG habitat areas under Alternative 4. The decision area is slightly different under the different Alternatives, so the Alternative 4 decision area was used for the following calculations, but the results are generally applicable across all the Alternatives. Lease status is not considered in development potential rank, both leased and unleased areas are included.

From 2013 to 2023 a total of 755 wells were completed in the state across all mineral types.[9]

**Table 9: Montana Oil Development Potential Ranking in Alternative 4 GRSG Habitat Boundaries***

| HMA and Potential | Acres |
|---|---|
| GHMA | 1,844,000 |
| Low Potential | 1,658,000 |
| Medium Potential | 120,000 |
| High Potential | 66,000 |
| PHMA | 3,307,000 |
| Low Potential | 3,048,000 |
| Medium Potential | 164,000 |
| High Potential | 95,000 |
| RHMA | 94,000 |
| Low Potential | 72,000 |
| Medium Potential | 1,000 |
| High Potential | 22,000 |
| **Grand Total** | **5,246,000** |

Source: EPCA 2018, BLM GIS 2023
RHMA = restoration habitat management area
*The decision area is slightly different under the different Alternatives, so the Alternative 4 decision area was used to calculate tables.

[9] Montana Board of Oil & Gas Conservation. 2024. Well Activity. https://bogapps.dnrc.mt.gov/dataminer/Statistics/StatsHorzCompletionCount.aspx

**Table 10: Montana Gas Development Potential Ranking in Alternative 4 GRSG Habitat Boundaries**

| HMA and Potential | Acres |
|---|---|
| GHMA | 1,844,000 |
| Low Potential | 1,190,000 |
| Medium Potential | 655,000 |
| High Potential | 0 |
| PHMA | 3,307,000 |
| Low Potential | 1,908,000 |
| Medium Potential | 1,399,000 |
| High Potential | 0 |
| RHMA | 94,000 |
| Low Potential | 68,000 |
| Medium Potential | 27,000 |
| High Potential | 0 |
| **Grand Total** | **5,246,000** |

Source: EPCA 2018, BLM GIS 2023

***RFD Scenario***

The Montana study area for the projections below includes Billings, Butte, Dillon, Hi-Line, Lewistown, and Miles City Field Offices, and the Upper Missouri River Breaks National Monument. A number of the Field Office RFDs prior to the 2015 Greater Sage Grouse planning effort projected large amounts of development of coal-bed natural gas, however BLM specialists reported that since that time coal-bed natural gas development in the state has been much less than was projected and that coal-bed natural gas was no longer considered economically viable in the area. As a result, projections of coal-bed natural gas wells or development were not included in this analysis. The projected number of wells developed on Federal mineral estate in Montana under the proposed Alternatives, and resulting surface disturbance, and oil and gas production is shown in the tables below.

**Table 11: Oil and Gas Well 20-year Projections Federal Minerals in Montana**

| Alternative | Oil and Gas Wells |
|---|---|
| Alternative 1 | 2,180 |
| Alternative 2 | 2,180 |
| Alternative 3 | 1,272 |
| Alternative 4 | 2,180 |
| Alternative 5 | 2,180 |
| Alternative 6 | 2,180 |

Source: Derived from tables and information in the GRSG RMP/EISs and Appendix documents for Billings, Butte, Dillon, Hi-Line, Lewistown, and Miles City Field Offices, adjusted for the proposed alternatives.

**Table 12: Potential Surface Disturbance from Oil and Gas Drilling on BLM Minerals 2023-2043 in Montana**

| Alternative | Short term Disturbance (Acres) | Long Term Disturbance (Acres) |
|---|---|---|
| Alternative 1 | 9,118 | 2,427 |
| Alternative 2 | 9,118 | 2,427 |

| Alternative | Short term Disturbance (Acres) | Long Term Disturbance (Acres) |
|---|---|---|
| Alternative 3 | 6,020 | 1,960 |
| Alternative 4 | 9,118 | 2,427 |
| Alternative 5 | 9,118 | 2,427 |
| Alternative 6 | 9,118 | 2,427 |

Source: Source: Derived from tables and information in the GRSG RMP/EISs and Appendix documents for Billings, Butte, Dillon, Hi-Line, Lewistown, and Miles City Field Offices, adjusted for the proposed alternatives.

**Table 13: Forecast of the Montana Study Area Federal Oil and Gas Production 2023-2043.**

| Alternative | Oil (barrels) | Gas (MCF) |
|---|---|---|
| Alternative 1 | 130,104,338 | 565,943,852 |
| Alternative 2 | 130,104,338 | 565,943,852 |
| Alternative 3 | 125,743,303 | 301,863,108 |
| Alternative 4 | 130,104,338 | 565,943,852 |
| Alternative 5 | 130,104,338 | 565,943,852 |
| Alternative 6 | 130,104,338 | 565,943,852 |

Sources: Source: Source: Derived from tables and information in the GRSG RMP/EISs and Appendix documents for Billings, Butte, Dillon, Hi-Line, Lewistown, and Miles City Field Offices, adjusted for the proposed alternatives.
MCF= thousands of cubic feet

### 12.3.3 Geothermal

Geothermal energy is heat energy contained in the rocks of the earth's crust. Certain geologic conditions and processes resulted in shallow geothermal resources that underlie substantial portions of many western states, including land administered by the BLM in Montana.

These shallow resources can be classified as low temperature (less than 194 degrees Fahrenheit [° F]), moderate temperature (194° F to 302° F), and high temperature (greater than 302° F). Low and moderate temperature resources are generally used for heating, rather than power generation. Binary steam plants can generate power with fluid temperatures between 225° and 360° F.

Montana's geothermal systems reflect local and regional geology. The Basin and Range, Yellowstone Hotspot, Northern Great Plains, and intrusive rocks provide favorable conditions for geothermal waters. Montana hosts approximately 150 low- to moderate-temperature springs and wells; most are in the southwestern part of the State. Co-produced water from petroleum wells in eastern Montana reaches temperatures of over 300°F. Naturally occurring hot water and steam, including hot water coproduced or produced from re-purposed petroleum wells, can be used in heat exchangers or steam turbines to generate electrical power. However, direct-use applications in the state are currently limited to local use for heating structures and for recreation and resorts.[10] There is currently a low level of interest in developing federally owned geothermal resources in Montana, so no development is expected in GRSG habitat, and no projections were deemed necessary.

[10] https://www.mbmg.mtech.edu/MontanaGeology/EnergyResources/geothermal.asp#

## 12.4 FLUID MINERALS – NEVADA AND NORTHEASTERN CALIFORNIA

### 12.4.1 Methodology

This report is an update to Appendix P- Fluid Minerals Reasonably Foreseeable Development Scenario of the 2015 Nevada and Northeastern California Greater Sage-Grouse Proposed LUPA/Final EIS with the most current publicly available information. Trends from the 2015 RFD are assumed to continue and it is assumed that the demand for renewable energy, including geothermal will continue to increase and may be influenced by such factors as advances in enhanced geothermal systems (EGS). Technological advances could increase the size and scope of the impacts. These impacts should be considered as potential developments that could lead to further increase in exploration and development of geothermal resources in Nevada in typical geothermal systems and in areas not generally recognized as having high geothermal potential.

This document is limited to publicly available information and does not include confidential drilling data. It does not attempt to quantify the potential impacts of advances in EGS or other technology that is currently being tested for viability and has not been commercially proven. If future developments exceed predictions the BLM will assess these impacts at that time.

Updated projections were developed based on consultation with BLM specialists and the data available from the Nevada Division of Minerals (NDOM). Projections are based on the assumptions and methodology used in the 2015 RFD which were examined in connection to ongoing trends and determined to still be valid.

Projections for oil and gas development were based on Table P-5 from Appendix P of the 2015 Nevada and Northeastern California Greater Sage-Grouse Proposed LUPA/Final EIS. In this plan a large proportion of the wells projected in Table P-5 were attributed to a development being planned for the Elko-Noble area. BLM specialists confirmed that this planned development was no longer ongoing, and no further wells were expected. As a result, the Elko-Noble area projections were removed from the updated table. The current Alternatives were matched up to the Alternatives from 2015 based on the proposed management. Current Alternative 3 proposes similar fluid mineral management as was proposed under Alternative C in the 2015 Nevada and Northeastern California Greater Sage-Grouse Proposed LUPA/Final EIS, and all other current Alternatives propose the same or very similar management as under the Proposed Plan Alternative in the same Plan.

Surface disturbance projections were derived from the same Alternative matches described in the previous paragraph. These were based on Table P-9 in the Appendix P of the 2015 Nevada and Northeastern California Greater Sage-Grouse Proposed LUPA/Final EIS. The production of oil was based on information in Appendix P that based on production data, production wells within the planning area produce on average 14 barrels per day per well. The planning area does not produce significant quantities of natural gas so no projections for natural gas were created.

Geothermal projections from the 2015 Nevada and Northeastern California Greater Sage-Grouse Proposed LUPA/Final EIS were identified as being potentially too low given the level of ongoing and planned development. There are 732 megawatts (MW) of geothermal power generation operational on federal lands in Nevada as of 2023.[11] Additionally, there is approximately 180MW of generation which has been authorized but not yet constructed, and there is an additional approximately 300 MW of generation in the permitting stage, for a total of 1,042MW likely to be online in the near future. Based on this trend it was assumed that up to 1150MW of generating capacity could be operational by 2035. In 2015 480MW of generating capacity was operational. A linear regression was created using these data three points (480MW in 2015, 732MW in

[11] Alex Jensen, BLM Nevada State Office Geothermal Program Lead 9/28/2023.

2023, and 1150MW in 2035) to extend the projections out to 2043, the end of the 20-year planning period. Table P-1 from Appendix P of the 2015 Nevada and Northeastern California Greater Sage-Grouse Proposed LUPA/Final EIS was used to estimate surface disturbance but the disturbance from power plant and substation facilities was increased from 10 acres of temporary and permanent disturbance per facility to 20 acres of temporary and 15 acres of permanent disturbance per facility because BLM specialists reported that operators were trending towards larger facilities and producing more MW per facility.

### 12.4.2 Oil and Gas

Oil production has decreased from 281,382 barrels in 2015 to 223,493 barrels in 2021.[12] This decline is assumed to continue unless new reserves or fields are discovered. Most of the production and exploration activities since 2015 were concentrated in Railroad Valley, Nye County and Pine Valley in Eureka County. There is very little natural gas production in Nevada. The California portion of the decision area has minimal oil and gas development.

Since 2013 a total of 19 oil and gas wells were drilled in Nevada, a number of the wells did not successfully produce. The results of these wells where information is available are described as follows. In December of 2017 True Oil drilled a well in Railroad Valley in Nye County, the well was plugged and abandoned (P&A) in January of 2018. Major Oil drilled a well in Hot Creek Valley, Nye County, in May 2018, the well was P&A in May 2019. Major Oil also drilled another well in Hot Creek Valley in November 2020, the well was P&A in April of 2021. Grant Canyon Oil and Gas drilled two conventional horizontal wells in the 3 Bar Field in Pine Valley, Eureka County, since 2015. One well was drilled in May of 2019 and completed in May of 2019, the well is averaging approximately 994 barrels of oil and 807 barrels of water per month. Another well was drilled in the 3 Bar Field and had reported production of 111 barrels oil and 907 barrels water in May of 2023. Sam Oil drilled a well in White River Valley, Nye County, the well is shut in and has no reported production. Other exploration wildcat wells have been drilled in Newark Valley (all reported as shut in) in Nye County. A well was drilled by Great Basin Operating in 2022 in southwest Elko County, the well is reported as being shut in.[13] The Elko-Noble Project which was a large contributor to the projected number of wells in the 2015 Nevada RFD was less successful than anticipated and is no longer active. Wells that may be drilled in the area are no longer called out as a separate item in projections below.

#### *Oil and Gas Well Projections*

Oil and gas well projections by Alternative are shown below in the table.

**Table 14: Oil and Gas Well Projections for the Nevada-California GRSG Decision Area for the 20-year Planning Period**

| Alternative | Oil Wells Expected to be Drilled | | | Oil Wells Expected to be Producing | | |
|---|---|---|---|---|---|---|
| | On Existing Leases | On New Leases | Total | On Existing Leases | On New Leases | Total |
| **1** | 14 | 19 | 33 | 3 | 4 | 7 |
| **2** | 14 | 19 | 33 | 3 | 4 | 7 |
| **3** | 10 | 0 | 10 | 2 | 0 | 2 |
| **4** | 14 | 19 | 33 | 3 | 4 | 7 |

[12] https://data-ndom.opendata.arcgis.com/pages/oilgasandgeothermalproduction
[13] Nevada Division of Minerals, Well Database, 2022.

| Alternative | Oil Wells Expected to be Drilled | | | Oil Wells Expected to be Producing | | |
|---|---|---|---|---|---|---|
| | On Existing Leases | On New Leases | Total | On Existing Leases | On New Leases | Total |
| 5 | 14 | 19 | 33 | 3 | 4 | 7 |
| 6 | 14 | 19 | 33 | 3 | 4 | 7 |

Source: Derived from Table P-5 from the 2015 Nevada and Northeastern California Greater Sage-Grouse Proposed LUPA/Final and Proposed Alternative information.

Based on production data within the planning area, production wells produce on average 14 barrels per day per well. Gas production in expected to be negligible. Estimated production by alternative is shown below.

**Table 15: Decision Area New Well Production by Alternative**

| Alternative | New Annual Production (barrels) | Total 20-year Production from New Oil Wells (barrels) |
|---|---|---|
| 1 | 35,770 | 715,400 |
| 2 | 35,770 | 715,400 |
| 3 | 10,220 | 204,400 |
| 4 | 35,770 | 715,400 |
| 5 | 35,770 | 715,400 |
| 6 | 35,770 | 715,400 |

Source: Derived from Appendix P Fluid Minerals Reasonably Foreseeable Development Scenario the 2015 Nevada and Northeastern California Greater Sage-Grouse Proposed LUPA/Final and Proposed Alternative information.

### 12.4.3 Geothermal

Nevada has eighteen operating geothermal power plants with federal interest, for a total generating capability of over 600 MW, and nearly 400 MW of additional geothermal projects in the permitting, exploration, development, and construction phases are expected to increase that capacity in the near future.[14]

Geothermal leases are for an initial 10-year period with 50 percent of the funds disbursed to the state, 25 percent is disbursed to the respective county, and 25 percent remaining in the Department of the Treasury.

The average kilowatt hours (Kwh) produced using geothermal energy in Nevada shows an increasing trend.[15] The trend for generation from Federal leases is also increasing as shown in the table below.

**Table 16: Reported Electrical generation, Federal Geothermal leases.**

| Nevada Geothermal - Electrical Generation, Federal Leases | Kilowatt Hours (kwh) |
|---|---|
| 2003 | 658,510,043 |
| 2004 | 674,485,049 |
| 2005 | 681,692,924 |
| 2006 | 637,744,978 |
| 2007 | 586,048,771 |
| 2008 | 569,422,744 |

[14] https://www.blm.gov/programs/energy-and-minerals/renewable-energy/geothermal-energy/regional-information/nevada

[15] https://minerals.nv.gov/uploadedFiles/mineralsnvgov/content/Programs/Geo/Geo-NVGeoPowerProdAndPrice2021(1).pdf

| Nevada Geothermal - Electrical Generation, Federal Leases | Kilowatt Hours (kwh) |
|---|---|
| 2009 | 726,844,239 |
| 2010 | 1,011,707,412 |
| 2011 | 1,023,720,775 |
| 2012 | 1,213,710,003 |
| 2013 | 1,440,832,542 |
| 2014 | 1,551,677,028 |
| 2015 | 1,871,102,791 |
| 2016 | 2,129,884,592 |
| 2017 | 2,117,036,922 |
| 2018 | 2,327,248,799 |
| 2019 | 2,420,865,506 |
| 2020 | 2,666,774,942 |
| 2021 | 2,683,281,628 |
| 2022 | 2,731,770,420 |

Source: Office of Natural Resources Revenue 2023

There is also reported geothermal electrical generation from federal leases in Lassen County California which is in the Nevada-California decision area. That production which was reported in millions of British thermal units (MMBTU) and is shown in the table below was last reported in 2018. It is not clear if the usage stopped after 2018 or if the reporting type changed. Geothermal direct utilization, which is also reported in MMBTU, was reported in Lassen County California from 2003 through 2023 and reported amounts jumped in starting in 2018 so it's possible that the type of use reported was changed. This is shown in **Table 17** below. The data obtained from the Office of Natural Resources Revenue does not contain the name of the reporting facilities, but a search suggests that the user is likely the Honey Lake plant operated by Greenleaf Power, which is a biomass electrical generation facility which uses geothermal resources to preheat boiler feed water to increase plant efficiency.[16]

**Table 17: Federal Geothermal Leases Reported Use, Lassen County, California**

| Geothermal - Electrical Generation Lassen County, California | Kilowatt Hours (kwh) |
|---|---|
| 2014 | 734,855 |
| 2015 | 666,434 |
| 2016 | 533,990 |
| 2017 | 468,609 |
| 2018 | 167,947 |
| **Geothermal - Direct Utilization** | **Millions of British Thermal Units (MMBTU)** |
| 2003 | 288,029 |
| 2004 | 165,885 |
| 2005 | 260,242 |
| 2006 | 238,147 |
| 2007 | 217,500 |
| 2008 | 219,089 |
| 2009 | 179,171 |

[16] https://greenleaf-power.com/honey-lake/

| Geothermal - Direct Utilization | Millions of British Thermal Units (MMBTU) |
|---|---|
| 2010 | 224,486 |
| 2011 | 228,011 |
| 2012 | 271,470 |
| 2013 | 276,337 |
| 2014 | 200,405 |
| 2015 | 170,924 |
| 2016 | 136,144 |
| 2017 | 122,616 |
| 2018 | 272,031 |
| 2019 | 242,702 |
| 2020 | 286,226 |
| 2021 | 255,801 |
| 2022 | 252,412 |

Source: Office of Natural Resources Revenue 2023

***Geothermal Production Projections***

The table below shows the projected geothermal generation capacity on federal leases in the Nevada-California GRSG planning area over the next 20 years. Approximately 815 MW of geothermal generation capacity would be added over the next 20 years. The addition of 815 MW may translate into 20 new power plants (589 MW ÷ 30 MW average per power plant = 27 power plants) supported by 138 wells (589 MW ÷ 5.9 MW per well = 138 new wells).

**Table 18: Projected Geothermal Generation Capacity on Federal Leases in Nevada 2023-2043**

| Year | Geothermal Generation Capacity in Megawatts (MW) |
|---|---|
| 2023 | 743 |
| 2024 | 776 |
| 2025 | 810 |
| 2026 | 843 |
| 2027 | 877 |
| 2028 | 911 |
| 2029 | 944 |
| 2030 | 978 |
| 2031 | 1,011 |
| 2032 | 1,045 |
| 2033 | 1,079 |
| 2034 | 1,112 |
| 2035 | 1,146 |
| 2036 | 1,179 |
| 2037 | 1,213 |
| 2038 | 1,247 |
| 2039 | 1,280 |
| 2040 | 1,314 |
| 2041 | 1,347 |

| Year | Geothermal Generation Capacity in Megawatts (MW) |
|---|---|
| 2042 | 1,381 |
| 2043 | 1,415 |

Source: Derived from information contained in Appendix P of the 2015 Nevada and Northeastern California Greater Sage-Grouse Proposed LUPA/Final EIS and information from the BLM Nevada Geothermal webpage.[17]

As of 2022 there were approximately 160,000 acres of existing nonproducing federal geothermal leases in GRSG habitat, and a total of approximately 476,000 acres of non-producing federal geothermal leases in Nevada. There are approximately 14,000 acres of producing federal geothermal leases in GRSG habitat and approximately 56,000 acres total of producing federal geothermal leases in Nevada. Based on the production capacity of existing producing leases, the amount of acreage under existing nonproducing leases within Greater Sage Grouse habitat is sufficient to meet the projected growth in geothermal generation capacity during the 20-year planning period several times over, so assuming development is pursued on these leases and exploration determines that most have suitable geothermal resources, Increases in the amount of geothermal generation are expected to be the same under all the proposed Alternatives. Alternative 3 would close Greater Sage Grouse habitat to new geothermal leasing, which could prevent some future development in Alternative 3 PHMA, but it is likely that the development that would have occurred in these areas would relocated to other geothermal leases in Nevada.

***Geothermal Activity Surface Disturbance Projections***

Most geothermal development in the planning area has been of air-cooled binary systems which have the largest acreage disturbance for geothermal development, however that disturbance has been trending down, averaging less than 2 acres per MW of capacity for recent developments. Advances in drilling technology such as directional drilling have allowed for smaller surface disturbance. EGS technology has the potential to use far less groundwater to create binary geothermal production, however it has not yet been proven at the commercial scale, so estimates are based on traditional geothermal developments.

**Table 19: Estimated Total New Decision Area Disturbance from Geothermal Development During the Planning Period**

| Disturbance Type | Temporary Disturbance per Facility (acres) | Permanent Disturbance per Facility (acres) | Number of New Facilities | Total New Temporary Disturbance (acres) | Total New Permanent Disturbance (acres) |
|---|---|---|---|---|---|
| Production & Injection Wells (Disturbance from all facility wells) | 36 | 23 | 27 | 972 | 621 |
| Power Plant & Substation | 20 | 15 | 27 | 540 | 405 |
| Switching Station | 7 | 7 | 27 | 189 | 189 |

[17] https://www.blm.gov/programs/energy-and-minerals/renewable-energy/geothermal-energy/regional-information/nevada "Nevada BLM has eighteen operating geothermal power plants with federal interest, for a total generating capability of over 600 MW and nearly 400 MW of additional geothermal projects in the permitting, exploration, development and construction phases."

| Disturbance Type | Temporary Disturbance per Facility (acres) | Permanent Disturbance per Facility (acres) | Number of New Facilities | Total New Temporary Disturbance (acres) | Total New Permanent Disturbance (acres) |
|---|---|---|---|---|---|
| Access Roads & Pipelines | 18 | 18 | 27 | 486 | 486 |
| **TOTAL:** | **81** | **63** | - | **2,187** | **1,701** |

Source: Derived from Table P-1 from the 2015 Nevada and Northeastern California Greater Sage-Grouse Proposed LUPA/Final and updated geothermal production capacity estimates.

## 12.5 FLUID MINERALS – NORTH DAKOTA

### 12.5.1 Methodology

Since the publication of the 2015 Greater Sage Grouse plan for North Dakota an updated Reasonably Foreseeable Development Scenario for Oil and Gas Development in North Dakota[18] was published in 2022 as part of the revision of the North Dakota Resource Management Plan. Assumptions and methodology used to develop the updated projections below are the same assumptions and methodology described in the RFD for the North Dakota RMP revision. These were used along with new information where available to revise the projections provided to the current date, focus the analysis on the portions of the state with GRSG, and to analyze the proposed Alternatives. GRSG habitat management area in North Dakota is in the south-west corner of the state and limited to a small amount of the total area of the state. Much of the BLM fluid mineral decision area is already under an existing lease with approximately 15 percent unleased. To develop the below projections, the parcels of BLM-administered federal mineral estate that are within the GRSG planning area and the North Dakota boundaries were examined by township and information on the acres of BLM-administered federal mineral and amount leased vs available to lease in each township was recorded. The 20-year projections wells producing federal minerals for townships containing GRSG habitat were counted, and it was determined that under the existing rate of development a total of 222 production wells and 29 support (non-producing) wells are projected to be drilled on BLM-administered federal mineral estate over the next 20 years. To figure out projections by year the total projected federal North Dakota wells projected in a particular year were divided by the total 20-year projected federal wells and then multiplied by the total GRSG area wells to get the proportion of the total wells that occurred in that year. A similar method was used to get the projected production in GRSG habitat, the total production from new federal wells for a specific year was divided by the total number of new federal wells to get per well production for that year which was then multiplied by the number of new GRSG area federal production wells for that year. The reduction under Alternative 3, which would manage all GRSG habitat as closed to leasing, was calculated by determining the proportion of unleased federal mineral estate in the North Dakota GRSG planning area. Approximately 15.38 percent of the area is unleased and thus would not be leasable or able to be developed under Alternative 3, so the projection totals from the other Alternatives were reduced by 15.38 percent for this Alternative.

Surface disturbance projections were based on information from the Reasonably Foreseeable Development Scenario for Oil and Gas Development in North Dakota which assumed that 1.3 acres of surface disturbance per well would occur for new wells on BLM minerals. However, the GRSG area is outside the Bakken/Three Forks Formation where locating many horizontal wells on a single pad, which results in smaller per well disturbance, is the typical method of development. As a result, it was assumed 3 acres of surface disturbance

[18] https://eplanning.blm.gov/public_projects/1505069/200366341/20072477/250078659/NDRMP_Oil%20and%20Gas%20RFD_Oct2022_508.pdf

per well would occur to be more in line with the type of development seen in the GRSG area of North Dakota.

### 12.5.2 Oil and Gas

Since the publication of the 2015 Greater Sage Grouse plan for North Dakota an updated Foreseeable Development Scenario[19] oil and gas development in North Dakota was published in 2023 as part of the revision of the North Dakota Resource Management Plan. Assumptions and methodology used to develop the updated projections below are the same assumptions and methodology described in the RFD for the ongoing North Dakota RMP revision. These were used along with new information where available to revise the projections provided to the current date, focus the analysis on the portions of the state with GRSG, and to analyze the proposed Alternatives. GRSG habitat management area in North Dakota is in the south-west corner of the state and limited to a small amount of the total area of the state. Much of the BLM fluid mineral decision area is already under an existing lease with approximately 15 percent unleased.

#### *Oil and Gas Development Potential*

The North Dakota decision area is located on areas given a development potential rank of medium to high in the North Dakota Field Office RFD prepared for 2020-2040, updated in 2022, and released in 2023 with the Draft RMP/EIS as part of the North Dakota Resource Plan Revision and EIS.[20]

Since 2015 there have been six wells drilled on BLM administered lands in the Greater Sage Grouse decision area in North Dakota, all the drilled wells were located in PHMA,[21] however it is likely that there are other wells that are located outside of the decision area but are producing from federal minerals within the decision area by horizontal or directional drilling.

#### *RFD Scenario*

*Projected Drilling Activity by Alternative*

The 2020-2040 North Dakota RFD predicted that up to 222 wells would be drilled on federal minerals in the North Dakota GRSG decision area. In North Dakota, the vast majority of wells are horizontal wells.

Under the proposed Alternatives almost all of the North Dakota decision area would be PHMA so only PHMA management is presented in the following summary. Under Alternative 1 (existing management) PHMA would be managed as open to fluid mineral leasing subject to NSO stipulation, without waiver or modification, and with limited exception. Because much of the are decision area is already under existing leases which would not be impacted by the application of NSO stipulations to new leases, the potential area impacted by the proposed Alternatives is small. Also, because the vast majority of wells in North Dakota are horizontal, the impacts of NSO stipulations is not expected to have a major impact on the rate of development in most cases. Operators wanting to develop NSO area would be able to locate wellheads outside of NSO and horizontally drill into the minerals without much change to their standard development process. Alternative 2 would apply the same management as Alternative 1. Alternative 3 would manage all GRSG habitat as PHMA, under this Alternative all PHMA would be closed to leasing which would prevent any currently unleased BLM-administered federal mineral estate from being leased and developed. This would reduce the number of wells and total production compared to Alternative 1, but development and production would still occur on existing federal leases in the area, and private minerals would still be available

[19] https://eplanning.blm.gov/public_projects/1505069/200366341/20072477/250078659/NDRMP_Oil%20and%20Gas%20RFD_Oct2022_508.pdf
[20] https://eplanning.blm.gov/eplanning-ui/project/1505069/510
[21] IHS Enerdeq 2023

for leasing. Under Alternatives 4, 5 and 6, PHMA would be managed as open to fluid mineral leasing subject to NSO stipulation with waivers, modifications, and exceptions available at the discretion of the authorized officer. The allowance for waivers, modifications, and exceptions might result in increased development and production compared to Alternative 1, but because waivers, modifications, and exceptions are discretionary it is impossible to quantify any potential increase.

**Table 20: Oil and Gas Well and Production Projections on BLM Administered Federal Minerals in the North Dakota GRSG Decision Area Over the 20-year Forecast Period**

| Year | Alternatives 1, 2, 4, 5 & 6 | | | | Alternative 3 | | | |
|---|---|---|---|---|---|---|---|---|
| | GRSG Area BLM Mineral Producing Well Spuds | GRSG Area BLM Support Wells | GRSG Area BLM Mineral New Well Oil Production (Barrels) | GRSG Area BLM Mineral New Well Gas Production (MCF) | GRSG Area BLM Producing Well Spuds | GRSG Area BLM Support Wells | GRSG Area BLM Mineral New Well Oil Production (Barrels) | GRSG Area BLM Mineral New Well Gas Production (MCF) |
| 2023 | 4.47 | 0.58 | 524,702 | 1,079,562 | 3.79 | 0.49 | 443,993 | 913,505 |
| 2024 | 5.81 | 0.76 | 918,328 | 1,889,438 | 4.92 | 0.64 | 777,072 | 1,598,807 |
| 2025 | 9.14 | 1.19 | 1,533,654 | 3,155,454 | 7.74 | 1.01 | 1,297,749 | 2,670,086 |
| 2026 | 9.32 | 1.21 | 1,893,439 | 3,895,704 | 7.89 | 1.03 | 1,602,193 | 3,296,472 |
| 2027 | 9.68 | 1.26 | 2,193,417 | 4,512,901 | 8.19 | 1.06 | 1,856,029 | 3,818,732 |
| 2028 | 9.98 | 1.30 | 2,463,888 | 5,069,388 | 8.45 | 1.10 | 2,084,896 | 4,289,622 |
| 2029 | 10.22 | 1.33 | 2,711,891 | 5,579,648 | 8.65 | 1.12 | 2,294,752 | 4,721,394 |
| 2030 | 10.48 | 1.36 | 2,953,200 | 6,076,135 | 8.87 | 1.15 | 2,498,943 | 5,141,513 |
| 2031 | 10.68 | 1.39 | 3,180,324 | 6,543,436 | 9.04 | 1.17 | 2,691,131 | 5,536,934 |
| 2032 | 10.89 | 1.42 | 3,403,177 | 7,001,951 | 9.22 | 1.20 | 2,879,705 | 5,924,920 |
| 2033 | 11.06 | 1.44 | 3,547,674 | 7,299,251 | 9.36 | 1.22 | 3,001,976 | 6,176,490 |
| 2034 | 11.28 | 1.47 | 3,677,824 | 7,567,030 | 9.55 | 1.24 | 3,112,106 | 6,403,080 |
| 2035 | 11.41 | 1.48 | 3,743,933 | 7,703,049 | 9.66 | 1.25 | 3,168,046 | 6,518,176 |
| 2036 | 11.72 | 1.52 | 3,827,079 | 7,874,120 | 9.91 | 1.29 | 3,238,403 | 6,662,933 |
| 2037 | 11.79 | 1.53 | 3,887,687 | 7,998,820 | 9.98 | 1.30 | 3,289,689 | 6,768,452 |
| 2038 | 11.65 | 1.51 | 3,847,130 | 7,915,373 | 9.86 | 1.28 | 3,255,370 | 6,697,841 |
| 2039 | 11.70 | 1.52 | 3,856,162 | 7,933,957 | 9.90 | 1.29 | 3,263,012 | 6,713,566 |
| 2040 | 11.90 | 1.55 | 3,972,327 | 8,172,963 | 10.07 | 1.31 | 3,361,309 | 6,915,809 |
| 2041 | 12.53 | 1.63 | 4,184,601 | 8,609,712 | 10.60 | 1.38 | 3,540,931 | 7,285,377 |
| 2042 | 12.98 | 1.69 | 4,348,299 | 8,946,515 | 10.98 | 1.43 | 3,679,449 | 7,570,375 |
| 2043 | 13.29 | 1.73 | 4,445,723 | 9,146,964 | 11.25 | 1.46 | 3,761,888 | 7,739,990 |
| **Total** | **222** | **28.85** | **65,114,459** | **133,971,369** | **188** | **24** | **55,098,642** | **113,364,076** |

Source: Derived from the RFD for the 2022 North Dakota RMP revision, updated for the GRSG forecast period. Federal mineral estate located under US Forest Service administered federal surface estate is not included.

*Projected Surface Disturbance Due to Oil and Gas Activity by Alternative*

Much of the BLM-administered federal mineral estate in the planning area is split estate (meaning the surface is not federal land). Additionally, there is US Forest Service administered federal surface overlying federal mineral estate in some areas, which is not included in the decision area for this Greater Sage Grouse planning effort. The following disturbance calculations project disturbance resulting from development of BLM-administered federal minerals but much of the surface disturbance would occur on non-federal surface, both because only there are 55,000 acres of BLM-administered federal mineral estate but only approximately 33,000 acres of BLM-administered federal surface estate in the decision area, and because operators generally prefer to locate wells on non-federal surface where possible because permitting and documentation required in order to operate on BLM-managed surface adds cost to the project.

The RFD for the 2022 North Dakota RMP/EIS assumed an average of 1.3 acres per well and associated infrastructure for new wells on BLM minerals. However, the GRSG decision area is outside the Bakken/Three Forks Formation where locating many horizontal wells on a single pad is the preferred method of development, so disturbance is likely to be greater; it was assumed that 3 acres of surface disturbance per well would occur in the GRSG area in order to be avoid the chance of underestimating surface disturbance. Using this methodology, it is assumed that approximately 666 acres of total surface disturbance from well pads, roads and tank batteries associated with oil and gas development on BLM-administered federal mineral estate could occur over the 20-year forecast period.

### 12.5.3 Geothermal

Currently, little geothermal development exists in North Dakota and the state has lower potential than many other western states.[22] However, the extensive deep drilling for oil and gas that has occurred in the state provides an extensive record of subsurface conditions.[23] Research into using co-produced fluids (petroleum and hot water) from deep oil wells is ongoing, and researchers at the University of North Dakota completed a test of the technology that successfully generated geothermal power from hot water that flows naturally from petroleum wells in the Williston Sedimentary Basin in western North Dakota.[24] Research into redeveloping end of life oil wells into geothermal generation wells is also ongoing. Development of electrical generation using geothermal resources could occur anywhere in the state where existing oil wells coproduce sufficient amounts of water at high temperatures, but the scalability and commercial viability of the technology has yet to be proven.

No development of geothermal resources on BLM-administered federal mineral estate in the GRSG planning area is reasonably foreseeable during the 20-year plan life. This is due to a number of factors including the likely need to obtain a federal geothermal lease for use of existing oil wells for development, and heat at depth being higher in parts of the state outside the planning area.[25]

## 12.6 Fluid Minerals – Oregon

### 12.6.1 Methodology

There is no ongoing development of oil and gas or geothermal resources on BLM administered surface or mineral estate within the planning area. No projections of development of these types could be developed based on available information. Given the possibility of future geothermal development an assumption was made regarding the possible size and disturbance associated with a theoretical geothermal development for the purpose of being able to analyze impacts associated with any future geothermal development that might occur.

### 12.6.2 Oil and Gas

#### *Oil and Gas Development Potential*

Assessment of oil and gas potential conducted as part of Section 604 of the EPCA ranks all Greater sage grouse HMAs in Oregon as having low potential for both oil and gas. None of the producing oil and gas fields in Oregon are located in GRSG habitat. There are approximately 78,652 acres of oil and gas leases on BLM-

[22] https://www.osti.gov/servlets/purl/1209221
[23] https://www.ndstudies.gov/energy/level2/module-5-biofuels-geothermal-recovered/geothermal-energy-north-dakota
[24] https://www.energy.gov/eere/success-stories/articles/eere-success-story-doe-funded-project-first-permanent-facility-co
[25] https://www.osti.gov/servlets/purl/1209221

managed federal fluid mineral estate within GRSG historical range as of 3/3/2023, none of the leases are producing.

***Projected Activity by Alternative***

Sage Grouse habitat in the Oregon planning area is presumed to have low oil and gas development potential, however there are current leases. It is expected that minimal if any, leasing, production, or surface disturbance associated with oil and gas exploration and development would occur in the planning area in Oregon over the next 20-years. Because there is no history of development no trend is available to estimate any future production.

### 12.6.3 Geothermal

There is no ongoing geothermal power generation on BLM-managed fluid mineral estate in Oregon. There are approximately 22,057 acres of authorized or pending federal geothermal leases within the Oregon Sage Grouse historical range as of 3/3/2023.

The state of Oregon has some of the nation's best geothermal resources.[26] Oregon's first geothermal power plant began operating in 2010 at the Oregon Institute of Technology in Klamath Falls. The initial electricity-generating capacity was 0.28 MW. A second plant at Oregon Institute of Technology generates 1.75 MW of power. The only commercial producing geothermal power plant is the Neal Springs plant in Malheur County. It is not within the GRSG planning area. The facility has five permitted production wells and six permitted injection wells, and the plant has an average net production of 22 MW. The city of Klamath Falls uses geothermal energy to heat buildings, homes, pools, and melt snow and ice from sidewalks and roads. In the town of Lakeview, a geothermal well system is used to heat school properties and hospital buildings.[27]

AltaRock Energy developed an EGS demonstration project[28] and Newberry geothermal research project at Newberry, which lies within the Deschutes National Forest and is near but not within the GRSG planning area. Alta Rock announced that results from the site could support construction of a 35 MW binary geothermal power plant utilizing a dry cooling system[29] but no development has been proposed at the site. Funding from the US Department of Energy expired in 2015[30] so future use of the site appears to be uncertain, however the operator is applying for additional Department of Energy grants and is planning to restart stimulation and exploration. EGS technology has the potential to be developed in the planning area, but because EGS technology has not been proven to be commercially viable at this time the scope of such projects is unknown.

***Projected Activity by Alternative***

The 2015 and 2018 Sage Grouse Plans did not project the occurrence of geothermal development in Oregon. Because there was no existing development and no previous estimates to use, the following assumption is made to analyze the impacts of potential geothermal development and associated surface disturbance. For the purposes of analysis, it is assumed that under all Alternatives except Alternative 3 up to one 20MW geothermal power generation facility would be developed on BLM-managed lands in GRSG habitat over the next 20 years. This facility would disturb up to 6 acres for the drilling of up to 6 thermal

[26] https://www.eia.gov/state/analysis.php?sid=OR
[27] https://www.oregon.gov/energy/energy-oregon/Pages/Geothermal.aspx
[28] https://energyinfo.oregon.gov/blog/2016/06/21/oregon-geothermal-on-the-rise
[29] https://altarockenergy.com/projects/newberry-egs-demonstration/
[30] Cladouhos, T. T., S. Petty, M. W. Swyer, M. E. Uddenberg, K. Grasso, Y. Nordin. Results from Newberry Volcano EGS Demonstration, 2010–2014. Geothermics, Volume 63, 2016. https://doi.org/10.1016/j.geothermics.2015.08.009

gradient wells and would disturb up to 24 acres for the drilling of up to 8 production and injection wells. Construction of pipelines would disturb up to 14 acres, and an additional 10 acres could be disturbed for the construction of the generating plant. An assumed 10 miles of road would disturb /approximately 50 acres, and 8 miles of power line would disturb approximately 40 acres. The total estimated disturbance acres for this scenario equals 144 acres. Under Alternative 3, all BLM-managed minerals in GRSG habitat would be closed to fluid mineral leasing so it is assumed that geothermal power development might be reduced under this alternative, but existing leases could still be used for development.

## 12.7 FLUID MINERALS – SOUTH DAKOTA

### 12.7.1 Methodology

BLM mineral resource experts examined the RFD projections produced for the 2015 South Dakota GRSG RMP/EIS as well as development trends and development data available since that time and determined that the methodology and trends that were used to produce the projections for that document did not need modifications given the lack of significant changes in trends surrounding fluid mineral development in the state.

Assumptions and methodology used to develop the updated projections below are the same assumptions and methodology described in the RFD for the of the 2015 South Dakota Proposed LUPA/Final EIS (2015 SD Plan). These were used, along with development data since 2015, to revise the projections in that document to fit the current planning timeline, and to analyze the new proposed Alternatives.

The original RFD for South Dakota was produced in 2009, however as part of the 2015 GRSG planning effort the BLM produced an updated analysis for the planning area titled "Oil and Gas Reasonably Foreseeable Development by Alternative for the SD RMP April 2014", this document contains a summary table for the RFD projections adjusted for the management of the 2015 proposed alternatives. This table was used to analyze the proposed alternatives from the current planning effort. Alternative 1 would continue the management in the preferred Alternative (Alternative D) analyzed in the 2015 SD Plan. Alternative 2 would apply similar management to Alternative 1, as would Alternatives 4 and 5 except that they would allow for more WEMs. Alternative 6 would apply the same management as Alternative 5 except that it would designate ACECs which would be closed to leasing, however no ACEC areas would be designated in South Dakota, so impacts would not differ from Alternative 5. Alternative 3 in the current planning effort proposes approximately the same management as was proposed under Alternative C in the 2015 SD Plan. The projected number of new wells spud (drilled), producing from the Alternatives C and D were carried forward to the updated summary table below. Projections of surface disturbance were similarly taken from the Alternatives C and D projections shown in Table 4-5 in the 2015 SD Plan.

Production projections were created using Table 6 in the 2009 South Dakota Reasonably Foreseeable Development Scenario. The proportion of BLM-administered federal minerals within the GRSG planning area out of the total RFD study area was used to scale the annual production projections for oil and gas provided in the RFD to only the GRSG decision area. The projections provided in the RFD were for the years 2010 through 2029 so the regression equations for the projections of annual production of oil and of gas were calculated and used to extend the projections through 2043, the end of the 20-year planning period of the current effort. Information in the "Oil and Gas Reasonably Foreseeable Development by Alternative for the SD RMP April 2014" Table 6 presented a baseline of expected production. Based on the number of wells projected under the action alternatives compared to the baseline it was determined that Alternatives 1, 2, 4, 5 and 6 represented an approximately 8 percent reduction in production compared to the baseline and that Alternative 3 represented an approximately 9 percent reduction in production compared to the

baseline. The projections of oil and gas production within the South Dakota GRSG mineral decision area were reduced by these percentages to calculate the projected production under each of the current Alternatives during the planning period.

There is no ongoing development of geothermal resources on BLM administered surface or mineral estate within the planning area. No geothermal development is expected, and no projections of geothermal development were created.

### 12.7.2 Oil and Gas

#### *Oil and Gas Development Potential*

The table below shows the potential ranking of the RFD scenario area, however GRSG are only found in the portion of the RFD scenario area considered in the 2015 South Dakota RMP Revision.

**Table 21: South Dakota Oil and Gas Development Potential in the RFD Scenario**

| Development Potential | Total Acres in RFD Study Area (All Ownerships) | Acres of BLM Administered Federal Minerals | Number of Townships | Percent of RFD Study Area (All Ownerships) |
|---|---|---|---|---|
| High | 318,000 | 113,473 | 13.81 | 1.24 |
| Moderate | 476,000 | 80,459 | 20.65 | 1.86 |
| Low | 1,082,000 | 284,555 | 46.95 | 4.23 |
| Very Low | 22,068,000 | 1,138,091 | 957.82 | 86.33 |
| None | 1,617,000 | 54,162 | 70.20 | 6.33 |

Source: 2015 South Dakota Proposed RMP/Final EIS, Table 4-2.

#### *Projected Drilling Activity by Alternative*

The projections for the number of wells drilled on Federal minerals in the decision area are shown in the table below. It is estimated that during the 20-year forecast period approximately 355 conventional wells and up to 71 coalbed methane wells would be drilled on non-BLM administered minerals in the state.

**Table 22: Oil and Gas Well Projections for Federal Minerals (except federal minerals under US Forest Service surface) Over the 20-year Forecast Period**

| Well Type | Alternative 1 | Alternative 2 | Alternative 3 | Alternative 4 | Alternative 5 | Alternative 6 |
|---|---|---|---|---|---|---|
| Number of oil and gas wells drilled | 59.9 | 59.9 | 55.5 | 59.9 | 59.9 | 59.9 |
| Producing oil and gas wells | 53.6 | 53.6 | 50 | 53.6 | 53.6 | 53.6 |
| Number of CBNG gas wells drilled | 2.3 | 2.3 | 1.4 | 2.3 | 2.3 | 2.3 |
| Producing CBNG gas wells | 2 | 2 | 1.3 | 2 | 2 | 2 |

Source: Derived from the RFD Summary Table in the 2015 the South Dakota RMP RFD updated and adjusted to remove Forest Service decision area from the projections.
CBNG = Coal bed natural gas

#### *Projected Surface Disturbance Due to Oil and Gas Activity by Alternative*

Because of split estate (non-federal surface over federal minerals) and use of horizontal and directional drilling in the planning area most development of federal minerals will occur using wells that are not located

on BLM-managed surface. The project disturbance from development of federal minerals regardless of surface ownership, and projected disturbance on BLM-administered surface are both shown in the table below.

**Table 23: Potential Surface Disturbance from Oil and Gas and Coalbed Gas Drilling on BLM Land 2023-2043**

| Alternative | Total Wells Projected on BLM-Managed Federal Minerals | Short-Term Surface Disturbance on Federal Minerals (5.3 acres per well) | Long-Term Surface Disturbance on Federal Minerals (3.2 acres per well) | Percent of Federal Minerals Overlain by BLM Surface | Total Wells Projected for BLM-Managed Surface | Short-Term Surface Disturbance on BLM Surface (5.3 acres per well) | Long-Term Surface Disturbance on BLM Surface (3.2 acres per well) |
|---|---|---|---|---|---|---|---|
| **Potential Surface Disturbance from Oil and Gas Drilling** | | | | | | | |
| **Alternative 3** | 55.5 | 294 | 178 | 16 | 9 | 48 | 29 |
| **Alternatives 1,2,4,5,6** | 60 | 318 | 192 | 16 | 10 | 53 | 32 |
| **Potential Surface Disturbance from Coalbed Gas Drilling** | | | | | | | |
| **Alternative 3** | 1.5 | 8 | 4.8 | 16 | 0.2 | 1 | 0.6 |
| **Alternatives 1,2,4,5,6** | 2.5 | 13.2 | 8 | 16 | 0.4 | 2 | 1.3 |

Source: Derived from Table 4-5 in the 2015 South Dakota Proposed RMP/Final EIS, adjusted to reflect changes in well projections.

***Projected Production by Alternative***

**Table 24: Projected South Dakota Study Area Annual and Cumulative Oil and Gas Production for 2023 Through 2043**

| Year | Annual Oil (Barrels) All Mineral Estate | Annual Gas (Thousand Cubic Feet) All Mineral Estate | Alternatives 1/2/4/5/6 BLM Administered Annual Oil (Barrels) | Alternatives 1/2/4/5/6 BLM Administered Gas (Thousand Cubic Feet) | Alternative 3 BLM Administered Oil (Barrels) | Alternative 3 BLM Administered Gas (Thousand Cubic Feet) |
|---|---|---|---|---|---|---|
| 2023 | 1,875,085 | 20,109,885 | 98,210 | 1,053,279 | 97,142 | 1,041,831 |
| 2024 | 1,920,304 | 19,715,937 | 100,578 | 1,032,646 | 99,485 | 1,021,422 |
| 2025 | 1,913,306 | 19,842,636 | 100,212 | 1,039,282 | 99,122 | 1,027,985 |
| 2026 | 1,943,632 | 20,196,635 | 101,800 | 1,057,823 | 100,694 | 1,046,325 |
| 2027 | 1,882,287 | 21,069,274 | 98,587 | 1,103,529 | 97,515 | 1,091,534 |
| 2028 | 1,863,648 | 20,408,592 | 97,611 | 1,068,925 | 96,550 | 1,057,306 |
| 2029 | 1,929,270 | 21,204,288 | 101,048 | 1,110,600 | 99,949 | 1,098,528 |
| 2030 | 1,929,627 | 22,147,590 | 101,067 | 1,160,007 | 99,968 | 1,147,398 |
| 2031 | 1,938,634 | 22,610,546 | 101,538 | 1,184,255 | 100,435 | 1,171,382 |

| Year | Annual Oil (Barrels) All Mineral Estate | Annual Gas (Thousand Cubic Feet) All Mineral Estate | Alternatives 1/2/4/5/6 BLM Administered Annual Oil (Barrels) | Alternatives 1/2/4/5/6 BLM Administered Gas (Thousand Cubic Feet) | Alternative 3 BLM Administered Oil (Barrels) | Alternative 3 BLM Administered Gas (Thousand Cubic Feet) |
|---|---|---|---|---|---|---|
| 2032 | 1,947,641 | 23,073,502 | 102,010 | 1,208,502 | 100,901 | 1,195,367 |
| 2033 | 1,956,648 | 23,536,458 | 102,482 | 1,232,750 | 101,368 | 1,219,351 |
| 2034 | 1,965,655 | 23,999,414 | 102,954 | 1,256,998 | 101,834 | 1,243,335 |
| 2035 | 1,974,662 | 24,462,370 | 103,425 | 1,281,246 | 102,301 | 1,267,320 |
| 2036 | 1,983,669 | 24,925,326 | 103,897 | 1,305,494 | 102,768 | 1,291,304 |
| 2037 | 1,992,676 | 25,388,282 | 104,369 | 1,329,742 | 103,234 | 1,315,288 |
| 2038 | 2,001,683 | 25,851,239 | 104,841 | 1,353,990 | 103,701 | 1,339,272 |
| 2039 | 2,010,690 | 26,314,195 | 105,312 | 1,378,238 | 104,168 | 1,363,257 |
| 2040 | 2,019,697 | 26,777,151 | 105,784 | 1,402,486 | 104,634 | 1,387,241 |
| 2041 | 2,028,704 | 27,240,107 | 106,256 | 1,426,733 | 105,101 | 1,411,225 |
| 2042 | 2,037,711 | 27,703,063 | 106,728 | 1,450,981 | 105,567 | 1,435,210 |
| 2043 | 2,046,718 | 28,166,019 | 107,199 | 1,475,229 | 106,034 | 1,459,194 |
| **Total** | **41,161,946** | **494,742,509** | **2,155,907** | **25,912,735** | **2,132,473** | **25,631,075** |

Sources: Derived from Table 6 *Forecast of South Dakota Study Area annual and cumulative oil and gas production for 2010 through 2029* in the South Dakota RMP RFD (2009) updated and adjusted to remove Forest Service decision area from the projections.

### 12.7.1 Geothermal

Currently, little geothermal development exists in South Dakota and no high temperature geothermal resources (greater than 302°F). have been identified in the state. The development that does exist is comprised of hot springs developed for recreational use (located in the town of Hot Springs) and a few local heating ventures in the western part of the state, none of which are on public land. The few hot springs are connected by faults to deeply buried reservoirs that contain geothermal water that moves upward along the fault zones to discharge at the land surface. See Chapter 3 of the 2015 South Dakota Proposed RMP/Final EIS for more information.

No development of geothermal resources is reasonably foreseeable or likely to occur on federal minerals in the planning area during the 20-year plan life.

## 12.8 Fluid Minerals – Utah

### 12.8.1 Methodology

BLM mineral resource experts examined the RFD projections produced for the 2015 Utah Greater Sage-Grouse LUPA and EIS, the 2019 Utah Greater Sage-Grouse Resource Management Plan Amendment (RMPA) and EIS, and the 2020 Utah Greater Sage-Grouse Supplemental EIS.[31] They also looked at development trends and production data available since that time. It was determined that because of the lack of significant changes in trends associated with fluid mineral development in the state, the methodology and trends that were used to produce projections of well development and production in the 2015 Utah Greater Sage-Grouse LUPA and EIS did not need modifications. The assumptions and methodology

[31] Call 1/26/2023 with Quincy Bahr, Mary Higgins, Kevin Kelley, Laura Opal, Teresa Snyder, Duane Spencer, and David Chase (BLM), and Francis Craig and Kate Krebs (EMPSi), and a call 2/15/2023 with Quincy Bahr and Angela Wadman (BLM) and Francis Craig and Kate Krebs (EMPSi).

described in the Oil and Gas Reasonably Foreseeable Development Scenario for Greater Sage-Grouse Occupied Habitat in Utah Sub-Region which was included as Appendix R as part of the 2015 Utah Greater Sage-Grouse Proposed LUPA/Final EIS,[32] were used to develop the updated projections below. These assumptions and methodology were used to incorporate new development data and other relevant information regarding oil and gas development since 2015 to revise the projections provided to the current planning period and to analyze the current proposed Alternatives. Data incorporated included the number, trend and location of wells drilled since 2013, production from federal mineral estate in the state, and information on federal leases in the decision area.

Well projections from the 2015 Utah Proposed Land Use Plan Amendment/Final Environmental Impact Statement Appendix R[33] Table R.1. The projections of new oil and gas wells in the 2015 plan were for a 15-year planning period and included federal minerals estate under Forest Service surface estate in GRSG habitat in the decision area. Because the current planning process is considering a 20-year timeline and federal minerals under Forest Service surface are not included in the current decision area the projections required adjustment. The total number of wells was from Table R.1 was reduced using a factor of approximately 0.786, the ratio of the change in the decision area total acreage of approximately 3,151,000 acres in 2023 from the approximately 4,008,600 acre total in the 2015 plan, to calculate the number of new wells projected in the new decision area (assuming equal distribution of the wells across the landscape). The resulting total number of projected new wells was divided by 15 to calculate the annual average number of new wells and then multiplied by 20 to calculate the total for the 20-year planning period of the current effort.

The Proposed Plan Alternative and Alternative C from the 2015 RFD were brought forward for use in projections for the current planning effort. These Alternatives were selected because they applied similar management to the current alternatives being considered. Alternative 3 would designate all GRSG habitat in the decision area as PHMA and close all PHMA to fluid mineral leasing, Alternative C from 2015 closed all GRSG habitat to fluid mineral leasing and used a similar decision area, so the rate of development from this alternative was extended forward. Alternative 1 would continue management from the 2015 Proposed Plan, PHMA would be open to leasing with NSO stipulations applied subject to WEMs and GHMA would be NSO around Leks. Alternative 2 would apply essentially the same management for fluid minerals as Alternative 1, and Alternatives 4 and 5 would also apply the same management but with minor changes to PHMA boundaries and the addition of WEMs. Alternative 6 would apply the same management as Alternative 5 but with the addition of NSO stipulations applied in ACECs, however most of the acreage that would be designated as ACECs under Alternative 6 is already are closed to leasing or has existing NSO stipulations applied to protect resources other than GRSG, so this alternative would be minimally different from Alternative 5 in impacts on oil and gas development. For all Alternatives other than Alternative 3 the management of fluid minerals would be sufficiently similar, and differences between them due to the allowances for WEMs under some alternatives are not quantifiable because WEM decisions are made by the BLM Authorized Officer on a case-by-case basis and cannot be predicted in advance. As a result it is assumed that impacts on fluid mineral development would be approximately the same under Alternatives 1, 2, 4, 5, and 6, and the projections of oil and gas development from the Proposed Plan management from the 2015 Plan was extended forward for use in the analysis of impacts on oil and gas development under these alternatives for the current planning effort.

[32] https://eplanning.blm.gov/public_projects/lup/103346/143763/177169/AppendixR_OilGasForeseeableDevelopment.pdf
[33] https://eplanning.blm.gov/public_projects/lup/103346/143763/177169/AppendixR_OilGasForeseeableDevelopment.pdf

Production was determined using information from the 2015 Utah Proposed Land Use Plan Amendment/Final Environmental Impact Statement Appendix W[34] which details the expected average production of oil and gas from new oil and gas wells as 200 thousand barrels of oil per oil well and 1,471 million cubic feet per gas well, over a 20 year well life. These production amounts were multiplied by the number of new oil and gas wells, respectively, over the 20-year planning period that were derived using the process described above. Surface disturbance was determined based on the total number of new wells in the 20-year planning period multiplied by the average disturbance per each feature type from Tables R.3 through R.7 in the 2015 Utah GRSG RMP/EIS Appendix R.

### 12.8.2 Oil and Gas

In order to show the oil and gas potential of the Utah GRSG planning area, and allow for comparison of the development potential across the entire GRSG planning area, the assessment of oil and gas potential conducted under part of the Section 604 of the EPCA was intersected with GRSG HMAs in the current BLM decision area. The boundaries of GRSG habitat vary slightly between some of the alternatives so the Alternative 4 and 5 boundaries were used in the calculations shown in the table below. Very little of the planning area has a high development potential for either oil or gas.

**Table 25: Oil and Gas Potential Ranking in the Decision Area**

| Utah Oil Potential by GRSG Habitat Type | Acres |
|---|---|
| **PHMA** | 3,388,000 |
| Low Potential | 2,193,000 |
| Moderate Potential | 2,120,000 |
| High Potential | 0 |
| **GHMA** | 1,195,000 |
| Low Potential | 950,000 |
| Moderate Potential | 234,000 |
| High Potential | 11,000 |
| Utah Gas Potential by GRSG Habitat type | |
| **PHMA** | 2,193,000 |
| Low Potential | 2,031,000 |
| Moderate Potential | 162,000 |
| High Potential | 0 |
| **GHMA** | 1,195,000 |
| Low Potential | 848,000 |
| Moderate Potential | 347,000 |
| High Potential | 0 |

Source: EPCA 2018, BLM GIS 2018

#### *Historical Drilling Trends*

In Utah there are 94,000 acres of federal oil and gas leases in PHMA and 276,000 acres of federal leases in GHMA. Of these 89,000 acres in PHMA and 211,000 acres in GHMA are authorized, no matter which Alternative is chosen, these leases would be available for development in the future unless they expire, are relinquished, or are surrendered due to lack of diligent development. The remaining lease acres are listed under pending or interim status.

[34] https://eplanning.blm.gov/public_projects/lup/103346/143763/177174/AppendixW_EconomicImpactAnalysisMethodology.pdf

Since 2013 there have been 4,883 new wells spud (meaning drilling of the well was started) within Utah on both federal and non-federal lands, out of these approximately 90 percent were intended to be producing wells. Approximately 42% of the wells were directional wells, 14% were horizontal wells, and 44 percent were vertical wells.[35] The trend in the number of well spuds per year is highly variable as shown in **Table 26**, below.

**Table 26: Well Spuds by Year**

| Year | Well Spuds |
|---|---|
| 2013 | 685 |
| 2014 | 1434 |
| 2015 | 402 |
| 2016 | 246 |
| 2017 | 501 |
| 2018 | 474 |
| 2019 | 303 |
| 2020 | 69 |
| 2021 | 292 |
| 2022 | 350 |
| 2023* | 127 |

Source: IHS Enerdeq 2023, query date 7/24/2023
*2023 data complete through approximately mid-July 2023.

A total of 60 wells have been recorded as being drilled at a surface location in GRSG PHMA or GHMA federal surface in the decision area, but more wells producing federal minerals by horizontal or directional drilling from a non-federal surface location likely exist.

Projections produced as part of RFD scenarios typically aim to estimate levels of development that would be nearer the upper bound of expected development in order to allow for an analysis of impacts associated with fluid mineral development that avoids understating possible impacts. If actual levels of development have exceeded the projections it is an indicator that an update to the projections is needed, however if actual levels of development have not reached the level projected that is acceptable.

The projections below were based on the development scenarios created in the 2015 Utah GRSG RFD which were based on criteria including past and present oil and gas exploration, development and production activity within and near Greater Sage-Grouse occupied habitat, existing oil and gas leases, expressions of interest submitted by industry, exploration and development trends, locations of seismic surveys, existing infrastructure, and commodity prices.

The Carbon, Uintah, and Rich population areas (Carbon, Duchesne, Daggett, Rich, Summit and Uintah Counties) are the areas expected to have the majority of the oil and gas development that would potentially be impacted under the proposed Alternatives. The rest of the planning area is expected to have minimal to no future oil and gas development.

Because the planning effort for which this document has been developed is being conducted on a range-wide scale, projections were extended at the state-level scale rather than the population area scale that was used in previous planning.

[35] IHS Enerdeq 2023, query date 7/24/2023.

***Projections by Proposed Alternative***

Proposed Alternatives 1 and 2 continue the management from the 2015 and 2018 GRSG planning efforts, respectively, in order to form the dual No Action Alternatives. Proposed Alternative 1 is the same as the Proposed Plan from the 2015 Utah GRSG LUPA and EIS, the projections assumptions which were defined in the 2015 Utah GRSG RFD continue to be used for Alternative 1. Proposed Alternative 2 is the same management proposed plan from the 2018 Utah GRSG RMPA and Final EIS. The analysis of the proposed plan in the 2018 Utah GRSG RMPA and Final EIS concluded that the projected number of wells under the 2018 proposed plan would be approximately the same as the number of wells that was projected under the 2015 proposed plan. Thus Alternatives 1 and 2 continue to result in the same proposed levels of oil and gas development. Proposed Alternative 3 would manage all GRSG habitat as PHMA and close all PHMA to fluid mineral leasing. This same management was proposed and analyzed as Alternative C in the 2015 Utah GRSG LUPA and EIS, and the 2015 Utah GRSG RFD. The analysis and assumptions from those documents are carried forward and used in the Analysis of Alternative 3 below. Proposed Alternatives 4 and 5 would manage PHMA as open to leasing with NSO stipulations, subject to waivers, exemptions, and modifications; and manage GHMA as open to leasing with NSO applied around leks only. This would result in effectively the same management of fluid minerals as under Alternative 1. As a result, the projections of future oil and gas development are the same across Alternatives 1, 2, 4, 5, and 6. Alternative 3 would result in reduced oil and gas development and production compared to the other Alternatives, due to the decision to close all PHMA to leasing, but because preexisting lease that are in the new PHMA boundary could still be developed, some new well drilling and production would continue under Alternative 3. The results are shown in the tables below.

**Table 27: Projected Wells Drilled in GRSG Habitat 2023-2043**

| Alternative | Total Wells | Total Gas Wells | Total Oil Wells |
|---|---|---|---|
| **1** | 3,111 | 2,436 | 676 |
| **2** | 3,111 | 2,436 | 676 |
| **3** | 2,775 | 2,159 | 616 |
| **4** | 3,111 | 2,436 | 676 |
| **5** | 3,111 | 2,436 | 676 |
| **6** | 3,111 | 2,436 | 676 |

Source: Derived using information from Table R.1 in Appendix R of the 2015 Utah Greater Sage-Grouse Proposed LUPA/Final EIS, and Proposed alternatives.

**Table 28: 20-year Projected Oil and Gas Production from Federal Mineral Estate in the Decision Area by Alternative**

| Alternative | 20-year Gas Production (Millions of Cubic Feet) | 20-year Oil Production (Barrels) |
|---|---|---|
| **1** | 3,582,970 | 135,202,315 |
| **2** | 3,582,970 | 135,202,315 |
| **3** | 3,175,530 | 123,187,946 |
| **4** | 3,582,970 | 135,202,315 |
| **5** | 3,582,970 | 135,202,315 |
| **6** | 3,582,970 | 135,202,315 |

Source: Derived using information from Appendix W, and Tables R.1 and R.2 in Appendix R of the 2015 Utah Greater Sage-Grouse Proposed LUPA/Final EIS, and Proposed alternatives.

**Table 29: Estimated 20-Yr Surface Disturbance from Oil and Gas Development of BLM-Administered Federal Mineral Estate**

| Type of Development | Alternative | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|---|
| **Well pads** | Total Wells | 3,111 | 3,111 | 2,775 | 3,111 | 3,111 | 3,111 |
| | Total Well Pads | 831 | 831 | 741 | 831 | 831 | 831 |
| | Average Disturbance per Pad | 5.4 | 5.4 | 5.4 | 5.4 | 5.4 | 5.4 |
| | Total Pad Disturbance Acres | 4,487.74 | 4,487.74 | 4,002.99 | 4,487.74 | 4,487.74 | 4,487.74 |
| **Roads** | Road Miles | 536.51 | 536.51 | 478.56 | 536.51 | 536.51 | 536.51 |
| | Average Disturbance per Road Mile | 4.8 | 4.8 | 4.8 | 4.8 | 4.8 | 4.8 |
| | Road Disturbance Acres | 2,576.30 | 2,576.30 | 2,298.01 | 2,576.30 | 2,576.30 | 2,576.30 |
| **Pipelines** | Pipeline Miles | 545.98 | 545.98 | 487 | 545.98 | 545.98 | 545.98 |
| | Average Disturbance per Mile | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 |
| | Pipeline Disturbance Acres | 655.38 | 655.38 | 584.59 | 655.38 | 655.38 | 655.38 |
| Total Ancillary Features Acres | | 480 | 480 | 480 | 480 | 480 | 480 |
| **TOTAL Disturbance Acres** | | **8,199.42** | **8,199.42** | **7,365.60** | **8,199.42** | **8,199.42** | **8,199.42** |

Source: Derived using information from Appendix R of the 2015 Utah Greater Sage-Grouse Proposed LUPA/Final EIS, and Proposed alternatives.

***Total Estimated Future Surface Disturbance for Geophysical Exploration***

Estimated surface disturbance associated with seismic exploration is shown in the table below.

**Table 30: Estimated 20-Yr Seismic Exploration Surface Disturbance**

| Alternative | Miles of Seismic Lines | Average Disturbance per Mile | Disturbance Acres |
|---|---|---|---|
| **1** | 1,248.70 | 1.2 | 1,498.02 |
| **2** | 1,248.70 | 1.2 | 1,498.02 |
| **3** | 1,113.82 | 1.2 | 1,336.21 |
| **4** | 1,248.70 | 1.2 | 1,498.02 |
| **5** | 1,248.70 | 1.2 | 1,498.02 |
| **6** | 1,248.70 | 1.2 | 1,498.02 |

Source: Derived using information from Appendix R of the 2015 Utah Greater Sage-Grouse Proposed LUPA/Final EIS, and Proposed alternatives.

### 12.8.3 Geothermal

Utah currently has three operational utility scale geothermal energy facilities with an installed capacity of 72.5MW. The Blundell Plant operated by PacifiCorp Energy consists of a 23MW flash steam plant and 10MW secondary recovery binary plant.[36] The Cove Fort Hybrid Plant operated by Enel Green Power is a

[36] https://geology.utah.gov/docs/emp/geothermal/ugwg/pdf/larsen0408.pdf

geothermal-hydro hybrid power plant with a 25MW installed capacity.[37] The Thermo Geothermal Power Plant operated by Cyrq Energy consists of a 14.5MW binary process plant.[38] Both Blundell and Cove Fort plants have federal geothermal leases, but neither are located in GRSG HMAs. The Utah BLM has conducted geothermal lease sales during three of the past 4 years; 3045.19 acres were leased in 2023, 21,685.35 acres were leased in 2022, and 26,200.62 acres were leased in 2020.[39]

The table below shows geothermal electrical generation from federal geothermal leases in Utah from 2013 to 2023. This shows the trend over time which is tied to the amount of geothermal development.

**Table 31: Utah Geothermal Electrical Generation from Federal Geothermal Leases in Kilowatt Hours**

| Year | Kilowatt Hours (kwh)* |
|---|---|
| 2013 | 12,986,766 |
| 2014 | 132,080,000 |
| 2015 | 130,138,400 |
| 2016 | 150,003,437 |
| 2017 | 144,419,064 |
| 2018 | 132,624,724 |
| 2019 | 143,793,551 |
| 2020 | 112,090,593 |
| 2021 | 129,606,607 |
| 2022 | 128,459,411 |
| **Total** | **1,216,202,553** |

Source Office of Natural Resources Revenue 2023
*Some geothermal electrical generation in Utah is reported by ONNR in thousands of pounds (presumed to be of steam for a flash steam plant) which are not able to be converted to kilowatt hours generated without additional information, as a result that data is not included in these totals.

The 2015 Utah Greater Sage-Grouse LUPA and EIS contained the following as an RFD scenario for Geothermal:

> *It is possible that the existing Thermo Geothermal Field (currently, Cyrq-owned wells and generation plant) could expand in the future to include an adjacent 980-acre geothermal lease (UTU-087662) that is located within the Bald Hills Populated Area. Development of this lease is expected to comprise of drilling five geothermal energy production or produced fluid injection wells. With an estimated surface disturbance of 7 acres per well, including respective access roads and pipelines, a total of 35 acres of long-term surface disturbance would result.*

It also noted that geothermal resources are plentiful in the middle and northwest portions of the state, although a lack of transmission capacity may hinder electricity development in the northwest corner.

[37] https://www.enelgreenpower.com/our-projects/operating/cove-fort-hybrid-plant
[38] https://cyrqenergy.com/energy-plant-locations/#minersville-ut
[39] https://www.blm.gov/programs/energy-and-minerals/renewable-energy/geothermal-energy/regional-information/utah

The 2019 Utah Greater Sage-Grouse RMPA and EIS did not provide an updated RFD scenario for geothermal development, but did provide the following updates to geothermal information:

> *Between 2015 and 2017, the BLM has offered for lease 24,468 acres within HMAs. Lease stipulations apply as described in the leases as analyzed in the 2015 Final EIS.*
>
> *Six geothermal development permits have been approved and drilled on existing pads on existing leases. McGinness Hills Phase 3 Environmental Assessment authorized up to 42 acres of disturbance on existing leases, which will be offset according to the mitigation hierarchy.*

Since 2019 the BLM in Utah has conducted annual geothermal lease sales which can be viewed on the Utah Geothermal Energy webpage.[40]

***Geothermal RFD scenario***

Over the next 20 years both exploration and development activities could occur on existing and future geothermal leases. Test and thermal gradient wells typically disturb approximately 1 acre per well and production and injection wells for power generation typically disturb up to 7 acres. For the purposes of analysis, it is assumed that one 30MW geothermal power generation facility would be developed on BLM-managed lands in GRSG habitat over the next 20 years. This facility could disturb up to 6 acres for the drilling of up to 6 thermal gradient wells and would disturb up to 56 acres for the drilling of up to 8 production and injection wells. Construction of pipelines would disturb up to 14 acres, and an additional 10 acres could be disturbed for the construction of the generating plant. An assumed 10 miles of road would disturb approximately 50 acres, and 8 miles of power line would disturb approximately 40 acres. Because the existing issued geothermal leases are likely sufficient develop a facility of this size this could occur under any of the proposed Alternatives, but it would be less likely under Alternative 3 because the closure of all GRSG PHMA to new fluid mineral leasing would not allow new geothermal leases to be issued within GRSG HMAs under Alternative 3. The potential surface disturbance from the development of a new geothermal facility by Alternative are shown in the table below.

**Table 32: Surface Disturbance Associated with the Development of a Geothermal Generating Facility**

| Alternative | Alternative 1 | Alternative 2 | Alternative 3 | Alternative 4 | Alternative 5 |
|---|---|---|---|---|---|
| Thermal Gradient Well Disturbance (acres) | 6 | 6 | 6 | 6 | 6 |
| Production and Injection Well Disturbance (acres) | 56 | 56 | 56 | 56 | 56 |
| Pipeline Construction Disturbance (acres) | 14 | 14 | 14 | 14 | 14 |
| Generating Plant Disturbance (acres) | 10 | 10 | 10 | 10 | 10 |

[40] https://www.blm.gov/programs/energy-and-minerals/renewable-energy/geothermal-energy/regional-information/utah

| Alternative | Alternative 1 | Alternative 2 | Alternative 3 | Alternative 4 | Alternative 5 |
|---|---|---|---|---|---|
| Road Disturbance (acres) | 50 | 50 | 50 | 50 | 50 |
| Powerline Disturbance (acres) | 40 | 40 | 40 | 40 | 40 |
| **Total (acres)** | **176** | **176** | **176** | **176** | **176** |

Source: 2015 Utah Greater Sage-Grouse LUPA and EIS modified based on current alternatives

## 12.9 FLUID MINERALS – WYOMING

### 12.9.1 Methodology

Production projections from the 2015 document were not well documented in how they were derived or what was included. As a result, new projections were created using available data. Data on the production of oil and gas from federal mineral estate in Wyoming was pulled from the US Department of Interior (DOI) Office of Natural Resource Revenue (ONNR).[41] This data was then edited to remove the production that did not occur in the decision area, this included removing the proportion of federal minerals under Forest Service surface, and the proportion of federal minerals in areas of the state without GRSG habitat. For the purposes of this it was assumed that there is an equal distribution of federal fluid mineral production across the state. The acreage of the current mineral decision area which does not include federal minerals under Forest Service surface) was divided by the total area of federal mineral estate in Wyoming to get the proportion of total federal mineral estate that is part of the decision area. The production data from ONNR was reduced using this proportion to get amount of oil and gas production that is from the GRSG mineral decision area. It was then assumed that Alternatives 1 and 2 which would both approximately continue existing management so the existing annual production (for 2022, the year-over-year trend is relatively steady) was multiplied by the 20-year project timeline, to project production for those Alternatives. For the other Alternatives, the proportion of the projected total number of wells under Alternatives 1 and 2 was taken as the ratio of the number of wells under other Alternatives to reduce or increase the projected 20-year production from Alternatives 1 and 2 to derive the projected 20-year production for the other Alternatives.

While Coal Bed Natural Gas (CBNG) wells were seeing considerable interest in the period leading up to the development of the 2015 Greater Sage Grouse planning, since that time the economics have been unfavorable and developments have underperformed, in Wyoming no CBNG wells have been drilled in the planning area in the past 10 years and none are likely in the future. As a result, CBNG wells were removed from all projections and not projected forward into the future.

The 2015 plan did not include all of BLM-managed lands in Wyoming because there were ongoing resource management plan (RMPs) efforts for the Buffalo Field Office (FO), Lander FO, and Bighorn Basin (combined plan for Cody FO and Worland FO), and Sage Grouse Planning was completed as part of the RMP process for these FOs. For the current proposed plan amendment all of Wyoming is being included in the planning area so the oil and gas development projections from the Buffalo, Lander and Bighorn Basin RMPs were collected, CBNG wells were removed from the projections and the remaining wells projected were added to the well projections associated with the most similar fluid mineral management alternative in the GRSG plan. So that projections being created would cover BLM-managed federal minerals across the entire state.

[41] https://revenuedata.doi.gov/query-data?dataType=Production

For updating well projections, Table 4-43[42] from the 2015 Wyoming Greater Sage-Grouse Land Use Plan (LUP) Amendment (2015 WY Plan), was used as a starting point. Alternatives 1 and 2 would continue existing management from 2015 LUPA so the Proposed LUP Amendments column is carried forward for those Alternatives. Alternative 3 would close almost all GRSG habitat in the decision area to fluid mineral leasing. While this is approximately the same management as Alternative C in the 2015 WY Plan, concerns were raised with how the Alternative C projections appeared not to fully account for the impacts associated with closing lands around existing undeveloped leases, the extent of possible development in areas with NSO stipulations, and ROW exclusions preventing the construction of new off-lease roads and pipelines required for development of existing undeveloped leases. Similar concerns were raised that Alternatives 4, 5, and 6 would need to account for areas where existing undeveloped leases surrounded by NSO would be stranded due to lack of access, and areas where NSO would be too far from locations where surface facilities could be placed to be developed by horizontal or directional drilling. To account for these concerns the following process was developed. All proposed NSO areas were reverse buffered to calculate the area within the average reach of directional or horizontal drilling technology, a 0.5 mile inward buffer distance from all edges of NSO areas was used for all areas of Wyoming except for the Power River Basin (as delineated by the Wyoming State Geologic Survey[43]) which used a 2-mile inward buffer distance because the producing formations in the Powder River basin are horizontal and continuous making them straightforward to develop using long reach horizontally drilling. In the remaining NSO area, and areas that would be closed to new leasing, existing leases that were not recorded as held by production (existing leases held by production are assumed to already have needed off-lease infrastructure in place) were overlaid with layers of existing roads and pipelines to determine how many of these leases would be able to be accessed using existing roads and production pipelines, and how many could be cut off from being able to access the lease to develop wells and transport produced oil and gas to market. It was assumed that the existing leases not held by production that intersected roads or pipelines would be able to use these corridors to construct additional off lease road or pipeline infrastructure if needed. The acreage of developable NSO (NSO within the reach of horizontal or directional drilling, on an existing lease that is held by production, or on an existing lease not held by production but with road or pipeline access) was calculated and used for NSO in projection comparisons, and the remaining non-accessible NSO acreage which would not be able to be developed was treated as effectively closed to leasing when comparing against the 2015 WY Plan projections. The acreage of existing leases by lease status and production status was calculated because it was reported in the US Government Accountability Office Report 21-138[44] that approximately 25 percent of existing leases get developed in their first term, leases in areas that would be closed to leasing would not be considered for extension, and many leases in areas with new NSO stipulations applied would be likely to have reduced leasing interest making them less likely to be renewed. The total acreage of existing leases not held by production in NSO and closed areas was reduced by 75 percent to reflect that only 25 percent of leases in these areas are likely to be developed. The acreage of 'developable NSO' (NSO within the reach of horizontal or directional drilling, on an existing lease that is held by production, or on an existing lease not held by production but with road or pipeline access[reduced by 75% of total acreage]) was calculated and used for NSO in projection comparisons, and the remaining non-accessible NSO acreage which would not be able to be developed was treated as effectively closed to leasing when comparing against the 2015 WY Plan projections. The output map was examined for 'islands' of leasable minerals fully surrounded by NSO

[42] https://eplanning.blm.gov/public_projects/lup/103347/143798/177223/11_Chapter-4_Environmental-Consequences_FEIS_052115.pdf

[43] https://www.wsgs.wyo.gov/pubs-maps/gis.aspx see the "Wyoming Basins" dataset under the Geology tab.

[44] Oil and Gas: Onshore Competitive and Noncompetitive Lease Revenues. US Government Accountability Office. GAO-21-138. Published: November 19, 2020. https://www.gao.gov/products/gao-21-138

or closed (with ROW exclusion and no existing roads/pipeline corridors) and any areas are added to the projection as a further percent reduction of the existing lease acres total. The results of this process were used to adjust projections of wells for Alternatives 3, 4, 5 and 6.

There is no ongoing development of geothermal resources on BLM administered surface or mineral estate within the planning area. No projections of geothermal development could be developed based on available information. However, given that the possibility of future geothermal development exists, an assumption was made regarding the possible size and disturbance associated with a theoretical geothermal development for the purpose of being able to analyze impacts associated with future geothermal development that might occur.

### 12.9.2 Oil and Gas

#### *Oil and Gas Development Potential*

Assumptions and methodology used to develop the updated projections below follow the assumptions and methodology used in the 2015 Wyoming Greater Sage-Grouse Land Use Plan Amendment. These were used along with new information to revise the projections provided to the current date and to analyze the proposed Alternatives. The trends described in the 2015 Wyoming Greater Sage-Grouse Land Use Plan Amendment and the RFDs for the Wyoming BLM field offices within the GRSG planning area generally remain in line with the levels of development occurring, however some documents did not fully anticipate the level of changes associated with technological improvements in horizontal and directional drilling. Improvements in horizontal drilling and geosteering technology have allowed for a reduction in surface impacts associated with developing of oil and gas. Multiple horizontal wells can be located on a single well pad and extend well bores horizontally for two or more miles out in the productive formations under ideal conditions. This allows a reduction in surface infrastructure as a single well pad can produce from the same area that would previously have required numerous conventional or less advanced wells in the past. This allows for a reduction in disturbance associated with development infrastructure such as roads and pipelines which now only route to a small number of multi-well pads rather than numerous pads across the landscape. Improvements in this technology also allow for greater development of resources in areas where NSO stipulations are applied. In basins where the characteristics of the productive formations are well suited to this type of development, including the Powder River Basin in the Buffalo Field Office and Casper Field Office, this has become the dominate form of development resulting in a reduction of surface impacts per unit of production.

Since 2013 approximately 9,127 wells associated with oil and gas development have been drilled in all of Wyoming. Since 2015 approximately 2,700 wells have been drilled in GRSG habitat.[45] This total includes production wells, service wells, injection wells, workovers of existing wells, and may include some wells that were plugged and abandoned or never completed. The Wyoming Oil and Gas Conservation Commission database repots a total of 6,455 unique well spuds of oil, gas, and coalbed methane wells in the state from 2013 through 2023.[46]

The tables below show the EPCA development potential ranking for oil and gas in the proposed GRSG management areas from Alternative 4. The decision area is slightly different under the different Alternatives, so the Alternative 4 decision area was used for the following calculations, but the results are generally

[45] IHS Enerdeq 2023.

[46] Wyoming Oil and Gas Conservation Commission. 2024. Count of Spuds by Type and Year(s). Internet website: http://pipeline.wyo.gov/online_stats_bk/spud_stats.cfm

applicable across all the Alternatives. Not all areas were given a developmental potential rank, so the totals below do not add up to the entire decision area.

**Table 33: EPCA Oil Development Potential within Alternative 4 Greater Sage-grouse HMAs in Wyoming**

| Wyoming | Acres |
|---|---|
| **PHMA** | 13,370,000 |
| Low | 5,949,000 |
| Medium | 2,188,000 |
| High | 5,233,000 |
| **GHMA** | 13,095,000 |
| Low | 5,606,000 |
| Medium | 2,399,000 |
| High | 5,090,000 |
| **Grand Total** | **26,465,000** |

Source: EPCA 2018, BLM GIS 2023

**Table 34: EPCA Gas Development Potential within Alternative 4 Greater Sage-grouse HMAs in Wyoming**

| Wyoming | Acres |
|---|---|
| **PHMA** | 10,917,000 |
| Low | 6,452,000 |
| Medium | 3,556,000 |
| High | 909,000 |
| **GHMA** | 13,184,000 |
| Low | 7,229,000 |
| Medium | 4,805,000 |
| High | 1,150,000 |
| **Grand Total** | **24,101,000** |

Source: EPCA 2018, BLM GIS 2023

The table below shows the acres of existing leases by status in the proposed GRSG management areas under Alternative 4. Approximately 24% of the HMAs are under an existing authorized lease.

**Table 35: BLM Fluid Mineral Lease Status within Alternative 4 Greater Sage-grouse HMAs in Wyoming**

| Alternative 4 | Acres |
|---|---|
| **GHMA** | 4,481,000 |
| Authorized | 4,231,000 |
| Pending | 124,000 |
| Interim | 126,000 |
| **PHMA** | 3,206,000 |
| Authorized | 3,023,000 |
| Pending | 61,000 |
| Interim | 122,000 |
| **Grand Total** | **7,957,000** |

Source: BLM GIS 2023

***Projected Oil and Gas Activity by Alternative***

The estimated number of wells and future surface disturbance associated with wells, roads, and pads is shown in the table below.

**Table 36: Reasonably Foreseeable Development Scenario for Oil and Gas Development and Surface Disturbance in Wyoming GRSG Habitat in the next 20 years.**

| Alternative | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| Projected number of oil and gas wells | 14,450 | 14,450 | 4,284 | 9,148 | 13,565 | 13,387 |
| Projected number of CBNG wells* | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Projected Short-term Surface Disturbance from new well pads, roads, and pipelines (acres) | 111,988 | 111,988 | 33,198 | 70,900 | 105,126 | 103,753 |
| Total Projected Long-term Surface Disturbance from new well pads, roads, and pipelines (acres) | 61,413 | 61,413 | 18,205 | 38,880 | 57,650 | 56,897 |

Source: updates to data from Table 4-43 in the 2015 Wyoming Greater Sage-Grouse Land Use Plan Amendment based on changes to management under the proposed Alternatives and changes to the decision area.
*Coal Bed Natural Gas (CBNG) wells were seeing considerable interest in the period leading up to the development of the 2015 Greater Sage Grouse planning, however since that time the economics have been unfavorable and developments have underperformed, in Wyoming no CBNG wells have been drilled in the planning area in the past 10 years and none are likely in the future, CBNG wells were removed from the projections.

***Projected Production by Alternative in the Decision Area***

Under Alternatives 1 and 2 approximately 791,060,387 barrels of oil and 16,289,517,518 mcf of natural gas are projected to be produced over the 20-year planning period of 2023-2043.

Under Alternative 3, approximately 567,523,820 barrels of oil and 11,686,451,964 mcf of natural gas are projected to be produced over the 20-year planning period of 2023-2043.

Under Alternative 4, approximately 674,488,974 barrels of oil and 13,889,078,683 mcf of natural gas are projected to be produced over the 20-year planning period of 2023-2043.

Under Alternative 5 approximately 771,593,305 barrels of oil and 15,888,651,312 mcf of natural gas are projected to be produced over the 20-year planning period of 2023-2043.

Under Alternative 6 approximately 767,697,101 barrels of oil and 15,808,420,677 mcf of natural gas are projected to be produced over the 20-year planning period of 2023-2043.

### 12.9.3 Geothermal

***Geothermal Summary***

There is no existing use of geothermal resources in Wyoming for power generation.[47] A study conducted for the Wyoming Energy Authority found that:[48]

> *Detailed literature review and analysis suggests Wyoming's geothermal resources are moderate to low temperatures, approximately 300 °F or less… and situated in localized regions throughout the state. Most*

[47] https://www.wsgs.wyo.gov/energy/geothermal.aspx

[48] Batir, J., E. Gentry, K. Kitz, M. Richards, J. Boak, H. Soroush, Petrolern LLC. 2022. Final Report of Geothermal Resource and Applicable Technology for Wyoming, Final Report for Wyoming Energy Authority. July 2022. Ref. No. WYO0722RE01. Internet website: https://wyoenergy.org/wp-content/uploads/2022/11/Petrolern_FinalReportWYGeothermalPotentialAndApplicableTechnology_FINAL1Aug2022.pdf

*of the geothermal resources are below 200 °F, below ideal electrical generation potential temperatures. There are no indications for a widespread high temperature geothermal resource that would provide significant geothermal value to Wyoming and the costs and risks of exploration for high-temperature resources are high; however, technologies to utilize lower temperature resources are likely to have the greatest economic impact and benefit for Wyoming, given the widespread indication of potential low temperature geothermal resources.*

There has been discussion of the possibility of converting oil and gas wells with favorable temperature characteristics that are no longer productive for oil and gas into use as geothermal wells, but this has not been commercially proven at this time.

***Projected Geothermal Activity by Alternative***

It is unlikely that any geothermal energy development would occur in GRSG habitat during the 20-year planning period. However, for the purposes of analysis it is assumed that under all Alternatives except Alternative 3 up to one 20MW geothermal power generation facility would be developed on BLM-managed lands in GRSG habitat over the next 20 years. A facility of this size could disturb up to 6 acres for the drilling of up to 6 thermal gradient wells and disturb up to 24 acres for the drilling of up to 8 production and injection wells. Construction of pipelines would disturb up to 14 acres, and an additional 10 acres could be disturbed for the construction of the generating plant. An assumed 10 miles of road would disturb approximately 50 acres, and 8 miles of power line would disturb approximately 40 acres. Under Alternative 3 it is assumed that no geothermal power development would occur on BLM-managed lands in GRSG habitat because under this alternative all GRSG habitat would be closed to fluid mineral leasing and there are no existing geothermal leases that could be developed.

## 12.10 WIND ENERGY

The following criteria and assumptions were used in the development of the RFD table (**Table 37**).

***General Assumptions***

- The planning area is only within HMAs.
- Alternative 1 - See **Table 38** of this document.
- Alternative 2 - No changes from Alternative 1. Nevada exceptions do not apply to the RFD Table. Utah avoidance criteria are not incorporated due to the fact that exact lek locations are not known.
- Alternative 3 - All habitat is managed as exclusion.
- Alternative 4 - PHMA is managed as right-of-way (ROW) exclusion areas. IHMA is managed as ROW avoidance areas. Areas (regardless of PHMA, GHMA, IHMA or non-HMA status) within 0.5 miles are managed as ROW avoidance areas. GHMA is not included in the 0.5-mile buffer managed as ROW avoidance areas for utility scale wind projects.
- Alternative 5 - PHMA and IHMA would be avoidance areas for utility scale wind and solar energy development. GHMA is open with minimization measures.
- Existing Avoidance and Exclusions include protections for other resources, Wind Mapper exclusion and avoidance datasets combined to create this data.

***Data Gaps***

- Colorado - No Linkage Management Area (LMA) in calculations, No GHMA Avoidance or Exclusion ROW data available
- Nevada and California - No other habit management area (OHMA) in calculations

- Montana - No restoration habitat management area (RHMA) or connectivity habitat management area (CHMA) in calculations
- North and South Dakota - There is no existing ROW avoidance or exclusion data.
- Utah - No GHMA Acres under Alternative 2

***GIS Workflow***

Wind energy development constraints (ROW avoidance, RMP wind energy avoidance, low wind energy potential, etc.) are all combined together to create a total constraints layer. The wind potential layer then has this master constraints layer erased from it to identify areas where there are no constraints to wind energy development (labeled as "potential developable wind resources"); this layer is combined with the master constraints layer to create a comprehensive wind development layer indicating constraints or lack of constraints and annual wind speeds for these areas. The comprehensive wind development layer is then clipped to BLM-managed surface across the 10 states included in the RFD. This layer is then combined with the GRSG Habitat Management Area layer(s) for each alternative (these have also been clipped to BLM surface). The output of this workflow is a layer that contains wind speed data for each GRSG HMA by alternative, and information on constraints to wind energy development that might impact the ability to develop wind energy in these areas.

***Data Sources***

BLM GIS (U.S. Bureau of Land Management Geographic Information Systems) data used in the Greater Sage Grouse Planning alternatives, affected environment, and impact analysis (BLM GIS 2023).

Wind Potential Source: National Renewable Energy Laboratory United States Wind Speed at 80-Meter above Surface Level (National Renewable Energy Laboratory 2017).

Wind Constraints source: Wind Energy Development Exclusions and Resource Sensitivities for the BLM West-wide Wind Mapping Project (Argonne National Laboratory 2016).

**Table 37: RFD Acres by Alternative**

| Alternative 1 | | Alternative 2 | | Alternative 3 | | Alternative 4 | | Alternatives 5 and 6 | |
|---|---|---|---|---|---|---|---|---|---|
| **Status** | **Acres** | **Status** | **Acres** | **Status** | **Acres** | **Status** | **Acres** | **Status** | **Acres** |
| **Idaho** | — | — | — | — | — | — | — | — | — |
| Total Acres of BLM Surface within HMAs | 9,656,000 | Total Acres of BLM Surface within HMAs | 9,642,000 | Total Acres of BLM Surface within HMAs | 9,644,000 | Total Acres of BLM Surface within HMAs | 9,644,000 | Total Acres of BLM Surface within HMAs | 9,644,000 |
| Land Unsuitable for Wind Resources | 1,333,000 | Land Unsuitable for Wind Resources | 1,329,000 | Land Unsuitable for Wind Resources | 1,311,000 | Land Unsuitable for Wind Resources | 1,311,000 | Land Unsuitable for Wind Resources | 1,311,000 |
| Existing Open to Development | 5,913,000 | Existing Open to Development | 5,912,000 | ROW Avoidance Acres | 0 | Existing Open to Development | 5,915,000 | ROW Avoidance Acres | 632,000 |
| Existing Avoidance Area | 771,000 | Existing Avoidance Area | 771,000 | ROW Exclusion Acres | 8,333,000 | Existing Avoidance Area | 764,000 | Land Open for Development | 7,701,000 |
| Existing Exclusion Area | 1,640,000 | Existing Exclusion Area | 1,629,000 | — | — | Existing Exclusion Area | 1,654,000 | — | — |
| Proposed Open to Development | 1,288,000 | Proposed Open to Development | 1,288,000 | — | — | Proposed Avoidance Acres [within 0.5 miles of PHMA] | 5,254,000 | — | — |
| Proposed Avoidance Area | 771,000 | Proposed Avoidance Area | 771,000 | — | — | Proposed Avoidance Acres [GHMA and IHMA and areas within of 0.5 miles of PHMA] | 8,422,000 | — | — |
| Proposed Exclusion Area | 4,855,000 | Proposed Exclusion Area | 4,818,000 | — | — | Proposed Exclusion Acres (PHMA) | 5,164,000 | — | — |
| **Montana** | — | — | — | — | — | — | — | — | — |
| Total Acres of BLM Surface within HMAs | 5,776,000 | Total Acres of BLM Surface within HMAs | 5,776,000 | Total Acres of BLM Surface within HMAs | 5,173,000 | Total Acres of BLM Surface within HMAs | 5,465,000 | Total Acres of BLM Surface within HMAs | 5,465,000 |
| Land Unsuitable for Wind Resources | 143,000 | Land Unsuitable for Wind Resources | 143,000 | Land Unsuitable for Wind Resources | 104,000 | Land Unsuitable for Wind Resources | 105,000 | Land Unsuitable for Wind Resources | 105,000 |
| Existing Open to Development | 5,087,000 | Existing Open to Development | 5,087,000 | ROW Avoidance Acres | 0 | Existing Open to Development | 4,665,000 | ROW Avoidance Acres | 151,000 |
| Existing Avoidance Area | 222,000 | Existing Avoidance Area | 222,000 | ROW Exclusion Acres | 5,068,000 | Existing Avoidance Area | 182,000 | Land Open for Development | 5,209,000 |
| Existing Exclusion Area | 158,000 | Existing Exclusion Area | 158,000 | — | — | Existing Exclusion Area | 118,000 | — | — |
| Proposed Open to Development | 0 | Proposed Open to Development | 0 | — | — | Proposed Avoidance Acres [within 0.5 miles of PHMA] | 3,391,000 | — | — |
| Proposed Avoidance Area | 2,292,000 | Proposed Avoidance Area | 2,292,000 | — | — | Proposed Avoidance Acres [GHMA and IHMA and areas within of 0.5 miles of PHMA] | 5,174,000 | — | — |
| Proposed Exclusion Area | 3,175,000 | Proposed Exclusion Area | 3,175,000 | — | — | Proposed Exclusion Acres (PHMA) | 3,183,000 | — | — |
| **South Dakota** | — | — | — | — | — | — | — | — | — |
| Total Acres of BLM Surface within HMAs | 151,000 | Total Acres of BLM Surface within HMAs | 151,000 | Total Acres of BLM Surface within HMAs | 151,000 | Total Acres of BLM Surface within HMAs | 151,000 | Total Acres of BLM Surface within HMAs | 151,000 |
| Land Unsuitable for Wind Resources | 6,000 | Land Unsuitable for Wind Resources | 6,000 | Land Unsuitable for Wind Resources | 6,000 | Land Unsuitable for Wind Resources | 6,000 | Land Unsuitable for Wind Resources | 6,000 |
| Existing Open to Development | 145,000 | Existing Open to Development | 145,000 | ROW Avoidance Acres | 0 | Existing Open to Development | 145,000 | ROW Avoidance Acres | ND |
| Existing Avoidance Area | ND | Existing Avoidance Area | ND | ROW Exclusion Acres | 145,000 | Existing Avoidance Area | ND | Land Open for Development | ND |
| Existing Exclusion Area | ND | Existing Exclusion Area | ND | — | — | Existing Exclusion Area | ND | — | — |
| Proposed Open to Development | 23,000 | Proposed Open to Development | 23,000 | — | — | Proposed Avoidance Acres [within 0.5 miles of PHMA] | 131,000 | — | — |
| Proposed Avoidance Area | ND | Proposed Avoidance Area | ND | — | — | Proposed Avoidance Acres [GHMA and IHMA and areas within of 0.5 miles of PHMA] | 154,000 | — | — |
| Proposed Exclusion Area | 122,000 | Proposed Exclusion Area | 122,000 | — | — | Proposed Exclusion Acres (PHMA) | 122,000 | — | — |

| Alternative 1 | | Alternative 2 | | Alternative 3 | | Alternative 4 | | Alternatives 5 and 6 | |
|---|---|---|---|---|---|---|---|---|---|
| **Status** | **Acres** | **Status** | **Acres** | **Status** | **Acres** | **Status** | **Acres** | **Status** | **Acres** |
| **North Dakota** | — | — | — | — | — | — | — | — | — |
| Total Acres of BLM Surface within HMAs | 33,000 | Total Acres of BLM Surface within HMAs | 33,000 | Total Acres of BLM Surface within HMAs | 33,000 | Total Acres of BLM Surface within HMAs | 33,000 | Total Acres of BLM Surface within HMAs | 33,000 |
| Land Unsuitable for Wind Resources | 22,000 | Land Unsuitable for Wind Resources | 22,000 | Land Unsuitable for Wind Resources | 22,000 | Land Unsuitable for Wind Resources | 22,000 | Land Unsuitable for Wind Resources | 22,000 |
| Existing Open to Development | 11,000 | Existing Open to Development | 11,000 | ROW Avoidance Acres | 0 | Existing Open to Development | 11,000 | ROW Avoidance Acres | ND |
| Existing Avoidance Area | ND | Existing Avoidance Area | ND | ROW Exclusion Acres | 11,000 | Existing Avoidance Area | ND | Land Open for Development | ND |
| Existing Exclusion Area | ND | Existing Exclusion Area | ND | — | — | Existing Exclusion Area | ND | — | — |
| Proposed Open to Development | 0 | Proposed Open to Development | 0 | — | — | Proposed Avoidance Acres [within 0.5 miles of PHMA] | 33,000 | — | — |
| Proposed Avoidance Area | 0 | Proposed Avoidance Area | ND | — | — | Proposed Avoidance Acres [GHMA and IHMA and areas within of 0.5 miles of PHMA] | 33,000 | — | — |
| Proposed Exclusion Area | 11,000 | Proposed Exclusion Area | 11,000 | — | — | Proposed Exclusion Acres (PHMA) | 11,000 | — | — |
| **Colorado** | — | — | — | — | — | — | — | — | — |
| Total Acres of BLM Surface within HMAs | 1,680,000 | Total Acres of BLM Surface within HMAs | 1,777,000 | Total Acres of BLM Surface within HMAs | 1,584,000 | Total Acres of BLM Surface within HMAs | 1,681,000 | Total Acres of BLM Surface within HMAs | 1,681,000 |
| Land Unsuitable for Wind Resources | 318,000 | Land Unsuitable for Wind Resources | 310,000 | Land Unsuitable for Wind Resources | 292,000 | Land Unsuitable for Wind Resources | 318,000 | Land Unsuitable for Wind Resources | 318,000 |
| Existing Open to Development | 1,291,000 | Existing Open to Development | 1,398,000 | ROW Avoidance Acres | 0 | Existing Open to Development | 1,292,000 | ROW Avoidance Acres | 0 |
| Existing Avoidance Area | 0 | Existing Avoidance Area | 0 | ROW Exclusion Acres | 1,292,000 | Existing Avoidance Area | 0 | Land Open for Development | 1,363,000 |
| Existing Exclusion Area | 0 | Existing Exclusion Area | 0 | — | — | Existing Exclusion Area | ND | — | — |
| Proposed Open to Development | 0 | Proposed Open to Development | 0 | — | — | Proposed Avoidance Acres [within 0.5 miles of PHMA] | 1,102,000 | — | — |
| Proposed Avoidance Area | 621,000 | Proposed Avoidance Area | 559,000 | — | — | Proposed Avoidance Acres [GHMA and IHMA and areas within of 0.5 miles of PHMA] | 1,721,000 | — | — |
| Proposed Exclusion Area | 670,000 | Proposed Exclusion Area | 839,000 | — | — | Proposed Exclusion Acres (PHMA) | 673,000 | — | — |
| **Nevada** | — | — | — | — | — | — | — | — | — |
| Total Acres of BLM Surface within HMAs | 21,176,000 | Total Acres of BLM Surface within HMAs | 21,168,000 | Total Acres of BLM Surface within HMAs | 22,651,000 | Total Acres of BLM Surface within HMAs | 22,629,000 | Total Acres of BLM Surface within HMAs | 22,629,000 |
| Land Unsuitable for Wind Resources | 333,000 | Land Unsuitable for Wind Resources | 315,000 | Land Unsuitable for Wind Resources | 4,568,000 | Land Unsuitable for Wind Resources | 4,561,000 | Land Unsuitable for Wind Resources | 4,561,000 |
| Existing Open to Development | 2,126,000 | Existing Open to Development | 3,151,000 | ROW Avoidance Acres | 0 | Existing Open to Development | 2,734,000 | ROW Avoidance Acres | 746,000 |
| Existing Avoidance Area | 1,103,000 | Existing Avoidance Area | 1,393,000 | ROW Exclusion Acres | 18,083,000 | Existing Avoidance Area | 1,494,000 | Land Open for Development | 17,322,000 |
| Existing Exclusion Area | 10,279,000 | Existing Exclusion Area | 3,711,000 | — | — | Existing Exclusion Area | 1,681,000 | — | — |
| Proposed Open to Development | 1,553,000 | Proposed Open to Development | 1,549,000 | — | — | Proposed Avoidance Acres [within 0.5 miles of PHMA] | 13,630,000 | — | — |
| Proposed Avoidance Area | 336,000 | Proposed Avoidance Area | 1,393,000 | — | — | Proposed Avoidance Acres [GHMA and IHMA and areas within of 0.5 miles of PHMA] | 16,284,000 | — | — |
| Proposed Exclusion Area | 11,619,000 | Proposed Exclusion Area | 5,313,000 | — | — | Proposed Exclusion Acres (PHMA) | 9,195,000 | — | — |

| Alternative 1 | | Alternative 2 | | Alternative 3 | | Alternative 4 | | Alternatives 5 and 6 | |
|---|---|---|---|---|---|---|---|---|---|
| **Status** | **Acres** | **Status** | **Acres** | **Status** | **Acres** | **Status** | **Acres** | **Status** | **Acres** |
| **California** | — | — | — | — | — | — | — | — | — |
| Total Acres of BLM Surface within HMAs | 1,360,000 | Total Acres of BLM Surface within HMAs | 1,330,000 | Total Acres of BLM Surface within HMAs | 1,376,000 | Total Acres of BLM Surface within HMAs | 1,376,000 | Total Acres of BLM Surface within HMAs | 1,376,000 |
| Land Unsuitable for Wind Resources | 333,000 | Land Unsuitable for Wind Resources | 315,000 | Land Unsuitable for Wind Resources | 335,000 | Land Unsuitable for Wind Resources | 335,000 | Land Unsuitable for Wind Resources | 335,000 |
| Existing Open to Development | 831,000 | Existing Open to Development | 829,000 | ROW Avoidance Acres | 0 | Existing Open to Development | 986,000 | ROW Avoidance Acres | 0 |
| Existing Avoidance Area | 0 | Existing Avoidance Area | 0 | ROW Exclusion Acres | 1,040,000 | Existing Avoidance Area | 0 | Land Open for Development | 1,041,000 |
| Existing Exclusion Area | 0 | Existing Exclusion Area | 0 | — | — | Existing Exclusion Area | 0 | — | — |
| Proposed Open to Development | 441,000 | Proposed Open to Development | 438,000 | — | — | Proposed Avoidance Acres [within 0.5 miles of PHMA] | 692,000 | — | — |
| Proposed Avoidance Area | 0 | Proposed Avoidance Area | 0 | — | — | Proposed Avoidance Acres [GHMA and IHMA and areas within of 0.5 miles of PHMA] | 1,344,000 | — | — |
| Proposed Exclusion Area | 390,000 | Proposed Exclusion Area | 391,000 | — | — | Proposed Exclusion Acres (PHMA) | 692,000 | — | — |
| **Oregon** | — | — | — | — | — | — | — | — | — |
| Total Acres of BLM Surface within HMAs | 10,386,000 | Total Acres of BLM Surface within HMAs | 10,383,000 | Total Acres of BLM Surface within HMAs | 11,225,000 | Total Acres of BLM Surface within HMAs | 11,225,000 | Total Acres of BLM Surface within HMAs | 11,225,000 |
| Land Unsuitable for Wind Resources | 966,000 | Land Unsuitable for Wind Resources | 966,000 | Land Unsuitable for Wind Resources | 1,131,000 | Land Unsuitable for Wind Resources | 1,131,000 | Land Unsuitable for Wind Resources | 1,131,000 |
| Existing Open to Development | 7,299,000 | Existing Open to Development | 7,297,000 | ROW Avoidance Acres | 0 | Existing Open to Development | 7,674,000 | ROW Avoidance Acres | 537,000 |
| Existing Avoidance Area | 1,604,000 | Existing Avoidance Area | 517,000 | ROW Exclusion Acres | 10,093,000 | Existing Avoidance Area | 1,753,000 | Land Open for Development | 9,557,000 |
| Existing Exclusion Area | 517,000 | Existing Exclusion Area | 0 | — | — | Existing Exclusion Area | 666,000 | — | — |
| Proposed Open to Development | 0 | Proposed Open to Development | 0 | — | — | Proposed Avoidance Acres [within 0.5 miles of PHMA] | 6,867,000 | — | — |
| Proposed Avoidance Area | 4,899,000 | Proposed Avoidance Area | 4,003,000 | — | — | Proposed Avoidance Acres [GHMA and IHMA and areas within of 0.5 miles of PHMA] | 10,996,000 | — | — |
| Proposed Exclusion Area | 4,521,000 | Proposed Exclusion Area | 2,391,000 | — | — | Proposed Exclusion Acres (PHMA) | 5,964,000 | — | — |
| **Utah** | — | — | — | — | — | — | — | — | — |
| Total Acres of BLM Surface within HMAs | 2,564,000 | Total Acres of BLM Surface within HMAs | 2,123,000 | Total Acres of BLM Surface within HMAs | 3,642,000 | Total Acres of BLM Surface within HMAs | 3,459,000 | Total Acres of BLM Surface within HMAs | 3,459,000 |
| Land Unsuitable for Wind Resources | 806,000 | Land Unsuitable for Wind Resources | 612,000 | Land Unsuitable for Wind Resources | 1,114,000 | Land Unsuitable for Wind Resources | 1,054,000 | Land Unsuitable for Wind Resources | 1,054,000 |
| Existing Open to Development | 1,503,000 | Existing Open to Development | 1,287,000 | ROW Avoidance Acres | 0 | Existing Open to Development | 2,091,000 | ROW Avoidance Acres | 51,000 |
| Existing Avoidance Area | 227,000 | Existing Avoidance Area | 214,000 | ROW Exclusion Acres | 2,528,000 | Existing Avoidance Area | 265,000 | Land Open for Development | 2,354,000 |
| Existing Exclusion Area | 28,000 | Existing Exclusion Area | 10,000 | — | — | Existing Exclusion Area | 50,000 | — | — |
| Proposed Open to Development | 216,000 | Proposed Open to Development | 0 | — | — | Proposed Avoidance Acres [within 0.5 miles of PHMA] | 2,503,000 | — | — |
| Proposed Avoidance Area | 227,000 | Proposed Avoidance Area | 0 | — | — | Proposed Avoidance Acres [GHMA and IHMA and areas within of 0.5 miles of PHMA] | 16,948,000 | — | — |
| Proposed Exclusion Area | 1,529,000 | Proposed Exclusion Area | 1,511,000 | — | — | Proposed Exclusion Acres (PHMA) | 1,624,000 | — | — |

| Alternative 1 | | Alternative 2 | | Alternative 3 | | Alternative 4 | | Alternatives 5 and 6 | |
|---|---|---|---|---|---|---|---|---|---|
| **Status** | **Acres** | **Status** | **Acres** | **Status** | **Acres** | **Status** | **Acres** | **Status** | **Acres** |
| **Wyoming** | — | — | — | — | — | — | — | — | — |
| Total Acres of BLM Surface within HMAs | 17,200,000 | Total Acres of BLM Surface within HMAs | 17,200,000 | Total Acres of BLM Surface within HMAs | 17,016,000 | Total Acres of BLM Surface within HMAs | 17,025,000 | Total Acres of BLM Surface within HMAs | 17,025,000 |
| Land Unsuitable for Wind Resources | 1,172,000 | Land Unsuitable for Wind Resources | 1,172,000 | Land Unsuitable for Wind Resources | 1,171,000 | Land Unsuitable for Wind Resources | 1,172,000 | Land Unsuitable for Wind Resources | 1,172,000 |
| Existing Open to Development | 15,387,000 | Existing Open to Development | 15,387,000 | ROW Avoidance Acres | 0 | Existing Open to Development | 15,223,000 | ROW Avoidance Acres | 0 |
| Existing Avoidance Area | 0 | Existing Avoidance Area | 0 | ROW Exclusion Acres | 15,845,000 | Existing Avoidance Area | 0 | Land Open for Development | 15,853,000 |
| Existing Exclusion Area | 641,000 | Existing Exclusion Area | 0 | — | — | Existing Exclusion Area | 631,000 | — | — |
| Proposed Open to Development | 8,315,000 | Proposed Open to Development | 8,315,000 | — | — | Proposed Avoidance Acres [within 0.5 miles of PHMA] | 10,398,000 | — | — |
| Proposed Avoidance Area | 7,072,000 | Proposed Avoidance Area | 7,072,000 | — | — | Proposed Avoidance Acres [GHMA and IHMA and areas within of 0.5 miles of PHMA] | 16,948,000 | — | — |
| Proposed Exclusion Area | 641,000 | Proposed Exclusion Area | 641,000 | — | — | Proposed Exclusion Acres (PHMA) | 9,304,000 | — | — |

ND = No Data Available

^The colors used in Alternative 1 in Table 36 correspond to the proposed ROW management in Table 37.

**Table 38: Alternative 1 ROW Management**

| Region | PHMA or IHMA | GHMA |
|---|---|---|
| North Dakota | Exclusion | Avoidance |
| Idaho | Exclusion | Open |
| Southwest Montana | Exclusion | Avoidance |
| Nevada/Northeastern California | Exclusion | Yes |
| Colorado | Exclusion | Avoidance |
| Oregon | Exclusion | Avoidance |
| South Dakota | Exclusion | ND |
| Utah | Exclusion | Open |
| Wyoming | Avoidance | Open |

**Table 39: Calculation Theory**

| Alternative 1 | Data Inputs |
|---|---|
| Total Acres of BLM Surface within HMAs | State Total |
| Land Unsuitable for Wind Resources | "Low Wind Resources" |
| Existing Open to Development | Potentially developable wind resources - All HMAs |
| Existing Avoidance Area | ROW avoidance - All HMAs |
| Existing Exclusion Area | ROW exclusion - All HMAs |
| Proposed Open to Development | Potentially developable wind resources - GHMA |
| Proposed Avoidance Area | Potentially developable wind resources - IHMA, ROW avoidance - GHMA and IHMA |
| Proposed Exclusion Area | Potentially developable wind resources - PHMA, Row Avoidance - PHMA, Row Exclusion - GHMA, IHMA, and PHMA |
| **Alternative 2** | **Data Inputs** |
| Total Acres of BLM Surface within HMAs | State Total |
| Land Unsuitable for Wind Resources | "Low Wind Resources" |
| Existing Open to Development | Potentially developable wind resources - All HMAs |
| Existing Avoidance Area | ROW avoidance - All HMAs |
| Existing Exclusion Area | ROW exclusion - All HMAs |
| Proposed Open to Development | Potentially developable wind resources - GHMA |
| Proposed Avoidance Area | Potentially developable wind resources - IHMA, ROW avoidance - GHMA and IHMA |
| Proposed Exclusion Area | Potentially developable wind resources - PHMA, Row Avoidance - PHMA, Row Exclusion - GHMA, IHMA, and PHMA |
| **Alternative 3** | **Data Inputs** |
| Total Acres of BLM Surface within HMAs | State Total |
| Land Unsuitable for Wind Resources | "Low Wind Resources" |
| ROW Avoidance Acres | N/A - All HMAs are Exclusion |
| ROW Exclusion Acres | Potentially developable wind resources, ROW avoidance, ROW exclusion |
| **Alternative 4** | **Data Inputs** |
| Total Acres of BLM Surface within HMAs | State Total |
| Land Unsuitable for Wind Resources | "Low Wind Resources" |
| Existing Open to Development | Potentially developable wind resources - All HMAs |

| Alternative 4 | Data Inputs |
|---|---|
| Existing Avoidance Area | ROW avoidance - All HMAs |
| Existing Exclusion Area | ROW exclusion - All HMAs |
| Proposed Avoidance Acres [within 0.5 miles of PHMA] | 0.5mi buffer of PHMA |
| Proposed Avoidance Acres [GHMA and IHMA and areas within of 0.5 miles of PHMA] | Proposed Avoidance Acres [within 0.5 miles of PHMA], POTENTIALLY DEVELOPABLE WIND RESOURCES - GHMA and IHMA, ROW Avoidance - GHMA and IHMA |
| Proposed Exclusion Acres (PHMA) | PWDR - PHMA, ROW Avoidance - PHMA, ROW Exclusion - All HMAs |
| **Alternative 5** | **Data Inputs** |
| Total Acres of BLM Surface within HMAs | State Total |
| Land Unsuitable for Wind Resources | "Low Wind Resources" |
| ROW Avoidance Acres | ROW avoidance - PHMA |
| Land Open for Development | State Total-Land Unsuitable-ROW Avoidance |

## 12.11 SOLAR ENERGY

The RFD for solar development is needed to guide analyses on the effect of alternatives being considered to solar power generation. The solar development RFD for this GRSG EIS incorporates and builds on the RFD from the 2023 Solar Programmatic EIS (PEIS), under concurrent development.

In order to evaluate the adequacy of lands available for application in meeting the nation's renewable energy goals, the Solar PEIS developed a projection of the land area and electricity-generating capacity (power) requirements for future solar energy development. For the 2023 Solar PEIS (BLM 2024) (*Note: this is the 2024 Solar PEIS*), the amount of land area and power projected for utility-scale solar energy development in the 11-state Solar PEIS planning area through the year 2045 is used as the RFD. The year 2045 was used because it allows for approximately 20 years of development, which is the typical time period the BLM uses for programmatic planning. The amount of land area and power projected for utility-scale solar energy development in the Solar PEIS 11-state planning area is shown in **Table 41**.

The 2023 GRSG EIS and 2023 Solar PEIS each have five different alternatives and differing planning areas, and it is not known which alternative (or combination of alternatives) either process will ultimately select. Because of this, the GRSG EIS solar RFD is a qualitative analysis that builds off the RFD from the Solar PEIS RFD. The allocations associated with solar energy ROW development in the GRSG EIS are shown in **Table 40** below, organized by each state within the GRSG planning area and by GRSG habitat management area.

The acres associated with these habitat management areas are shown in **Table 2-1** in **Chapter 2** of the GRSG EIS. Additional information on ROW management and criteria that define these management actions are in **Section 4.8**, Lands and Realty, of the EIS.

**Table 40: Solar ROW Management based on Greater Sage-Grouse Habitat Management Area**

| State | GRSG Alternative 1 | | GRSG Alternative 2 | | GRSG Alternative 3 | | GRSG Alternative 4 | | GRSG Alternative 5 | |
|---|---|---|---|---|---|---|---|---|---|---|
| | PHMA[1] | GHMA | PHMA[1] | GHMA | PHMA[1] | PHMA[1] | PHMA[1] | GHMA | PHMA[1] | GHMA |
| North Dakota | Exclusion | Avoidance | Exclusion | Avoidance | Exclusion | Exclusion | Exclusion | Avoidance | Avoidance | Open |
| Idaho | Exclusion[2] | Open | Exclusion[2] | Open | Exclusion | Exclusion | Exclusion | Avoidance | Avoidance | Open |
| Montana | Avoidance[3] | Avoidance[3] | Avoidance[3] | Avoidance[3] | Exclusion | Exclusion | Exclusion | Avoidance | Avoidance | Open |
| Nevada / Northeastern California | Exclusion[2] | Exclusion[4] | Exclusion[2] | Exclusion[4] | Exclusion | Exclusion | Exclusion | Avoidance | Avoidance | Open |
| Colorado | Exclusion[3] | Avoidance | Exclusion[3] | Avoidance | Exclusion | Exclusion | Exclusion | Avoidance | Avoidance | Open |
| Oregon | Exclusion | LSP | Exclusion | LSP | Exclusion | Exclusion | Exclusion | Avoidance | Avoidance | Open |
| South Dakota | Avoidance[3] | Avoidance[3] | Avoidance[3] | Avoidance[3] | Exclusion | Exclusion | Exclusion | Avoidance | Avoidance | Open |
| Utah | Exclusion[4] | Exclusion[4] | Exclusion[4] | Open | Exclusion | Exclusion | Exclusion | Avoidance | Avoidance | Open |
| Wyoming | Open[3] | Open | Open[3] | Open | Exclusion | Exclusion | Exclusion | Avoidance | Avoidance | Open |

[1] – IHMA in Idaho, [2] – Greater than 20 Megawatt facilities, [3] – Based on Major ROW for Utility Corridors, [4] – Based on 2012 Solar EIS.

**Table 41: Solar PEIS - Reasonably Foreseeable Development Scenarios**

| State | Estimated BLM-Administered Acres Developed by 2045 under RFDs | Estimated Non-BLM-Administered Acres Developed by 2045 under RFDs |
|---|---|---|
| Arizona | 198,210 | 66,070 |
| California* | 109,972 | 413,706 |
| Colorado | 45,207 | 15,069 |
| Idaho | 89,574 | 29,858 |
| Montana | 5,387 | 1,796 |
| Nevada | 48,119 | 16,040 |
| New Mexico | 11,123 | 3,708 |
| Oregon | 51,387 | 17,129 |
| Utah | 39,793 | 13,264 |
| Washington | 71,781 | 23,927 |
| Wyoming | 27,255 | 9,085 |
| **TOTAL** | **697,809** | **326,865** |

Source: BLM 2024 (Note: this is the 2024 Solar PEIS)

* To account for exclusion of the Desert Renewable Energy Conservation Plan (DRECP) area in California, the proportion of BLM-administered lands outside of the DRECP area (28%) was applied to the estimated RFDs development acres. It is estimated that 282,787 acres of BLM-administered land within the DRECP planning area would be developed by 2045 under the RFDs.

The basis for the Solar PEIS' state-level projections of solar energy development by 2045 in **Table 41** above was the DOE's Solar Futures study (2021) and its companion report on environmental implications (Heath et al. 2022). The Solar PEIS concluded that in general, the lands available for solar energy development in each state, usually outside of GRSG PHMA, would be adequate to meet the RFD under each of the Solar PEIS alternatives. However, due to the uncertainties in estimating RFD values by state, both the Solar PEIS and GRSG EIS recommended that the total RFDs for BLM-administered lands across the planning area be considered the most likely development level across all alternatives and that the state-level breakdown of the RFDs be recognized as forecasted estimates that may shift among states. None of the management actions in the GRSG EIS alternatives would preclude achieving the RFD projections of acres needed to achieve the nation's renewable energy goals. The nature and type of effects of the GRSG RFDs are discussed in Section 4.8 of the GRSG EIS.

## 12.12 REFERENCES

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# Appendix 13

## Socioeconomic Baseline Report

# Bureau of Land Management
# Greater Sage-Grouse Resource Management Plan Amendments/Environmental Impact Statement

## *SOCIOECONOMIC BASELINE REPORT*

## March 2024

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# APPENDIX


A Supplementary Tables and Figures

## ACRONYMS AND ABBREVIATIONS

| | Full Phrase |
|---|---|
| AML | appropriate management level |
| APD | application for permit to drill |
| AUMs | animal unit months |
| bbl | barrels |
| BLM | United States Department of the Interior, Bureau of Land Management |
| CEQ | Council on Environmental Quality |
| EIS | environmental impact statement |
| EO | executive order |
| FO | field office |
| GRSG | greater sage-grouse |
| HMA | habitat management area |
| IRA | Inflation Reduction Act of 2022 |
| kWh | kilowatt-hours |
| mcf | thousand cubic feet |
| MW | megawatt |
| ONRR | Office of Natural Resources Revenue |
| PHMA | priority habitat management area |
| PILTs | payments in lieu of taxes |
| RMP | resource management plan |
| ROW | right-of-way |
| US | United States |
| WHB HMA | wild horse and burro herd management area |

# Chapter 1. Introduction

The United States (US) Department of the Interior, Bureau of Land Management (BLM) revised land use plans in 2014 and 2015 in the states of California, Colorado, Idaho, Montana, Nevada, North Dakota, Oregon, South Dakota, Utah, and Wyoming (2015 Sage-Grouse Plan Amendments) to provide for greater sage-grouse (GRSG) conservation on public lands. These amendments were accompanied by environmental impact statements (EISs) that included analyses of the impacts on social and economic conditions as a result of proposed management.

Subsequently, the BLM amended several of those revised plans in 2019 in California, Colorado, Idaho, Nevada, Oregon, Utah, and Wyoming (2019 Sage-Grouse Plan Amendments). On October 16, 2019, the US District Court for the District of Idaho preliminarily enjoined the BLM from implementing the 2019 Sage-Grouse Plan Amendments (Case No. 1:16-CV-83-BLW).

Since the completion of these 2019 Sage-Grouse Plan Amendments, the BLM has found that the 2019 Sage-Grouse Plan Amendments (and for Montana, North Dakota, and South Dakota, the 2015 Sage-Grouse Plan Amendments) are potentially inconsistent with new science and rapid changes affecting the BLM's management of the public lands, including the effects of climate change (such as drought, loss of habitat, more frequent wildland fires, and less riparian areas).

This socioeconomic baseline report serves as an update to the social and economic baseline conditions discussed in the 2015 Sage-Grouse Plan Amendment EISs. The report provides a discussion on updates and changes to key social and economic factors for the relevant states and counties, including population, employment, and income data and trends. In addition, updated information is provided for BLM resources and resource uses. An overview of nonmarket values associated with BLM resources and resources uses is also included, pulling from the 2015 discussion with updates for more recent literature. In addition, screening of environmental justice populations at the county level throughout the planning area has been updated based on 2022 BLM guidance (BLM 2022a). The economic data presented in this discussion include annual averages for the most recent reporting periods. These include the widespread economic effects of the recession brought about by the 2020 global COVID-19 pandemic, which might have impacted local and regional economies through short-term reductions in employment and industry output. The effects may be ongoing and may not be evenly distributed across industries.

The planning area includes portions of California, Colorado, Idaho, Montana, Nevada, North Dakota, Oregon, South Dakota, Utah, and Wyoming, regardless of jurisdiction. Due to the nature of social, economic, and environmental justice conditions, the social and economic analysis utilizes a different study area than is used for other resources. Socioeconomic analysis areas and environmental justice analysis areas have been determined for each state to include counties that contain GRSG habitat on BLM-administered lands or minerals and within which social and economic conditions might reasonably be expected to change based on alternative management actions.

In the previous analysis associated with the 2015 GRSG planning effort, some subregions included additional "secondary" analysis areas to capture counties with important economic or social linkages to counties that do not contain habitat. For the current analysis, these "secondary" counties are not included in the analysis area; this is because these counties are generally more populous, and demographic data from these counties, if included, could overemphasize certain characteristics that are not necessarily representative of the area that would be most impacted by changes in BLM management decisions related to GRSG. An overview of counties included in each state analysis area is included in **Appendix A**, **Table A-1**.

# Chapter 2. Demographic and Economic Baseline Conditions

Historical and projected population growth are important socioeconomic indicators because they aid in estimating future demand for public lands and potential shifts in demand for various land uses as well as they provide context for how land use planning changes could affect the local population, further informing associated economic analyses. Population changes since 2010 and anticipated population growth within the analysis area are described below.

This chapter also provides a summary of economic data, including trends and current conditions for per capita income and unemployment. The unemployment rate is a key indicator that measures the percentage of unemployed people to the number of people in the labor force, and it is often used as an indicator of economic health and conditions. A high unemployment rate is a concern for the general economy and likely indicates that many individuals in the labor force are unable to find employment, which could lead to in economic distress due to the lack of work and associated income (Bondarenko 2024). Changes in the unemployment rate from year to year provide a good picture of the relative health of the economy over time.

In addition, this chapter identifies and describes major economic sectors in the socioeconomic study area that can be affected by public land management actions. Those economic activities that rely on or could rely on BLM-administered lands, such as livestock grazing or energy development, are the most likely affected. Differences in major sectors since the publication of the 2015 Sage-Grouse Plan Amendment EISs are highlighted below; for all other sectors, please refer to the respective 2015 Sage-Grouse Plan Amendment EIS.

## 2.1 CALIFORNIA

The California analysis area includes two counties, Lassen County and Modoc County, which are in the northeast corner of California (see **Figure A-1** in **Appendix A**). These two counties were included in the analysis area because they include a large percentage of BLM-administered land in GRSG habitat management areas (HMAs). About 32 percent of all acres in Lassen County and 9 percent of all acres in Modoc County are in HMAs on BLM-administered surface acres. Of the BLM surface acres in Lassen County and Modoc County, over 90 percent are in HMAs for both counties.

California's population and economic growth have slowed in recent years, which is expected to continue in the near future. From 2010 to 2021, the population in California increased by about 2.8 million—a growth rate of about 7.7 percent, which was slightly less than the population growth rate for the US (8.5 percent; US Department of Commerce 2022). Over the next 20 years, the population in California is projected to remain stagnant, with a slight increase of about 1.7 percent (see **Table 2-1**; California Department of Finance 2023).

**Table 2-1. California Analysis Area Population**

| Geographic Area | 2010 | 2021 | 2040 | % Change 2010–21 | % Change 2021–2040 (estimated) |
|---|---|---|---|---|---|
| Lassen County, California | 35,081 | 32,949 | 21,772 | -6.1 | -33.9 |
| Modoc County, California | 9,605 | 8,723 | 7,463 | -9.2 | -14.4 |
| California | 36,637,290 | 39,455,353 | 40,106,449 | 7.7 | 1.7 |

Sources: California Department of Finance 2023; US Department of Commerce 2022

Employment within California from 2010 to 2021 grew by almost 4.3 million jobs, which was an increase of about 22 percent. The largest magnitude of employment increases occurred in the health care and social assistance; transportation and warehousing; and professional, scientific, and technical services industries (see **Table A-2** in **Appendix A**). The historical increase in employment is consistent with the steady reduction in the unemployment rate in California from 6.3 percent in 2015 to 4.1 percent in 2019. However, the unemployment rate across California more than doubled in 2020 due to large number of layoffs that occurred during the global COVID-19 pandemic (see **Table 2-2**; BLS 2023). This increase in the unemployment rate could contribute to the projected population stagnation in California, as workers move to other locations in search of employment. On the other hand, per capita income in 2021 was higher than the US average per capita income; also, the real total earnings in California increased from 2010 to 2021 by about 42 percent (BEA 2021a, 2021b).

**Table 2-2. California Analysis Area Unemployment Rate**

| Geographic Area | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 |
|---|---|---|---|---|---|---|---|
| Lassen County | 7.3 | 7.0 | 5.5 | 4.9 | 4.7 | 7.4 | 5.9 |
| Modoc County | 8.6 | 7.8 | 8.2 | 7.6 | 7.2 | 8.9 | 7.1 |
| California | 6.3 | 5.5 | 4.8 | 4.3 | 4.1 | 10.2 | 7.3 |

Source: BLS 2023

In contrast to the state of California, the population in the California analysis area where the HMAs largely exist decreased, with Lassen County experiencing a population loss of 6.1 percent and Modoc County a loss of 9.2 percent between 2010 and 2021 (see **Table 2-1**; US Department of Commerce 2022). Population in the California analysis area counties is anticipated to continue to decline through 2040 with a loss of 33.9 percent in Lassen County and 14.4 percent in Modoc County, compared with a 1.7 percent population gain in the state of California (see **Table 2-1**; California Department of Finance 2023).

Lassen County is the most populus county in the California analysis area, with a population of 32,949 people. Modoc County has a population of 8,723, representing the lowest populus county in the California analysis area. This suggests that Lassen County has a larger economy than Modoc County, and more residents and employment are in Lassen County. Lassen County also has more BLM-administered surface and subsurface acres in GRSG HMAs, which means the population in this county could face more impacts from BLM decisions related to GRSG.

The population reduction in the California analysis area could be due to limited or decreasing employment opportunities, which could influence residents to move to more populated areas in California or out of state. This is especially true in Lassen County. For example, in 2023, a prison closed in Lassen County, which caused many people employed at the prison to lose their jobs and search for employment elsewhere

(Castleman 2023). From 2010 to 2021, total employment in Lassen County decreased by 8 percent (a reduction in over 1,000 jobs). Total employment in Modoc County was largely stagnant, with a slight increase of about 1 percent (about 60 jobs). Government and government enterprises represented the industry with the highest employment in both Lassen and Modoc Counties, with 49.8 percent and 27.5 percent of total jobs, respectively, in 2021. However, from 2010 to 2021, employment in the government and government enterprises industry decreased by almost 800 jobs in Lassen County and 120 jobs in Modoc County. This was the largest magnitude reduction in employment across all industries (see **Table A-2** in **Appendix A;** BEA 2021a, 2021b). From 2015 to 2019, the average annual unemployment rates in Lassen County and Modoc County were greater than the average annual unemployment rate in California, which highlights the more limited employment opportunities in these counties compared with other areas of California. During the 2020 COVID-19 pandemic, the unemployment rates in Lassen County and Modoc County increased to similar, but slightly lower, rates than the state of California (see **Table 2-2**; BLS 2023).

The average labor income in Lassen and Modoc Counties could also play a role in encouraging workers to seek jobs elsewhere. In 2021, the average earnings per employee were about $71,000 in Lassen County and $57,000 in Modoc County, which were lower than per capita income across California by about $17,000 and $31,000, respectively. This is partially due to the concentration of employment in three industries in Lassen and Modoc Counties that had lower earnings per employee than the same industries in California (government and government enterprises, retail trade, and other services). From 2010 to 2021, real per capital income increased in both Lassen County and Modoc County, by over $5,000 and almost $11,000, respectively, accounting for inflation (which was a 15 percent and 24 percent increase for Lassen County and Modoc County, respectively); however, the increases in magnitude and percentage of per capita income were less than the increase in per capita income for the state of California, which increased by over $22,000 (an increase of about 41 percent over the decade; see **Table A-2** and **Table A-3** in **Appendix A**; BEA 2021a, 2021b).

In 2021, farming in California only represented 1 percent of total employment and less than 1 percent of total earnings.[1] However, in the California analysis area, farming plays a more important role in the local economies. In Modoc County, farming was the second-largest industry for employment and labor earnings (only falling below the government and government enterprises industry), with about 12.8 percent of total jobs and 19.4 percent of total earnings coming from the farming industry. In Lassen County, farming was the fourth-largest industry for employment (falling below government and government enterprises, retail trade, and other services), with 4.5 percent of total employment coming from the farming industry. The farming industry was the third-largest contributor of total labor earnings in Lassen County (only falling below government and government enterprises and retail trade industries), with about 3.9 percent of total labor earnings coming from farming (see **Table A-2** and **Table A-3** in **Appendix A**; BEA 2021a, 2021b). This suggests that the local economies in the California analysis area could be susceptible to impacts on farming, including potential changes to livestock grazing and ranching (see EIS **Section 3.1.7**, Livestock Grazing, for more details on grazing and ranching use on BLM-administered lands in the California analysis area).

Employment in the mining industry (including quarrying and oil and gas extraction) remained low from 2010 to 2021 in both Lassen and Modoc Counties, as did labor income from the mining industry, with less than 1 percent of the total jobs and labor income coming from this industry (see **Table A-2** and **Table**

[1] Farming employment includes the labor of farm proprietors, but not unpaid family labor; therefore, the statistics presented in this report do not include the total value of farming through employment.

**A-3** in **Appendix A**; BEA 2021a, 2021b). This suggests that the economies in these two counties do not depend on the mining industry, and these economies would likely not be sensitive to changes in mineral development.

The retail trade industry is another important industry within the California analysis area. In Lassen County, in 2021, the retail trade industry contributed about 9.4 percent of total employment and about 5.3 of nonfarm earnings. In Modoc County, retail trade contributed 8.4 percent of total employment as well as 5.8 percent of nonfarm earnings in 2021(see **Table A-2** and **Table A-3** in **Appendix A**; BEA 2021a, 2021b).

Statistics included in the 2015 Sage-Grouse Plan Amendment EIS, which included data from 2010, showed similar trends in employment and labor income across industries. This suggests that the economic significance of major industries in the California analysis area have remained fairly consistent over the past decade.

## 2.2 COLORADO

The Colorado analysis area includes eight counties clustered in the northwest corner of Colorado (see **Figure A-2** in **Appendix A**). The counties with the largest amount of BLM-administered surface acres in GRSG HMAs include Moffat County, Rio Blanco County, and Jackson County, with about 1.1 million acres, 206,000 acres, and 141,000 acres of BLM-administered surface lands in GRSG HMAs, respectively. Additionally, the acres in GRSG HMAs made up over 70 percent of BLM-administered surface lands in Moffat County and Jackson County.

From 2010 to 2021, the population in Colorado increased by about 765,000 people, which is an increase of about 15.1 percent (see **Table 2-3**). This increase is projected to continue over the next 20 years, with the population increase estimated to be about 21.6 percent. One reason for the increase in population is that Colorado has shown steady economic growth and has numerous job opportunities (Grand Park Colorado 2019). From 2010 to 2021, employment in Colorado grew by about 800,000 jobs, which was an increase of about 25.5 percent. The largest magnitude of employment increases occurred in the professional, scientific, and technical services; transportation and warehousing; and construction industries (see **Table A-4 (Part 1)** and **Table A-4 (Part 2)** in **Appendix A**).

**Table 2-3. Colorado Analysis Area Population**

| Geographic Area | 2010 | 2021 | 2040 | % Change 2010–2021 | % Change 2021–2040 |
|---|---|---|---|---|---|
| Eagle County | 52,057 | 55,701 | 69,698 | 7.0 | 25.1 |
| Garfield County | 56,150 | 62,150 | 86,470 | 10.7 | 39.1 |
| Grand County | 14,790 | 15,838 | 18,427 | 7.1 | 16.3 |
| Jackson County | 1,387 | 1,357 | 1,244 | -2.2 | -8.3 |
| Mesa County | 147,155 | 157,323 | 202,388 | 6.9 | 28.6 |
| Moffat County | 13,806 | 13,160 | 12,621 | -4.7 | -4.1 |
| Rio Blanco County | 6,617 | 6,461 | 5,908 | -2.4 | -8.6 |
| Routt County | 23,439 | 25,098 | 33,472 | 7.1 | 33.4 |
| Colorado | 5,050,332 | 5,814,707 | 7,073,418 | 15.1 | 21.6 |

Sources: Colorado State Demography Office 2022; US Department of Commerce 2022

The unemployment rate in Colorado was stable through 2019, with a slight decrease from 3.7 percent in 2015 to 2.6 percent in 2019. Consistent with the rest of the country, the unemployment rate across Colorado increased sharply in 2020 due to a large number of layoffs that occurred during the global COVID-

19 pandemic (see **Table 2-4**; BLS 2023). In addition to the stability and increase in the job market in Colorado, per capita income in 2021 was higher than the US average per capita income. Real total earnings in Colorado increased from 2010 to 2021 by about 38 percent, which could have factored into individuals' decisions to move to Colorado (BEA 2021a, 2021b).

**Table 2-4. Colorado Analysis Area Unemployment Rate**

| Geographic Area | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 |
|---|---|---|---|---|---|---|---|
| Eagle County | 3.0 | 2.6 | 2.2 | 2.5 | 2.1 | 9.0 | 4.4 |
| Garfield County | 4.0 | 3.3 | 2.7 | 2.9 | 2.6 | 6.5 | 4.7 |
| Grand County | 3.1 | 2.6 | 2.1 | 2.5 | 2.0 | 8.0 | 4.2 |
| Jackson County | 3.6 | 2.6 | 1.7 | 2.5 | 2.2 | 4.0 | 3.3 |
| Mesa County | 5.3 | 5.1 | 3.0 | 3.7 | 3.2 | 7.1 | 5.7 |
| Moffatt County | 4.4 | 3.8 | 3.1 | 3.4 | 3.2 | 5.8 | 4.8 |
| Rio Blanco County | 5.1 | 4.8 | 3.6 | 3.9 | 3.5 | 5.2 | 5.5 |
| Routt County | 3.1 | 2.5 | 2.2 | 2.5 | 2.1 | 7.5 | 4.2 |
| State of Colorado | **3.7** | **3.1** | **2.6** | **3.0** | **2.6** | **6.9** | **5.4** |

Source: BLS 2023

Across the Colorado analysis area, the population increased by about 22,000 people from 2010 to 2021, which is an increase of about 6.9 percent; this is a slightly smaller growth rate than for the whole state of Colorado. However, the historical population growth in the Colorado analysis area varied by county. The county with the largest increase in population in the Colorado analysis area was Mesa County, with an increase of about 10,000 people (Mesa County is also the most populous county in the Colorado analysis area, with a population of 157,323 people; see **Table 2-3**). The county with the largest magnitude decrease in population from 2010 to 2021 in the Colorado analysis area was Moffat County, with a decrease of about 600 people (see **Table 2-3**; US Department of Commerce 2022). The population growth rates in the Colorado analysis area counties are anticipated to continue through 2040, with an increase in population in the counties that saw historical growth and a decrease in population in the counties that saw historical population decline (see **Table 2-3**; Colorado State Demography Office 2022).

Similar to the state of Colorado as a whole, the change in population in the Colorado analysis area counties is likely correlated with the number of job opportunities. From 2010 to 2021, Mesa County, which had the largest increase in population, had the largest increase in employment across the analysis area, with almost 10,000 additional jobs. This increase in total employment was largely driven by an increase in employment in the health care and social assistance industry, which accounts for the largest percentage of total employees in Mesa County at 13.7 percent. Moffatt County, which had the largest percentage decrease in population, had the largest decrease in employment, with a decrease of almost 600 jobs (see **Table A-4 (Part 1)** and **Table A-4 (Part 2)** in **Appendix A**). The decrease in total employment in Moffatt County was largely due to a decrease in employment in the government and government enterprises industry and the mining industry (including quarrying and oil and gas extraction); these industries represent two important industries in the county, with about 15.1 percent and 5.7 percent of total employment, respectively.

In contrast to total employment trends, which followed the population for most of the analysis area, the average annual unemployment rates followed similar trends across counties in the analysis area (see **Table 2-4**; BLS 2023). All counties in the analysis area had lower unemployment rates in 2019 than in 2015. The unemployment rates in the Colorado analysis area increased in 2020 during the COVID-19 pandemic. In all counties in the Colorado analysis area, except for Rio Blanco County, the unemployment rates decreased from 2020 to 2021 (in Rio Blanco County, the unemployment rate did not increase as much as other counties

from 2019 to 2020; therefore, the increase in the unemployment rate from 2020 to 2021 could have been due to delayed impacts from COVID-19). This difference in trends between the total employment and average annual unemployment rate is likely due to an increase in the number of individuals returning to the work force as the number of jobs increase.

In addition to the number of job opportunities attracting people to move to the Colorado analysis area, higher per capita income could also encourage population growth in the Colorado analysis area counties, and lower per capita income could lead to population decline. In 2021, Moffat County, which saw the highest decrease in population and employment from 2010 to 2021, had the lowest reported per capita income across all industries at about $49,000. Routt County and Eagle County had the highest per capita income across all counties in the analysis area, with per capita income amounts of about $98,000 and $97,000, respectively. Both counties saw growth in population, employment, and real per capita income from 2010 to 2021.

The per capita income for Routt County and Eagle County was higher than the per capita income for the state of Colorado, which had a per capita income of about $71,000 in 2021. In Routt County, the key industries with the highest average earnings per employee (which is calculated by dividing total earnings by the total number of employees; see **Table A-4 (Part 1)**, **Table A-4 (Part 2)**, **Table A-5 (Part 1)**, and **Table A-5 (Part 2)** in **Appendix A**; BEA 2021a, 2021b) were utilities, mining, and wholesale trade. In Eagle County, the industries with the highest average earnings per employee were utilities, wholesale trade, and health care and social assistance.

In 2021, the farming industry in Colorado only represented about 1 percent of total employment and less than 1 percent of total earnings.[2] However, in the Colorado analysis area, farming plays a more important role, especially in Jackson, Rio Blanco, and Moffatt Counties. In Jackson County, farming was the second-largest industry for employment (only falling below the government and government enterprises industry) and the largest industry for labor earnings, with about 15.1 percent of total jobs and 16.4 percent of total earnings coming from the farming industry. In Rio Blanco County, farming was the third-largest industry for employment, representing about 9.8 percent of total employment (behind government and government enterprises and mining); however, farming only accounted for about 2 percent of total earnings in the county. In Moffatt County, farming was the fourth-largest industry for employment, representing about 8.4 percent of total jobs (behind government and government enterprises, retail trade, and health care and social assistance); however, similar to Rio Blanco County, farming only accounted for about 2.1 percent of total earnings (see **Table A-4 (Part 1)**, **Table A-4 (Part 2)**, **Table A-5 (Part 1)**, and **Table A-5 (Part 2)** in **Appendix A**; BEA 2021a, 2021b).

These three counties have a high percentage of BLM-administered lands in GRSG HMAs. Therefore, these counties could be susceptible to impacts on farming, including potential changes to livestock grazing and ranching from BLM decisions on GRSG HMAs (see **Section 3.1.7**, Livestock Grazing, for more details on grazing and ranching use on BLM-administered lands in the Colorado analysis area). Additionally, from 2010 to 2021, there were declines in total population for all three counties as well as declines in total employment for Moffat County and Rio Blanco County. This suggests that these counties are more sensitive to changes in economic conditions than the rest of the Colorado analysis area.

[2] Farming employment includes the labor of farm proprietors, but not unpaid family labor; therefore, the statistics presented in this report do not include the total value of farming through employment.

In 2021, the mining industry (including quarrying and oil and gas extraction) accounted for less than 5 percent of total employment and less than 5 percent of labor earnings in each county in the Colorado analysis area, except for Rio Blanco and Moffatt Counties. In Rio Blanco County, mining was the second-largest industry for employment and labor earnings, representing about 12.3 percent of total jobs and 28.2 percent of total earnings (behind government and government enterprises). In Moffat County, mining was the eighth-largest industry for employment and represented about 5.7 percent of total jobs in the county. However, mining accounted for 13.4 percent total labor earnings, which was the second-largest industry in Moffat County (see **Table A-4 (Part 1)**, **Table A-4 (Part 2)**, **Table A-5 (Part 1)**, and **Table A-5 (Part 2)** in **Appendix A**; BEA 2021a, 2021b). As mentioned above, Moffat and Rio Blanco Counties had a decline in population and employment. This suggests that the economies rely on the mining industry, and they are likely sensitive to changes in mineral development that could impact economic conditions.

Other top industries within the Colorado analysis area include the government and government enterprises industry, recreation and tourism-related industries (such as the accommodation and food industry and retail trade industry), construction industry, healthcare and social assistance industry, and real estate and rental and leasing industry. The percentages of total employment from these industries across the Colorado analysis area have not changed substantially from the data included in the 2015 Sage-Grouse Plan Amendment EIS, which included data from 2010. This suggests that the economic significance of major industries in the Colorado analysis area have remained consistent over the past decade.

## 2.3 IDAHO

The Idaho analysis area includes 27 counties spread across most of southern and eastern Idaho (see **Figure A-3** in **Appendix A**). Owyhee County and Custer County have the largest amount of BLM-administered surface acres in GRSG HMAs, with about 3.1 million acres and 769,000 acres of BLM-administered surface lands in GRSG HMAs, respectively. Owyhee County is on Idaho's southwest border, and Custer County is in the center of Idaho.

From 2010 to 2021, the population in Idaho increased by 18.7 percent, or 284,820 people (**Table 2-5**). This population increase is largely due to Idaho's strong economy, low unemployment rate, and job growth, in addition to the lower cost of living and social considerations of living in Idaho (Callison 2023). Idaho is forecasted to grow from 2021 to 2032 by about 23.2 percent (Idaho Department of Labor 2020). From 2010 to 2021, employment in Idaho grew by about 256,000 jobs, which was an increase of about 30 percent. The largest magnitude of employment increases occurred in the construction, health care and social assistance, accommodation and food services, and construction industries (see **Table A-6** in **Appendix A**).

**Table 2-5. Idaho Analysis Area Population**

| Geographic Area | 2010 | 2021 | 2032[1] | % Change 2010–2021 | % Change 2021–2032 |
|---|---|---|---|---|---|
| Adams County | 3,924 | 4,321 | 5,480 | 9.6 | 26.8 |
| Bear Lake County | 6,026 | 6,327 | 7,432 | 5.0 | 17.5 |
| Bingham County | 44,496 | 47,540 | 53,968 | 6.8 | 13.5 |
| Blaine County | 21,329 | 23,868 | 27,077 | 11.9 | 13.4 |
| Bonneville County | 100,213 | 121,771 | 150,622 | 8.5 | 23.7 |
| Butte County | 2,842 | 2,573 | 2,543 | -9.5 | -1.2 |
| Camas County | 1,216 | 1,044 | 1,179 | -14.1 | 12.9 |
| Caribou County | 6,900 | 7,003 | 7,577 | 1.5 | 8.2 |
| Cassia County | 22,109 | 24,469 | 27,732 | 10.7 | 13.3 |
| Clark County | 857 | 839 | 729 | -2.1 | -13.1 |

| Geographic Area | 2010 | 2021 | 2032[1] | % Change 2010–2021 | % Change 2021–2032 |
|---|---|---|---|---|---|
| Custer County | 4,277 | 4,273 | 4,475 | -0.1 | 4.7 |
| Elmore County | 26,669 | 28,396 | 31,170 | 6.5 | 9.8 |
| Fremont County | 13,062 | 13,370 | 14,631 | 2.4 | 9.4 |
| Gem County | 16,778 | 18,692 | 23,538 | 11.4 | 25.9 |
| Gooding County | 15,140 | 15,422 | 15,981 | 1.9 | 3.6 |
| Jefferson County | 24,523 | 30,427 | 39,671 | 24.1 | 30.4 |
| Jerome County | 21,282 | 24,081 | 27,639 | 13.2 | 14.8 |
| Lemhi County | 7,861 | 7,948 | 8,442 | 1.1 | 6.2 |
| Lincoln County | 5,021 | 5,184 | 5,360 | 3.2 | 3.4 |
| Madison County | 36,413 | 50,979 | 75,961 | 40.0 | 49.0 |
| Minidoka County | 19,524 | 21,393 | 24,229 | 9.6 | 13.3 |
| Oneida County | 4,212 | 4,514 | 5,140 | 7.2 | 13.9 |
| Owyhee County | 11,389 | 11,815 | 13,600 | 3.7 | 15.1 |
| Payette County | 22,451 | 24,928 | 30,493 | 11.0 | 22.3 |
| Power County | 7,633 | 7,854 | 8,169 | 2.9 | 4.0 |
| Twin Falls County | 74,929 | 89,128 | 107,446 | 18.9 | 20.6 |
| Washington County | 10,105 | 10,425 | 11,904 | 3.2 | 14.2 |
| **State of Idaho** | 1,526,797 | 1,811,617 | 2,232,538 | 18.7 | 23.2 |

Sources: Idaho Department of Labor 2023; US Department of Commerce 2022
Forecasted population data were only forecasted through 2032 for Idaho.
The total for all counties in southwestern Idaho also includes data for Ada, Boise, Canyon, and Valley Counties, which are not included in the Idaho analysis area.
All counties in south-central Idaho are in the Idaho analysis area.
The total for all counties in southeastern Idaho also includes data for Bannock and Franklin Counties, which are not included in the Idaho analysis area.
The total for all counties in eastern Idaho also includes data for Teton County, which is not included in the Idaho analysis area.

The unemployment rate in Idaho was stable through 2019, with a slight decrease from 3.9 percent in 2015 to 3.0 percent in 2019. Consistent with the rest of the country, the unemployment rate across Idaho increased sharply in 2020 due to a large number of layoffs that occurred during the global COVID-19 pandemic (see **Table 2-6**; BLS 2023). Real total earnings in Idaho increased from 2010 to 2021 by about 48 percent; however, per capita income in 2021 was slightly lower than the US average per capita income, which suggests that Idaho's population increase was not largely motivated by higher incomes (BEA 2021a, 2021b).

**Table 2-6. Idaho Analysis Area Unemployment Rate**

| Geographic Area | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 |
|---|---|---|---|---|---|---|---|
| Adams County | 7.1 | 6.7 | 5.7 | 5.5 | 6.9 | 9.6 | 6.6 |
| Bear Lake County | 4.2 | 4.4 | 3.2 | 2.9 | 3.0 | 4.3 | 3.0 |
| Bingham County | 3.8 | 3.4 | 3.0 | 2.8 | 2.7 | 3.9 | 3.2 |
| Blaine County | 3.3 | 3.0 | 2.6 | 2.4 | 2.6 | 7.9 | 3.5 |
| Bonneville County | 3.2 | 3.1 | 2.7 | 2.5 | 2.4 | 4.1 | 2.9 |
| Butte County | 4.2 | 4.0 | 3.0 | 3.3 | 2.7 | 3.7 | 3.8 |
| Camas County | 3.2 | 3.5 | 2.8 | 2.3 | 2.9 | 4.9 | 3.4 |
| Caribou County | 3.8 | 3.5 | 3.1 | 2.8 | 2.7 | 3.7 | 3.1 |
| Cassia County | 3.1 | 2.9 | 2.5 | 2.3 | 2.5 | 3.7 | 2.9 |
| Clark County | 3.5 | 3.1 | 3.0 | 3.1 | 3.9 | 4.0 | 3.2 |
| Custer County | 6.2 | 4.9 | 4.3 | 4.1 | 4.2 | 5.1 | 4.7 |
| Elmore County | 4.4 | 4.0 | 3.7 | 3.3 | 3.3 | 4.9 | 3.7 |
| Fremont County | 3.4 | 3.3 | 2.7 | 2.5 | 2.4 | 3.7 | 2.9 |

| Geographic Area | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 |
|---|---|---|---|---|---|---|---|
| Gem County | 4.9 | 4.5 | 4.0 | 3.5 | 3.4 | 6.0 | 4.1 |
| Gooding County | 3.2 | 3.0 | 2.5 | 2.4 | 2.7 | 3.9 | 3.1 |
| Jefferson County | 3.2 | 3.0 | 2.6 | 2.3 | 2.4 | 3.5 | 2.7 |
| Jerome County | 3.1 | 3.1 | 2.8 | 2.6 | 2.6 | 4.1 | 3.3 |
| Lemhi County | 6.5 | 5.9 | 5.2 | 4.5 | 4.8 | 6.8 | 5.3 |
| Lincoln County | 4.2 | 4.3 | 3.2 | 3.5 | 3.6 | 6.1 | 4.4 |
| Madison County | 2.5 | 2.3 | 1.9 | 1.7 | 1.9 | 2.8 | 2.2 |
| Minidoka County | 3.4 | 3.1 | 2.7 | 2.5 | 2.6 | 3.9 | 3.1 |
| Oneida County | 3.3 | 3.5 | 2.9 | 2.2 | 2.3 | 4.3 | 2.5 |
| Owyhee County | 4.4 | 4.4 | 4.0 | 3,7 | 3.5 | 6.0 | 4.3 |
| Payette County | 4.6 | 4.5 | 4.0 | 3.6 | 3.6 | 5.4 | 4.0 |
| Power County | 4.3 | 3.9 | 3.4 | 2.9 | 3.1 | 4.1 | 3.8 |
| Twin Falls County | 3.4 | 3.3 | 3.0 | 2.7 | 2.8 | 5.3 | 3.6 |
| Washington County | 5.4 | 5.3 | 4.7 | 4.2 | 4.2 | 5.5 | 4.4 |
| **State of Idaho** | **3.9** | **3.7** | **3.2** | **2.9** | **3.0** | **5.5** | **3.6** |

Source: BLS 2023

Across the Idaho analysis area, the population increased by about 77,000 people from 2010 to 2021, which is an increase of about 15 percent; this is a smaller growth rate than for the whole state of Idaho. However, the historical population growth in the Idaho analysis area varied by county. The county with the largest increase in population in the Idaho analysis area was Bonneville County, with an increase of about 22,000 people (Bonneville County is also the most populous county in the Idaho analysis area, with a population of about 122,000 people; see **Table 2-5**). The population in Bonneville County is expected to continue to increase, with a projected population growth of about 23.7 percent from 2021 to 2032 (Idaho Department of Labor 2023; see **Table 2-5**). The county with the largest decrease in population from 2010 to 2021 in the Idaho analysis area was Butte County, with a decrease of about 300 people (see **Table 2-5**; US Department of Commerce 2022). The population in Butte County is expected decrease slightly through 2032, with a forecasted population decline of about 1.2 percent (Idaho Department of Labor 2023; see **Table 2-5**).

Similar to the state of Idaho as a whole, the change in population in the Idaho analysis area counties is likely correlated with the number of job opportunities. From 2010 to 2021, Bonneville County, which had the largest increase in population, had the largest increase in employment across the analysis area, with almost 21,000 additional jobs. This increase in total employment was largely driven by an increase in employment in the health care and social assistance industry, which accounts for the largest percentage of total employees in Bonneville County at 15.6 percent.

The only county in the Idaho analysis area that experienced a decrease in employment was Clark County, with a decrease of 26 jobs (5 percent; see **Table A-6** in **Appendix A**). Clark County also experienced a decrease in population over the same time period. This decrease in total employment was largely due to a decrease in employment in the government and government enterprises industry, which currently represents the largest percentage of total employment in the county at 25.3 percent. Clark County was also the only county in the analysis area to have an increase in the unemployment rate from 2015 to 2019 (see **Table 2-6**; BLS 2023); all other counties in the analysis area had lower unemployment rates in 2019 than in 2015. The unemployment rates in all counties in the Idaho analysis area increased in 2020 during the COVID-19 pandemic. In all counties in the analysis area, with the exception of Butte County, the unemployment rates decreased from 2020 to 2021.

In addition to the number of job opportunities attracting people to move to the Idaho analysis area, labor income plays a part in encouraging population growth or decline. In 2021, Blaine County reported the highest per capita income across the Idaho analysis area at almost $135,000 (over $82,000 more than the per capita income for the state of Idaho and almost $71,000 more than the per capita income for the US; BEA 2021a, 2021b). Blaine County also reported a high population growth rate of 11.9 percent from 2010 to 2019.

The county that had the lowest per capita income in the Idaho analysis area was Madison County, with per capita income of $26,000. Madison County had the largest percentage increase in population from 2010 to 2021. This suggests that there were other factors that drove people to move to Madison County besides higher income. For example, Madison County is home to Brigham Young University-Idaho, which attracts students and young professionals to the area.

In 2021, the farming industry played a key role in the economy across Idaho, especially in the analysis area counties. In Idaho, farming represented about 3.5 percent of total employment and 2.7 percent of total earnings.[3] In the Idaho analysis area, the farming industry made up over 9 percent of employment in 21 of the 27 counties in the Idaho analysis area. Farming was the largest industry for employment in Camas, Gooding, Lincoln, and Owyhee Counties, with about 22.7 percent, 22.6 percent, 24.1 percent, and 23.9 percent of total jobs coming from farming, respectively. Farm earnings made up less of a percentage of the total earnings in most of the counties in the analysis area, but they still made up over 8 percent in 11 counties in the analysis area.

Owyhee County is one of the counties with the most BLM-administered lands in GRSG HMAs; therefore, it could be more susceptible to impacts on farming, including potential changes to livestock grazing and ranching from BLM decisions on GRSG HMAs (see **Section 3.1.7**, Livestock Grazing, for more details on grazing and ranching use on BLM-administered lands in the Idaho analysis area).

In 2021, the mining industry (including quarrying and oil and gas extraction) accounted for less than 1 percent of total employment for each county in the Idaho analysis area, except for Caribou County. In Caribou County, mining was the third-largest industry for employment and second-largest industry for labor earnings, representing about 12.3 percent of total jobs and 20.9 percent of total earnings (see **Table A-7** in **Appendix A**; BEA 2021a, 2021b). Furthermore, mining employment in Caribou County increased slightly from 2010 to 2021 by about 300 jobs.

Recreation and tourism-related industries, such as the accommodation and food industry and retail trade industry, are other important industries within the Idaho analysis area, especially in Bear Lake, Bonneville, Cassia, Gem, Lemhi, Madison, Oneida, and Twin Falls Counties, where they made up 10 percent or more of the total employment in each county. The percentages of total employment and earnings from these key industries across the Idaho analysis area have not changed substantially from the data included in the 2015 Sage-Grouse Plan Amendment EIS, which included data from 2010. This suggests that the economic significance of major industries in the Idaho analysis area have remained consistent over the past decade.

## 2.4 MONTANA

The 26 counties included in the Montana analysis area are mostly clustered in the eastern and central portions of the state. Madison and Beaverhead Counties (which were previously included in the 2015 Sage-Grouse Plan Amendment EIS for Idaho ) are in Montana's southwest corner (see **Figure A-4** in

[3] Farming employment includes the labor of farm proprietors, but not unpaid family labor; therefore, the statistics presented in this report do not include the total value of farming through employment.

**Appendix A**). The counties with the largest amount of BLM-administered surface acres in GRSG HMAs are Valley County and Phillips County in northern Montana and Carter County in Montana's southeast corner, with about 965,000 acres, 855,000 acres, and 486,000 acres of BLM-administered surface lands in GRSG HMAs, respectively.

From 2010 to 2021, the population in Montana increased by 10.3 percent, or 101,727 people (**Table 2-7**). The state population is projected to increase by another 12.5 percent by 2040. Statewide, government and government-based enterprises, health care and social assistance, and retail trade represent the largest employment industries, with 13.5 percent, 11.2 percent, and 10.9 percent, respectively. Both the health care and social assistance and retail trade industries increased in the number of jobs from 2010 to 2021, which could have contributed to the statewide population growth. Trends indicate an economic expansion is occurring through the state due to increased levels of available employment opportunities, higher population numbers, and a growing service-based economy.

**Table 2-7. Montana Analysis Area Population**

| Geographic Area | 2010 | 2021 | 2040 | % Change 2010–2021 | % Change 2021–2040 |
|---|---|---|---|---|---|
| Beaverhead County* | 9,252 | 9,515 | 10,295 | 2.8 | 8.2 |
| Big Horn County | 12,911 | 12,967 | 11,178 | 0.4 | -13.8 |
| Blaine County | 6,512 | 6,503 | 5,806 | -0.1 | -10.7 |
| Carbon County | 10,066 | 11,103 | 13,425 | 10.3 | 20.9 |
| Carter County | 1,158 | 1,245 | 1,464 | 7.5 | 17.6 |
| Chouteau County | 5,818 | 5,617 | 5,253 | -3.5 | -6.5 |
| Custer County | 11,687 | 11,106 | 10,923 | -5.0 | -1.6 |
| Dawson County | 8,951 | 8,313 | 8,067 | -7.1 | -3.0 |
| Fallon County | 2,884 | 2,800 | 2,910 | -2.9 | 3.9 |
| Fergus County | 11,582 | 11,073 | 11,296 | -4.4 | 2.0 |
| Garfield County | 1,193 | 1,273 | 1,481 | 6.7 | 16.3 |
| Madison County* | 7,692 | 9,297 | 13,582 | 20.9 | 46.1 |
| McCone County | 1,742 | 1,636 | 1,562 | -6.1 | -4.5 |
| Musselshell County | 4,552 | 4,503 | 3,970 | -1.1 | -11.8 |
| Petroleum County | 489 | 497 | 448 | 1.6 | -9.9 |
| Phillips County | 4,252 | 3,816 | 3,833 | -10.3 | 0.4 |
| Powder River County | 1,737 | 1,716 | 2,381 | -1.2 | 38.8 |
| Prairie County | 1,185 | 1,062 | 1,145 | -10.4 | 7.8 |
| Roosevelt County | 10,444 | 10,817 | 8,790 | 3.6 | -18.7 |
| Rosebud County | 9,250 | 8,593 | 6,323 | -7.1 | -26.4 |
| Stillwater County | 9,107 | 9,966 | 12,873 | 9.4 | 29.2 |
| Sweet Grass County | 3,616 | 3,600 | 3,707 | -0.4 | 3.0 |
| Treasure County | 711 | 704 | 1,007 | -1.0 | 43.0 |
| Valley County | 7,372 | 7,372 | 8,346 | 0.0 | 13.2 |
| Wibaux County | 1,007 | 948 | 1,090 | -5.9 | 15.0 |
| Yellowstone County | 148,408 | 164,700 | 178,358 | 11.0 | 8.3 |
| **State of Montana** | 990,742 | 1,092,469 | 1,229,024 | 10.3 | 12.5 |

Sources: Montana Department of Commerce 2022; US Department of Commerce 2022

* Beaverhead and Madison Counties are managed under Idaho plans but are included in the Montana analysis area population table.

Within the Montana analysis area, the counties with the largest percentage increase in population between 2010 and 2021 were Madison, Yellowstone, and Carbon Counties, with increases of 20.9 percent, 11.0 percent, and 10.3 percent, respectively. These counties are also expected to see large percentage increases

in population going forward, with increases of 46.1 percent, 8.3 percent, and 20.9 percent by 2040 for Madison, Yellowstone, and Carbon Counties, respectively. The rapid population growth in these counties may be due in part to the development of the area's recreation and tourism industries and the presence of the Billings Metropolitan Statistical Area, which is an expanding urban area that spans Yellowstone and Carbon Counties (Madison County 2015; City of Billings 2023; **Table A-8** in **Appendix A**). Additionally, unemployment rates for Madison, Yellowstone, and Carbon Counties have been consistently below or similar to the state average, and total employment increased from 2010 to 2021 in all three counties (**Table 2-8**).

**Table 2-8. Montana Analysis Area Unemployment Rate**

| Geographic Area | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 |
|---|---|---|---|---|---|---|---|
| Beaverhead County | 3.5 | 3.4 | 3.2 | 3.1 | 2.9 | 4.0 | 2.8 |
| Big Horn County | 6.8 | 7.5 | 13.6 | 9.6 | 7.5 | 7.2 | 7.8 |
| Blaine County | 5.1 | 4.7 | 4.2 | 4.4 | 4.0 | 4.7 | 3.8 |
| Carbon County | 3.8 | 4.1 | 3.7 | 3.5 | 3.6 | 5.8 | 3.4 |
| Carter County | 3.4 | 2.9 | 2.6 | 2.5 | 2.9 | 2.8 | 2.6 |
| Chouteau County | 3.4 | 3.9 | 3.4 | 3.0 | 2.8 | 3.8 | 2.7 |
| Custer County | 3.4 | 3.7 | 3.2 | 3.1 | 2.9 | 4.7 | 3.1 |
| Dawson County | 3.2 | 4.0 | 3.1 | 2.7 | 2.5 | 5.4 | 3.1 |
| Fallon County | 2.4 | 3.8 | 2.7 | 1.8 | 1.7 | 3.9 | 2.6 |
| Fergus County | 4.2 | 4.1 | 4.1 | 3.7 | 3.2 | 4.5 | 3.3 |
| Garfield County | 2.9 | 3.0 | 2.9 | 2.7 | 2.4 | 2.7 | 2.6 |
| Madison County | 3.7 | 3.9 | 4.0 | 3.6 | 3.2 | 5.0 | 3.2 |
| McCone County | 2.3 | 2.0 | 2.1 | 1.8 | 2.0 | 2.8 | 1.8 |
| Musselshell County | 4.4 | 5.3 | 4.6 | 4.3 | 3.9 | 6.0 | 4.2 |
| Petroleum County | 5.3 | 4.7 | 4.4 | 4.2 | 3.7 | 3.3 | 2.6 |
| Phillips County | 5.2 | 5.5 | 4.6 | 4.5 | 3.8 | 4.8 | 3.8 |
| Powder River County | 2.7 | 2.4 | 2.6 | 2.9 | 2.4 | 3.1 | 2.7 |
| Prairie County | 4.2 | 3.4 | 3.7 | 3.7 | 3.8 | 6.6 | 3.6 |
| Roosevelt County | 5.4 | 5.5 | 4.7 | 4.6 | 4.4 | 5.9 | 4.2 |
| Rosebud County | 5.5 | 5.7 | 5.2 | 5.3 | 5.1 | 5.5 | 4.0 |
| Stillwater County | 3.9 | 4.1 | 3.9 | 3.4 | 3.2 | 4.9 | 2.9 |
| Sweet Grass County | 2.9 | 3.2 | 3.2 | 3.1 | 2.8 | 3.5 | 2.4 |
| Treasure County | 5.0 | 4.5 | 3.8 | 3.0 | 2.9 | 3.5 | 3.2 |
| Valley County | 3.2 | 3.5 | 3.3 | 3.1 | 3.2 | 4.2 | 3.1 |
| Wibaux County | 3.3 | 4.1 | 3.3 | 3.6 | 3.0 | 4.9 | 3.8 |
| Yellowstone County | 3.4 | 3.7 | 3.6 | 3.3 | 3.3 | 5.3 | 3.2 |
| **State of Montana** | **4.3** | **4.3** | **4.1** | **3.7** | **3.6** | **5.8** | **3.4** |

Source: BEA 2023

Fifteen counties within the Montana analysis area decreased in population, with the most substantial decreases in Prairie and Phillips Counties, which decreased 10.4 percent and 10.3 percent, respectively (**Table 2-7**). Both counties are sparsely populated and rural. Phillips County had a consistently above-average unemployment rate, which may be contributing to this population decline and future stagnation as individuals move to other areas in search of employment (**Table 2-8**). On the other hand, unemployment rates in Prairie County have been similar to the state average, which could be a contributor to the forecasted population increase in the county of 7.8 percent by 2040 (Montana Department of Commerce 2022; see **Table 2-7** and **Table 2-8**). Across the Montana analysis area, Rosebud, Roosevelt, and Big Horn Counties are projected to see the largest percent decrease in population by 2040, with a decrease of about 26.4 percent, 18.7 percent, and 13.8 percent, respectively. Similar to Phillips County, all three counties have

experienced consistently high unemployment rates since 2015, indicating that population declines may be related to stagnant economic conditions.

Since 2010, many counties in the analysis areas have seen an increase in the number of available jobs for multiple industry sectors. Across almost all counties, industries with a relatively high concentration of employment include retail trade, accommodation and food services, and wholesale trade. This is consistent with statewide trends for these industries. Average labor earnings for retail trade and accommodation and food services are relatively low compared with the state average of $53,000, while the average labor earnings for wholesale trade are higher at $80,000. Healthcare is a significant source of employment for counties like Yellowstone County, where it represents 13.7 percent of employment. Most counties also hold high concentrations of government and construction jobs, both of which pay above-average labor wages relative to the statewide all-industry labor earnings (**Table A-9** in **Appendix A**).

Real labor income has increased since 2010 in Montana and all counties in the Montana analysis area, except Fallon and Petroleum Counties. Government and government enterprises represent a key industry for labor income, with over 8 percent of labor income coming from this sector in all counties across the Montana analysis area. The mining (including quarrying and oil and gas extraction), construction, and transportation and warehousing industries represent a large portion of incomes for certain counties, such as Fallon; however, most of the other counties in the Montana analysis area have high labor income in the retail trade and health care and social assistance industries. Manufacturing, utilities, forestry, educational services, and management of companies continue to represent the lower portion of labor incomes in the Montana analysis area. Although the total share of income from these industries is, as a whole, relatively low, professions in certain sectors, such as utilities, yield above-average labor wages while employing fewer people.

The mining industry (including quarrying and oil and gas extraction) is not a significant source of employment at the state level, constituting 1.4 percent of all employment in 2021 and 1.8 percent in 2010; however, for certain counties in the Montana analysis area, mining plays a key role. Big Horn and Fallon Counties are characterized by a particularly high proportion of jobs in mining and oil and gas extraction, and both have undergone declines over the past decade. In 2010, mining represented 10.1 percent and 16.2 percent of employment in Big Horn and Fallon Counties, respectively; however, by 2021, these numbers had fallen to 8.1 percent and 11.4 percent. In 2010, Musselshell and Rosebud Counties also held a relatively large proportion of employment in this sector, with 13.2 percent and 9.1 percent, respectively; however, 2021 numbers are not available.[4]

Statewide, the average mining labor wages ($97,000) are higher than the average across all employment sectors. This trend is also reflected in Big Horn and Fallon Counties. In Big Horn County, the average mining labor wage is $96,000 as compared with a county average wage of $54,000. In Fallon County, the average mining labor wage is $105,000, which is higher than the county average of $49,000. This suggests these counties that rely on mining could be more sensitive to BLM decisions on mining in GRSG HMAs.

At 4.1 percent, farm employment is also a relatively minor source of employment in Montana. However, numerous counties in the analysis area are largely dependent on farming, with this sector comprising greater than 20 percent of county employment in nine counties in the analysis area; these are Carter,

[4] The BEA excludes employment and labor data for industries in certain locations to avoid disclosure of confidential information, as is the case for 2021 employment data in Musselshell and Rosebud Counties in Montana.

Chouteau, Garfield, McCone, Petroleum, Powder River, Prairie, Treasure, and Yellowstone Counties. Average labor wages for farming are relatively low at both the county and state level, ranging from approximately $8,000 in Prairie County to approximately $26,000 in Chouteau County. Although the farming industry does not represent high labor earnings, the high employment in the farming industry highlights the sensitivity of these counties to changes in BLM decisions that could impact farming, livestock grazing, and ranching.

## 2.5 NEVADA

The Nevada analysis area includes 10 counties, encompassing almost the entire state of Nevada. The analysis area only excludes some counties on Nevada's southern border (see **Figure A-5** in **Appendix A**). Seven of the 10 counties in the Nevada analysis area contain over 1 million acres of BLM-administered lands in GRSG HMAs: Elko, Eureka, Humboldt, Lander, Nye, Washoe, and White Pine Counties. Elko, White Pine, Humboldt, and Washoe Counties have the largest amount in BLM-administered surface lands in GRSG HMAs, with about 4.9 million acres, 2.9 million acres, 2.8 million acres, and 2.3 million acres, respectively.

From 2010 to 2021, the population in Nevada increased by 16.2 percent. From 2010 to 2021, overall employment increased in Nevada while real labor wages largely remained stagnant, with a slight increase from $61,000 to $62,000. As of 2021, the largest employment industries are the accommodation and food services; forestry, fishing, and related activities; retail trade; and government and government-related enterprises, with 14.8 percent, 13.4 percent, 9.9 percent, and 9.4 percent, respectively. At the state level, sectors that pay notably higher than the state average labor wage of $62,000 across all sectors include mining (including quarrying and oil and gas extraction), utilities, management, and information. These industries might not contribute to a large number of employees; however, due to the higher incomes, they play an important role in the local economies.

With a population of 479,758 people, Washoe County is the most populous county in the Nevada analysis area. It had the highest growth rate between 2010 and 2021, with a 16.2 percent increase, which was the same as the entire state of Nevada. The growth of Washoe County is likely due in part to an influx of people to the county's urban areas in the last 10 years, with this trend continuing through 2040. Nye County closely followed, with a population increase of around 14.2 percent. The continuous rapid growth of Nye County may also be related to urban expansion of Nevada's largest cities and spillover from Clark County, the fastest-growing county in Nevada (Nevada Department of Taxation 2021).

Counties with declining or stagnant populations tend to be more rural and sparsely populated, both historically and at present. Lincoln County had the greatest population decrease between 2010 and 2021, at about 9.1 percent, followed by a 7.0 percent decrease in Eureka County (see **Table 2-9**). While the population of Lincoln County is projected to decrease further, a 19.4 percent increase is anticipated in Eureka County. This contrast in population growth trends may be related to the volatility of the county's mining and energy industries, and the consequent fluctuations in worker migration patterns (Eureka County 2018). The estimated population change by county between 2021 and 2040 indicates a range of population changes throughout the analysis area, with the largest projected increase in Nye and Washoe Counties and a continued decrease in Lincoln County (Nevada Department of Taxation 2021).

**Table 2-9. Nevada Analysis Area Population**

| Geographic Area | 2010 | 2021 | 2040 | % Change 2010–2021 | % Change 2021–2040 (estimated) |
|---|---|---|---|---|---|
| Churchill County | 24,946 | 25,077 | 28,597 | 0.5 | 14.0 |
| Elko County | 47,707 | 53,420 | 58,521 | 12.0 | 9.5 |
| Eureka County | 1,603 | 1,724 | 2,058 | -7.0 | 19.4 |
| Humboldt County | 15,986 | 17,218 | 17,908 | 7.7 | 4.0 |
| Lander County | 5,545 | 5,729 | 5,946 | 3.3 | 3.8 |
| Lincoln County | 5,060 | 4,600 | 4,481 | -9.1 | -2.6 |
| Nye County | 43,878 | 50,096 | 67.656 | 14.2 | 35.1 |
| Pershing County | 6,703 | 6,668 | 6,753 | -0.5 | 1.3 |
| Washoe County | 412,844 | 479,758 | 590,280 | 16.2 | 23.0 |
| White Pine County | 9,765 | 9,192 | 10,517 | -5.9 | 14.4 |
| State of Nevada | 2,633,331 | 3,059,238 | 3,785,099 | 16.2 | 23.7 |

Sources: Nevada Department of Taxation 2021; US Department of Commerce 2022

The mining industry (including quarrying and oil and gas extraction) represents a larger percentage of employment in Humboldt, Pershing, and White Pine Counties (greater than 20 percent; **Table A-10** in **Appendix A**). The average labor income for this industry (over $110,000 in each of the three counties) is almost double the average state income across all employment sectors; it is also comparable to the state average for mining labor wages. From 2010 to 2021, total employment declined in Eureka, Humboldt, and White Pine Counties, suggesting a contraction of the workforce, which could impact available jobs in the mining industry. These trends parallel the stagnant or declining population levels in Eureka and White Pine Counties (**Table 2-9**). This suggests these counties that rely on mining could be more sensitive to BLM decisions on mining in GRSG HMAs, especially as external pressures lead to a decline in available mining jobs.

Farming employment decreased statewide and across all analysis area counties between 2010 and 2021. Lincoln and Pershing Counties hold the highest rate of farm employment, at 9.5 percent and 8.1 percent, respectively. Both counties have experienced declines in farm employment since 2010, from 10.1 percent and 10.6 percent, respectively. The average labor wage for farm employment was $65,000 in Lincoln County and $58,000 in Pershing County. These wages are similar to the state labor wage across all employment sectors, and higher than the statewide average for farming labor wages of $36,000 (see **Table A-11** in **Appendix A**). Similar to the counties that depend on the mining industry, these counties that rely on farming for economic conditions could be more sensitive to BLM decisions on livestock grazing in GRSG HMAs.

In terms of labor income, the trends and key sectors are similar to those for employment. Statewide, labor income is concentrated in mining, as well as in utilities, information, and management. The data show that since 2010, industry earnings have increased for most employment sectors in Nevada. However, mining, farming, forestry, and service-based industries have had a decline in their overall percentage of earnings. Government-based wages continue to be responsible for a large proportion of income for many counties, particularly Churchill County (37.7 percent), Pershing County (32.7 percent), and White Pine County (30.2 percent).

Income in the mining industry (including quarrying and oil and gas extraction) accounts for the largest percentage of income for Humboldt County (37.8 percent), Pershing County (55 percent), and White Pine County (41.7 percent), further indicating their reliance on mineral extraction, as discussed above. Moreover, across these mining-dependent counties, the average labor wages for the mining industry (including quarrying

and oil and gas extraction) in these counties—at over $110,000—are disproportionately high relative to the county averages for all employment sectors (approximately $70,000; **Table A-11** in **Appendix A**). However, the reliance on the mining industry for labor income in these three counties means the economies in these areas are likely susceptible to boom-and-bust cycles and would be more sensitive to changes in BLM management decisions that could affect mineral extraction (Vega 2022).

Unemployment rates across the Nevada analysis area had similar trends from 2015 to 2021. The counties had a decrease in unemployment rates in 2019 from 2015 levels. In 2020, the unemployment rates increased in all counties in the Nevada analysis due to restrictions during the 2020 COVID-19 pandemic. In 2021, unemployment rates decreased as businesses and economies opened back up (**Table 2-10**). Most counties in the Nevada analysis area had lower unemployment rates than the state of Nevada; however, from 2015 to 2019, Nye County experienced higher unemployment rates than the state of Nevada. Unemployment rates were also higher than the state rate in Churchill County in 2015, Lander County in 2016, and Pershing County in 2015 and 2016.

**Table 2-10. Nevada Analysis Area Unemployment Rate**

| Geographic Area | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 |
|---|---|---|---|---|---|---|---|
| Churchill County | 7.1 | 5.6 | 4.5 | 3.8 | 3.6 | 5.7 | 3.5 |
| Elko County | 5.2 | 4.5 | 3.7 | 3.1 | 3.0 | 5.9 | 3.3 |
| Eureka County | 5.9 | 4.6 | 3.0 | 2.5 | 2.5 | 3.5 | 2.6 |
| Humboldt County | 6.1 | 5.6 | 4.2 | 3.3 | 3.0 | 5.0 | 3.4 |
| Lander County | 6.8 | 6.3 | 4.5 | 3.5 | 3.2 | 4.9 | 3.6 |
| Lincoln County | 6.1 | 5.4 | 4.8 | 4.3 | 4.0 | 5.1 | 3.4 |
| Nye County | 8.9 | 7.4 | 6.4 | 5.6 | 5.3 | 10.2 | 6.1 |
| Pershing County | 7.0 | 6.0 | 4.6 | 4.0 | 4.0 | 4.8 | 3.6 |
| Washoe County | 6.3 | 5.1 | 4.1 | 3.5 | 3.3 | 8.2 | 4.3 |
| White Pine County | 5.5 | 4.7 | 4.1 | 3.5 | 3.0 | 4.2 | 3.0 |
| State of Nevada | 6.8 | 5.8 | 5.0 | 4.4 | 4.0 | 13.5 | 7.2 |

Source: BLS 2023

## 2.6 NORTH DAKOTA

The North Dakota analysis area lies in the state's southwestern corner and consists of Bowman and Slope Counties (see **Figure A-6** in **Appendix A**). Of the BLM-administered surface acreage in Bowman County, 100 percent falls within GRSG HMAs. In Slope County, 82,000 acres of non-surface mineral estate, or approximately 11 percent of total acres in the county, falls within HMAs.

From 2010 to 2021, the population of North Dakota increased by 17.2 percent, or 113,486 people (**Table 2-11**). The statewide population growth between 2010 and 2021 was likely fueled by the Bakken oil boom, which began in 2008 and drew workers to counties outside the analysis area, such as McKenzie and Williams Counties. Oil production peaked in 2012 and experienced intermittent declines due to a variety of factors. including international competition, reserve exhaustion, and the COVID-19 pandemic (Smith 2021; Williams-Derry and Kunkel 2021). Small-scale shifts in production patterns throughout the oil boom may have contributed to the diverging population growth trends at the county level between 2010 and 2021. Overall, the statewide population growth between 2010 and 2021 aligns with an increase in employment in the mining industry (including quarrying and oil and gas extraction), which grew from 2.8 percent of overall state employment in 2010 to 3.2 percent of state employment in 2021. Although mining constitutes a relatively small portion of employment in North Dakota, it is higher than the national average of less than 1 percent.

**Table 2-11. North Dakota Analysis Area Population**

| Geographic Area | 2010 | 2021 | 2040 | % Change 2010–2021 | % Change 2021–2040 |
|---|---|---|---|---|---|
| Bowman County | 3,102 | 3,024 | N/A | -2.5 | N/A |
| Slope County | 727 | 775 | N/A | 6.6 | N/A |
| State of North Dakota | 659,858 | 773,344 | N/A | 17.2 | N/A |

Source: US Department of Commerce 2022
N/A = Not available

The state unemployment rate steadily declined from 2016 through 2019. In 2020, unemployment in North Dakota more than doubled, when the COVID-19 pandemic triggered mass layoffs and disrupted the economy. The economy began to recover in 2021, as signified by a decline in the unemployment rate across the state (**Table 2-12**). In North Dakota, the largest nonfarm employment sectors include government, healthcare, and retail, representing 15.8 percent, 12.2 percent, and 10 percent, respectively. Government and government-based enterprises also represent the largest portion of personal wage income in North Dakota.

**Table 2-12. North Dakota Analysis Area Unemployment**

| Geographic Area | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 |
|---|---|---|---|---|---|---|---|
| Bowman County | 1.8 | 2.2 | 1.7 | 1.7 | 1,5 | 3.4 | 2,5 |
| Slope County | 2.6 | 2.5 | 1.9 | 2.0 | 2.0 | 3.0 | 2.8 |
| State of North Dakota | 2.8 | 3.1 | 2.6 | 2.4 | 2.1 | 5.1 | 3.7 |

Source BLS 2023

Bowman County has the largest population within the North Dakota analysis area, while Slope County has the lowest population. With a 2021 population of 775 people, Slope County observed a 6.6 percent population increase between 2010 and 2021, whereas Bowman County, which had a 2021 population of 3,024 people, saw a population decrease of 2.5 percent during the same period. Both counties' population changes between 2010 and 2021 did not follow overall North Dakota state trends (US Department of Commerce 2022; **Table 2-11**). The difference in populations trends could be related to the role the mining industry played in each county compared to North Dakota, as the impact of the Bakken oil boom and the general importance of mining in local economies becomes more apparent at the county level.

In 2010, mining was a key industry for Slope County, with approximately 13.8 percent of total employment and 38.9 percent of labor income coming from the mining industry, compared to 2.8 percent of employment and 5.1 percent of nonfarming earnings in North Dakota (2021 employment and income data were not disclosed; see **Table A-12** in **Appendix A**). In Bowman County, jobs in mining and extraction sharply decreased by more than half (from 5.3 to 2.2 percent of employment), as did income for this industry. This decline in the mining industry in Bowman County may reflect a shifting nexus of oil and mining jobs to other counties, as well as short-term trends in oil industry patterns that depend on fluctuations in production and impacts from broader economic or geopolitical trends. Additionally, except for government, education, healthcare, and miscellaneous service sectors, all employment numbers in Bowman County decreased; this trend aligns with its declining population and suggests the dependence of the county's non-mining industries on its mining industries (**Table A-12** in **Appendix A**).

**Table 2-12** shows that the North Dakota analysis area experienced rates of unemployment that are lower than the statewide rate for each year from 2015 to 2021. At the county level, Bowman County experienced a slight uptick in the unemployment rate in 2019, which coincides with the brief decline in the Bakken oil

boom that was caused by a drop in oil prices; then, the unemployment rate decreased until reaching its lowest unemployment rate in 2019 (1.5 percent; Scheyder 2016). From 2015 to 2021, Slope County experienced its lowest unemployment rate in 2017, after which the unemployment rate stagnated through 2019. The decline in unemployment could have attracted more people to the county, which would contribute to the population growth seen from 2010 to 2021. Both counties in the North Dakota analysis area experienced their highest unemployment rate in 2020 over the 7-year period due to restrictions and layoffs during the 2020 COVID-19; this was consistent with the state's unemployment trends but still lower than the overall state unemployment level.

Farming represents an important economic component of both analysis area counties. At 15.7 percent of all employment, farm employment in Bowman County measures over three times greater than the state statistic of 5 percent. Farm earnings comprise approximately 14 percent of Bowman County earnings, and the average farming labor income of $86,000 is higher than the county average of $58,000. Farming is also a major component of the economy in Slope County, representing 47.2 percent of all jobs and 29.3 percent of county income. Additionally, the average labor income for farming employment in Slope County is relatively high, at approximately $73,000, compared to the county average of $67,000. In both counties, farm employment declined at lower rates than overall private nonfarm employment (**Table A-12** in **Appendix A**). Farm employment remained roughly constant from 2010 to 2021 in both counties in the analysis area, while private, nonfarm employment declined by roughly 10 percent. This reflects the counties' continued reliance on agriculture and suggests that Bowman and Slope Counties could be sensitive to BLM decisions on livestock grazing in GRSG HMAs.

The largest nonfarm employment sectors in Slope County include government, real estate, and transportation, which represent 8.7 percent, 3.2 percent, and 3.0 percent of all employment (**Table A-12** in **Appendix A**). In Bowman County, government and government enterprises also constituted a relatively large proportion of employment and labor income, followed by several service sectors, including retail trade, wholesale trade, and healthcare (**Table A-13** in **Appendix A**). In both counties, labor income from retail trade is slightly low relative to its share of employment, indicating slightly lower labor wages. The average labor income in Slope County ($67,000) is slightly higher than the state average of $64,000, while in Bowman County it is lower, at $58,000. The differences in labor income could have been a factor contributing to the historical population growth in Slope County and population decline in Bowman County (**Table A-13** in **Appendix A**).

## 2.7 OREGON

The Oregon analysis area includes eight counties clustered in the southeast to central region of Oregon (see **Figure A-7** in **Appendix A**). The counties with the largest amount of BLM-administered surface acres in GRSG HMAs are Malheur, Harney, and Lake Counties, with about 4.3 million acres, 3.7 million acres, and 2.1 million acres of BLM-administered surface lands in GRSG HMAs, respectively. Additionally, the acres in GRSG HMAs make up over 80 percent of BLM-administered surface lands in all three counties. In Malheur County, GRSG HMAs acres represent about 76 percent of the total acres in the county (federal and nonfederal).

Oregon's population grew by about 445,000 people between 2010 and 2021, which is an increase of about 11.8 percent (see **Table 2-13**). This increase is projected to continue over the next 20 years, with the population increase estimated to be about 22.7 percent. Oregon's population increase was largely due to migration by residents from other states who were attracted by Oregon's economic expansion (Cunningham

**Table 2-13. Oregon Analysis Area Population**

| Geographic Area | 2010 | 2021 | 2040 | % Change 2010–2021 | % Change 2021–2040 |
|---|---|---|---|---|---|
| Baker County | 16,150 | 16,539 | 15,156 | 2.4 | -8.4 |
| Crook County | 21,515 | 24,300 | 31,410 | 12.9 | 29.3 |
| Grant County | 7,349 | 7,225 | 6,566 | -1.7 | -9.1 |
| Harney County | 7,364 | 7,454 | 7,537 | 1.2 | 1.1 |
| Lake County | 7,882 | 8,119 | 8,177 | 3.0 | 0.7 |
| Malheur County | 31,326 | 31,313 | 30,514 | 0.0 | -2.6 |
| Union County | 25,373 | 26,255 | 27,482 | 3.5 | 4.7 |
| Deschutes County | 154,568 | 194,964 | 203,390 | 26.1 | 4.3 |
| State of Oregon | 3,761,925 | 4,207,177 | 5,164,041 | 11.8 | 22.7 |

Sources: Portland State University Population Research Center 2022; University of Virginia Weldon Cooper Center, Demographics Research Group 2018; US Department of Commerce 2022

2021). From 2010 to 2021, employment in Oregon grew by about 385,000 jobs; this was an increase of about 17.7 percent, larger than population growth. The largest percentage in employment increases occurred in the transportation and warehousing, health care and social assistance, and construction industries (see **Table A-14** in **Appendix A**).

The unemployment rate in Oregon steadily declined from 5.5 percent in 2015 to 3.7 percent in 2019. Consistent with the rest of the country, the unemployment rate across Oregon increased sharply in 2020 due to a large number of layoffs that occurred during the global COVID-19 pandemic; however, it decreased to below the 2015 unemployment rate in 2021 (see **Table 2-14**; BLS 2023). Real total earnings in the state increased from 2010 to 2021 by about 43 percent; however, per capita income in 2021 was slightly lower than the US average per capita income, which suggests that Oregon's population increase was not largely motivated by higher incomes (BEA 2021a, 2021b).

**Table 2-14. Oregon Analysis Area Unemployment Rate**

| Geographic Area | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 |
|---|---|---|---|---|---|---|---|
| Baker County | 6.6 | 6.2 | 5.4 | 5.2 | 4.5 | 7.2 | 5.1 |
| Crook County | 8.2 | 6.8 | 6.2 | 5.8 | 5.1 | 8.8 | 6.7 |
| Grant County | 8.5 | 7.5 | 6.8 | 6.8 | 6.8 | 8.4 | 6.7 |
| Harney County | 7.0 | 6.1 | 6.2 | 5.8 | 5.2 | 5.9 | 5.1 |
| Lake County | 7.5 | 6.2 | 5.6 | 5.4 | 5.3 | 5.6 | 5.5 |
| Malheur County | 6.2 | 5.4 | 4.6 | 4.4 | 4.0 | 5.2 | 4.4 |
| Union County | 6.0 | 5.8 | 5.2 | 5.2 | 4.8 | 7.8 | 5.6 |
| Deschutes County | 5.7 | 4.8 | 4.2 | 4.1 | 3.9 | 8.0 | 5.3 |
| State of Oregon | 5.5 | 4.7 | 4.1 | 4.01 | 3.7 | 7.6 | 5.2 |

Source: BLS 2023

Across the Oregon analysis area, the population increased by about 45,000 people from 2010 to 2021, which is an increase of about 16.4 percent; this is a slightly larger growth rate than for the whole state of Oregon. Over the 11 years, the population in all Oregon analysis area counties increased or remained stagnant, except for Grant County. Grant County, which is the smallest county in the analysis area with a population of 7,225, had a very small decrease of over 100 people (a decrease of about 1.7 percent). The county with the largest percentage increase in population in the Oregon analysis area was Deschutes County, which had an increase of over 40,000 people (Deschutes County is also the most populous county in the Oregon analysis area, with a population of almost 195,000 people in 2021; see **Table 2-13**; US Department of Commerce 2022). Some counties in the Oregon analysis area are expected to see growth rates going

forward through 2040; however, the population growth is projected to slow in Deschutes County, with a forecasted change of 4.3 percent from 2021 to 2040. The population is expected to decline in Grant, Baker, and Malheur Counties by 9.1 percent, 8.4 percent, and 2.6 percent, respectively (see **Table 2-13**; Portland State University Population Research Center 2022).

The increase in population in the Oregon analysis area is likely correlated with employment, which increased by a similar amount to the populations from 2010 to 2021 (about 44,000 jobs), which was an increase of about 29 percent. All counties in the Oregon analysis area saw an increase in employment over the 11-year period. Deschutes County, which had the largest increase in magnitude of population, had the largest increase in employment across the analysis area, with over 40,000 additional jobs (a similar increase as the population). This increase in total employment was largely driven by an increase in employment in the health care and social assistance industry, which accounts for the largest percentage of total employees in Deschutes County at 12.5 percent. Grant County, which had the only population decline from 2010 to 2021, had the smallest increase in employment, with an increase of about 85 jobs (see **Table A-14** in **Appendix A**).

Unemployment rates across the Oregon analysis area generally decreased or were stagnant from 2015 to 2019. The unemployment rate in Deschutes County was similar to the unemployment rate across the state of Oregon; it steadily decreased from 5.7 percent in 2015 to 3.9 percent in 2019. The unemployment rate in Grant County was higher than the state of Oregon's, but it also decreased from 8.5 percent in 2015 to 6.8 percent in 2017 and remained stagnant through 2019. All the counties experienced an increase in the unemployment rate in 2020 during the COVID-19 pandemic (**Table 2-14**). However, in some counties, such as Harney, Lake, and Malheur Counties, the increase in unemployment rate in 2020 was small; this could be due to the reliance on the farm industry in these three counties and because farm workers were considered essential workers during the COVID-19 pandemic. All counties in the Oregon analysis area had a decrease in the unemployment rates from 2020 to 2021 as the local economies and businesses opened back up.

In addition to the number of job opportunities attracting people to move to the Oregon analysis area, labor income plays a part in encouraging population growth or decline. In 2021, Deschutes County, which had the highest increase in population and employment from 2010 to 2021, had the highest reported per capita income across all industries in the Oregon analysis area of almost $68,000 (over $6,000 more than the per capita income for the state of Oregon and over $3,000 more than the per capita income for the US; BEA 2021a, 2021b). Malheur County, which had a stagnant population from 2010 to 2021, had the lowest per capita income across all counties in the Oregon analysis area, with per capita income of almost $39,000 (about 33 percent less than the per capita income across the state of Oregon).

In Deschutes County, the key industries with the highest average earnings per employee (which is calculated by dividing total earnings by the total number of employees; see **Table A-15** in **Appendix A**; BEA 2021a, 2021b) were utilities, information, and construction. In Malheur County, the industries with the highest reported average earnings per employee were utilities, government and government enterprises, and manufacturing.

In 2021, the farming industry in Oregon represented about 2.7 percent of total employment and less than 1 percent of total earnings.[5] However, in the Oregon analysis area, which is on Oregon's eastern side,

[5] Farming employment includes the labor of farm proprietors, but not unpaid family labor; therefore, the statistics presented in this report do not include the total value of farming through employment.

farming plays an important role in the local economies. Farming employment makes up over 7 percent of total employment in all counties except Deschutes County. Farming was the second-largest industry for employment in Harney, Lake, and Grant Counties, with about 19.6 percent, 16.0 percent, and 13.0 percent of total jobs coming from farming, respectively (only falling below the government and government enterprises industry). Farming was the third-largest industry for employment in Malheur and Baker Counties, with 12.8 percent and 10.9 percent of total employment, respectively. In Union and Crook Counties, the farming industry was the fourth largest in terms of employment percentage, with 7.5 percent and 7.0 percent of total employment, respectively.

Farm earnings make up less of a percentage of the total earnings in most counties in the analysis area, but they still make up over 6 percent in Harney, Lake, and Malheur Counties. These three counties have a high percentage of BLM-administered lands in GRSG HMAs; therefore, these counties could be susceptible to impacts on farming, including potential changes to livestock grazing and ranching, from BLM decisions on GRSG HMAs (see **Chapter 3**, Livestock Grazing, in the EIS for more details on grazing and ranching use on BLM-administered lands in the Oregon analysis area).

Employment and earnings in the mining industry (including quarrying and oil and gas extraction) were either not disclosed, or they comprised a very small percentage (less than 1 percent) of total employment and earnings across the Oregon analysis area as well as the state of Oregon (see **Table A-15** in **Appendix A**; BEA 2021a, 2021b). This suggests that the economies in these two counties do not depend on the mining industry, and these economies would likely not be sensitive to changes in mineral development.

Recreation and tourism-related industries, such as the accommodation and food industry and retail trade industry, are other important industries within the Oregon analysis area. In Malheur, Baker, and Deschutes Counties, retail trade was the second-largest industry for employment, with 14.6 percent, 12.6 percent, and 11.4 percent, respectively, of total jobs coming from this industry. The percentages of total employment and earnings from these key industries across the Oregon analysis area have not changed substantially from the data included in the 2015 Sage-Grouse Plan Amendment EIS, which included data from 2010. This suggests that the economic significance of major industries in the Oregon analysis area have remained consistent over the past decade.

## 2.8 SOUTH DAKOTA

The South Dakota analysis area consists of Butte and Harding Counties, which lie in the state's northwestern corner (see **Figure A-8** in **Appendix A**). Including subsurface acreage, 10 percent of Butte County and 3 percent of Harding County fall within HMAs.

From 2010 to 2021, the population in South Dakota increased by 10.3 percent, or 82,785 people (**Table 2-15**). Total employment in South Dakota increased by a slightly smaller magnitude—about 64,000 jobs—which suggests there may be some correlation between the increase in population and the increase in employment (**Table A-16** in **Appendix A**). The employment increase was largely driven by the real estate and rental and leasing industry, which increased by about 10,000 jobs, and the health care and social assistance industry, which increased by over 9,000 jobs. In South Dakota, the percentages of employment by industry have remained relatively constant over the last decade, with a majority of employment occurring in government and government enterprises, health care and social assistance, and retail trade (**Table A-16** in **Appendix A**).

**Table 2-15. South Dakota Analysis Area Population**

| Geographic Area | 2010 | 2021 | 2040 | % Change 2010–2021 | % Change 2021–2040 |
|---|---|---|---|---|---|
| Butte County | 9,888 | 10,167 | N/A | 2.8 | N/A |
| Harding County | 1,250 | 1,179 | N/A | -5.7 | N/A |
| State of South Dakota | 799,462 | 881,785 | N/A | 10.3 | N/A |

Source: US Department of Commerce 2022
N/A = Not available

Butte County has the largest population within the South Dakota analysis area, while Harding County has the lowest population. Butte County, consisting of 10,167 people, observed a small population increase of about 2.8 percent between 2010 and 2021, whereas Harding County, with a population of 1,179 people, had a population decrease of 5.7 percent during the same period. The population changes in both counties in the South Dakota analysis area differed from the high population growth rate at the state level. This difference in population trends may be due to the rural character of the counties in the analysis area, as the state's population growth is concentrated in counties that contain or adjoin major urban centers, such as Sioux Falls and Rapid City (US Department of Commerce 2022).

Employment in both counties in the analysis area increased from 2010 to 2021. In Butte County, employment increased by about 200 jobs; in Harding County, employment increased by about 100 jobs (**Table A-16** in **Appendix A**). For both counties, the increase in employment was largely due to the retail trade industry, which accounted for an increase in about 100 jobs and 40 jobs in Butte and Harding Counties, respectively. In Butte County, the retail trade industry represented the largest nonfarm industry for employment, with about 14.7 percent of total employment. This was followed by government and government enterprises, with about 12.7 percent of jobs, and construction, accommodation, and other services, with about 7.2 percent for each of the three industries. In Harding County, the retail trade industry was the second-largest nonfarming industry for employment, with 9.2 percent of total jobs (only behind government and government enterprises with 10.3 percent of employment; see **Table A-16** in **Appendix A**).

Historical unemployment rates vary across the South Dakota analysis area. In Butte County, from 2015 to 2021, the unemployment rates were higher than they were for the state of South Dakota. In Harding County, the unemployment rates were lower than the unemployment rates for the state of South Dakota. Consistent with the rest of the US, the South Dakota analysis area and the state of South Dakota saw unemployment rates increase in 2020 during the COVID-19 pandemic. Unemployment rates in 2021 show that South Dakota's economy continues to recover from the economic effects of the COVID pandemic, with unemployment rates returning to similar levels to those experienced in 2015 (**Table 2-16**).

**Table 2-16. South Dakota Analysis Area Unemployment**

| Geographic Area | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 |
|---|---|---|---|---|---|---|---|
| Butte County | 3.3 | 3.5 | 3.3 | 3.0 | 2.9 | 5.0 | 3.4 |
| Harding County | 2.4 | 2.9 | 2.8 | 2.2 | 2.3 | 3.4 | 2.8 |
| State of South Dakota | 3.0 | 3.0 | 3.1 | 2.8 | 2.8 | 4.3 | 3.1 |

Source: BLS 2023

The farming industry has played a key role in the economies across South Dakota, especially in the South Dakota analysis area. In Butte County, farm employment comprised 11 percent of all employment in 2021; this is a slight decrease from 12 percent in 2010 but more than double the state statistic in 2021 of 5 percent (**Table A-16** in **Appendix A**). Earnings from the farm industry represent about 6.2 percent of total earnings

in Butte County. In Harding County, the farm industry was the largest industry for employment, with 26.4 percent of the jobs in this industry. This percentage of employment in the farm industry was only a slight decrease from the percentage of farm employment in 2010 of 27.5 percent (**Table A-16** in **Appendix A**). Earnings from the farm industry represent about 32.3 percent of total earnings in Harding County, which is the largest sector for labor income in the county. The reliance on farming as a key industry for employment suggests that the South Dakota analysis area could be susceptible to BLM management decisions that impact farming, ranching, or livestock grazing.

In Butte County, the industries with the largest percentage of labor income were government and government enterprises, retail trade, and construction. In Harding County, the industries with the largest percentage of labor income were farming, government and government enterprises, and construction. This is due to the importance of these industries for the number of jobs in the area. In Butte County, the average earnings per employee in these sectors were about $49,000, $30,000, and $51,000 for government and government enterprises, retail trade, and construction jobs, respectively. The earnings per employee in the top sectors in Harding County were about $55,000, $53,000, and $67,000 for farming, government and government enterprises, and construction jobs, respectively. On the other hand, the industries with the highest earnings per employee were information in Butte County, with $79,000 per job, and mining (including quarrying and oil and gas extraction) in Harding County, with $109,000 per job (**Table A-17** in **Appendix A**).

## 2.9 UTAH

Nearly all of Utah, or 23 out of 29 of its counties, lies within the analysis area (see **Figure A-9** in **Appendix A**). Those counties not in the analysis area lie at the southeastern, southwestern, and northern-central areas of the state. Seven counties (Daggett, Morgan, Rich, Carbon, Beaver, Box Elder, and Piute Counties) contain BLM-administered lands that qualify as at least 33 percent GRSG HMAs. In Daggett, Morgan, and Rich Counties, which are in Utah's northeastern corner, nearly 100 percent of all BLM-administered surface acreage falls within HMAs, holding implications for BLM management decisions in these counties. In Carbon County, as well as the western counties of Beaver, Box Elder, and Piute, approximately one-third to half of BLM-administered surface acreage falls within GRSG HMAs. For all seven counties, close to one-quarter of the total county acreage consists of GRSG HMAs, holding implications for future land management decisions. Expanding development that typically accompanies population growth may be an important factor in planning for GRSG management in the near future.

Utah's population grew by 20.6 percent between 2010 and 2021 (**Table 2-17**). The most populous county within the Utah analysis area in 2021 was Cache County, with 137,255 people. Other counties with relatively large populations within this analysis area include Toole County (76,165 people), Box Elder County (59,220 people), Iron County (61,232 people), and Summit County (42,843 people). At 51.4 percent, Wasatch County had the largest percentage increase in population between 2010 and 2021; this was followed by Morgan County (33.2 percent), Iron County (32.4), Tooele County (30.5 percent), percent), and Cache County (21.1 percent). Population growth in Wasatch County was driven by migration, tourism, and the presence of the Wasatch Campus of Utah Valley University. By 2040, Wasatch County is predicted to have a population increase of almost 60 percent, while Morgan and Tooele Counties will experience similarly rapid population growth (University of Utah, Kem C. Gardner Policy Institute 2022; see **Table 2-17**).

**Table 2-17. Utah Analysis Area Population**

| Geographic Area | 2010 | 2021 | 2040 | % Change 2010–2021 | % Change 2021–2040 |
|---|---|---|---|---|---|
| Beaver County | 6,645 | 7,156 | 8,777 | 7.7 | 22.7 |
| Box Elder County | 50,084 | 59,220 | 75,494 | 18.2 | 27.5 |
| Cache County | 113,307 | 137,255 | 185,948 | 21.1 | 35.5 |
| Carbon County | 21,390 | 20,488 | 20,689 | -4.2 | 1.0 |
| Daggett County | 1,076 | 962 | 910 | -10.6 | -5.4 |
| Duchesne County | 18,689 | 19,738 | 19,351 | 5.6 | -2.0 |
| Emery County | 10,991 | 9,885 | 9,674 | -10.1 | -2.1 |
| Garfield County | 5,167 | 5,079 | 5,294 | -1.7 | 4.2 |
| Grand County | 9,227 | 9,705 | 11,375 | 5.2 | 17.2 |
| Iron County | 46,240 | 61,232 | 85,248 | 32.4 | 39.2 |
| Juab County | 10,260 | 12,049 | 17,586 | 17.4 | 46.0 |
| Kane County | 7,113 | 7,924 | 9,769 | 11.4 | 23.3 |
| Millard County | 12,513 | 13,214 | 12,777 | 5.6 | -3.3 |
| Morgan County | 9,516 | 12,679 | 18,184 | 33.2 | 43.4 |
| Piute County | 1,548 | 1,479 | 1,625 | -4.5 | 9.9 |
| Rich County | 2,280 | 2,559 | 3,059 | 12.2 | 19.5 |
| Sanpete County | 27,834 | 28,948 | 34,693 | 4.0 | 19.8 |
| Sevier County | 20,793 | 21,799 | 23,044 | 4.8 | 5.7 |
| Summit County | 36,573 | 42,843 | 52,303 | 17.1 | 22.1 |
| Tooele County | 58,369 | 76,156 | 115,253 | 30.5 | 51.3 |
| Uintah County | 32,722 | 35,975 | 39,112 | 9.9 | 8.7 |
| Wasatch County | 23,689 | 35,872 | 57,112 | 51.4 | 59.2 |
| Wayne County | 2,775 | 2,504 | 2,712 | -9.8 | 8.3 |
| State of Utah | 2,772,667 | 3,343,552 | 4,440,560 | 20.6 | 32.8 |

Source: University of Utah, Kem C. Gardner Policy Institute 2022; US Department of Commerce 2022

More broadly, the three fastest-growing counties are all part of the Greater Salt Lake Region, a 12-county region that functions largely as a single consumption and labor market. The Greater Salt Lake Region is one of the urban areas driving Utah's population increase (**Table 2-17**; University of Utah, Kem C. Gardner Policy Institute 2022). Approximately 25 percent of the acreage in steadily growing Beaver, Box Elder, and Rich Counties falls within HMAs; an increasing population will have implications for future management decisions for GRSG.

The county that experienced the most population loss between 2010 and 2021 was Daggett County (10.6 percent), followed by Emery County (10.1 percent), Wayne County (9.8 percent), and Carbon County (4.2 percent) (**Table 2-17**). Except for Wayne County, all these counties are expected to either continue decreasing, or stagnate, in population through 2040. This may be due to their more rural nature or a higher-than-average unemployment rate encouraging residents to seek work elsewhere, or both. In Carbon and Emery Counties, declines in population and overall employment may be tied to unpredictable fluctuations in their coal-based economies amid changes in energy markets and growing competition from alternative sources of energy, including both renewables and fossil fuels (Gruenspecht 2019; Schott 2017; **Table 2-17**; **Table 2-18**; **Table A-18** in **Appendix A**). The economies in these counties could be sensitive to changes in industries, such as the mining industry, that might impact job availability and further encourage the population to move elsewhere for employment.

**Table 2-18. Utah Analysis Area Unemployment Rate**

| Geographic Area | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 |
|---|---|---|---|---|---|---|---|
| Beaver County | 3.7 | 4.8 | 3.9 | 3.3 | 3.0 | 4.0 | 2.8 |
| Box Elder County | 3.6 | 3.4 | 3.2 | 2.8 | 2.6 | 4.4 | 2.4 |
| Cache County | 3.0 | 3.0 | 2.7 | 2.5 | 2.1 | 3.0 | 2.0 |
| Carbon County | 5.6 | 5.8 | 4.9 | 4.2 | 3.6 | 5.3 | 3.9 |
| Dagget County | 4.5 | 5.0 | 4.9 | 4.2 | 3.8 | 4.6 | 3.6 |
| Duchesne County | 7.4 | 8.6 | 5.5 | 4.3 | 3.9 | 7.8 | 4.9 |
| Emery County | 5.9 | 6.1 | 4.9 | 4.5 | 3.9 | 4.8 | 3.9 |
| Garfield County | 8.7 | 8.1 | 7.3 | 7.3 | 6.1 | 10.4 | 6.5 |
| Grand County | 6.0 | 5.7 | 5.2 | 4.5 | 3.9 | 9.5 | 4.4 |
| Iron County | 4.4 | 4.2 | 4.0 | 3.3 | 2.9 | 4.5 | 2.8 |
| Juab County | 3.9 | 3.5 | 3.3 | 2.8 | 2.5 | 3.0 | 2.0 |
| Kane County | 4.3 | 3.7 | 3.3 | 3.0 | 2.9 | 5.3 | 2.9 |
| Millard County | 3.4 | 3.2 | 3.2 | 3.1 | 2.6 | 3.3 | 2.4 |
| Morgan County | 3.1 | 2.9 | 2.8 | 2.6 | 2.4 | 3.4 | 2.1 |
| Piute County | 6.3 | 5.7 | 4.7 | 5.0 | 4.5 | 6.2 | 4.4 |
| Rich County | 3.6 | 3.1 | 3.1 | 3.0 | 3.0 | 3.5 | 2.3 |
| Sanpete County | 4.1 | 3.9 | 3.8 | 3.5 | 3.1 | 3.8 | 2.8 |
| Sevier County | 4.4 | 4.3 | 3.7 | 3.4 | 3.0 | 4.3 | 3.3 |
| Summit County | 3.2 | 3.0 | 3.0 | 2.8 | 2.4 | 7.2 | 2.9 |
| Tooele County | 4.1 | 3.7 | 3.5 | 3.2 | 2.8 | 4.7 | 2.9 |
| Uintah County | 6.7 | 9.1 | 5.9 | 4.4 | 4.2 | 9.3 | 5.6 |
| Wasatch County | 3.4 | 3.3 | 3.2 | 3.0 | 2.7 | 6.5 | 2.9 |
| Wayne County | 8.9 | 7.5 | 7.1 | 5.7 | 5.4 | 7.7 | 4.7 |
| State of Utah | 3.5 | 3.3 | 3.1 | 2.9 | 2.6 | 4.7 | 2.7 |

Source: BLS 2023

Although most analysis area counties experienced population growth (and will continue to expand through 2040), many experienced much higher rates of unemployment; others had unemployment rates about equal to or greater than those of Utah from 2015 to 2021 (**Table 2-18**). Cache, Morgan, and Summit Counties (besides anomalously high unemployment rates in 2020–2021 that were related to the COVID-19 pandemic). The data show that 12 counties in Utah experienced their lowest rates of unemployment in 2021, which were slightly greater than Utah's overall unemployment rate for 2021. Lower employment rates in 2021 could have been driven by an increase in the available workforce, similar to state trends.

Eleven counties experienced their lowest rate of unemployment in 2019, which were slightly greater than Utah's overall unemployment rate for 2019. During 2015, 2016, and 2020, 22 counties experienced their highest rates of unemployment, which were greater than Utah's unemployment averages for these years. At the county level, the lowest unemployment rate was in 2021 in both Cache County (2.0 percent) and Juab County (2.0 percent) and ranged to a high of 10.4 percent in Garfield County (**Table 2-18**). It should be noted that in all counties that experienced population growth, the total number of jobs increased, but unemployment remained above the state average (**Table 2-18**; **Table A-18 [Parts 1–4]** in **Appendix A**).

Service-based industries continue to represent a large portion of Utah's overall employment and labor income; these trends also exist at the county level. Since 2010, total employment has increased for almost all the counties in the analysis area (except for Carbon and Emery Counties), indicating that there has been somewhat of an economic expansion (**Table A-18 [Parts 1–4]** in **Appendix A**). The increase in total employment across the analysis area was largely due to increases in jobs in the manufacturing,

accommodation and food services, and construction industries, which grew by about 10,000 jobs, 9,000 jobs, and 8,500 jobs, respectively.

Declines in employment in Carbon and Emery Counties may be tied to changes in the potentially unpredictable coal economy (Schott 2017). Carbon County experienced a slight loss of jobs in mining (from 7.7 percent in 2010 to 7.0 percent in 2021), administrative and waste management services (5.4 percent to 3.1 percent), and wholesale trade (4.2 to 2.7 percent). Employment in Emery County decreased in the construction; manufacturing; transportation and warehousing; professional, scientific, and technical services; other services; and government and governmental enterprises industries (**Table A-18 [Parts 1–4]** in **Appendix A**).

Employment in the mining industry (including quarrying and oil and gas extraction) continues to represent a low portion of total employment. The exceptions are Sevier (5.0 percent), Duchesne (11.7 percent), Carbon (7.0 percent), Emery (6.2 percent), and Uintah (8.2 percent) Counties; in these counties, the employment in the mining industry was greater than Utah's state average (**Table A-18 [Parts 1–4]** in **Appendix A**). It is worth noting that in all counties where data are available, all underwent declines in mining employment. This is particularly apparent in Uintah County, where mining declined from 17.7 percent of employment in 2010 to 8.2 percent in 2021. The average labor income for mining in these counties ranges from $83,000 in Uintah County to $108,000 in Emery County; all fall below the average statewide labor income for mining (**Table A-18 [Parts 1–4]** in **Appendix A**). These counties that rely on mining for employment and labor income could be sensitive to BLM management decisions that limit mining in GRSG HMAs. Counties with the highest proportion of farm employment include Piute (23.5 percent), Beaver (14.6 percent), and Millard (14.3 percent) Counties. These numbers represent slight declines of approximately 1–2 percent from 2010 (**Table A-18** in **Appendix A**). In Morgan, Tooele, and Wasatch Counties, which are the three fastest-growing counties, farm employment represents a relatively low share of total employment, with 5.2 percent, 2.0 percent, and 2.3 percent, respectively. Farm employment has declined since 2010 in these counties. However, numbers for all three counties remain higher than the state average of less than 1 percent (**Table A-18** in **Appendix A**).

Growing employment sectors for these three counties include service industries like finance, professional services, and real estate, in addition to the non-service industry of construction (**Table A-18** in **Appendix A**). The decline in farm employment and simultaneous shift toward service industries may reflect diversifying and expanding economies as county populations continue to expand. However, farming plays an important role for Beaver, Iron, Piute, Rich, and Sanpete Counties, where the average earnings per employee for the farming industry are higher than the average earnings per employee across all industries, with about $70,000, $46,000, $117,000, $57,000, and $44,000 in earnings, respectively. Additional changes in the farming industry through BLM management decisions that impact livestock grazing would result in large impacts on these counties that have relied on farming for employment and labor income.

Government-based employment continues to represent a large portion of total employment on both the state and county level, with some counties, such as Piute (19.5 percent) and Sanpete (22.8 percent), having high percentages of government-based employment (**Table A-18** in **Appendix A**). Government-based employment is also responsible for a large percentage of total employment in Daggett (26.2 percent), Duchesne (21.1 percent), and Carbon Counties (19.0 percent). These percentages are greater than Utah's government employment average. In Daggett and Carbon Counties, the average wages for government employment ($69,000 and $56,000, respectively) fall below the state average of $75,000 for this sector (**Table A-19** in **Appendix A**).

## 2.10 WYOMING

The Wyoming analysis area encompasses 21 counties, spanning almost the entire state of Wyoming; the only excluded counties are Teton County on Wyoming's western border and Goshen County on Wyoming's eastern border. All analysis area counties contain BLM-administered acreages classified as at least 89 percent GRSG HMAs, except for Laramie and Platte Counties, where BLM-administered acreage classified as GRSG HMAs is closer to 50 percent. Counties with the highest percentage of GRSG HMAs overall include Big Horn, which is 65 percent HMAs, and Sweetwater and Washakie, which are both classified as 72 percent GRSG HMAs. Carbon, Fremont, Hot Springs, Lincoln, Natrona, and Sublette Counties are also significant counties for GRSG HMAs, having been classified as between 40 to 50 percent HMAs (see **Figure A-10** in **Appendix A**).

Between 2010 and 2021, the population in Wyoming grew by 3 percent. Statewide population is expected to increase from 580,390 to 614,820 people by 2040, which is a rate of 5.9 percent (**Table 2-19**). The county with the largest population in 2021 within the Wyoming analysis area was Laramie County with 100,900 people. Other counties with relatively high populations include Natrona County (78,810 people), Campbell County (45,450 people), Sweetwater County (42,440 people), and Albany County (39,250 people). Laramie and Lincoln Counties both experienced population growth of 10 percent between 2010 and 2021, and both counties are expected to continue increasing at slightly higher rates through 2040. Between 2015 and 2021, unemployment rates in both counties were consistently lower than or comparable to the state average, which may signal relatively stable economic conditions that are drawing workers (**Table 2-20**).

**Table 2-19. Wyoming Analysis Area Population**

| Geographic Area | 2010 | 2021 | 2040 | % Change 2010–2021 | % Change 2021–2040 |
|---|---|---|---|---|---|
| Albany County | 36,299 | 39,250 | 42,600 | 8.1 | 8.5 |
| Big Horn County | 11,668 | 11,900 | 12,230 | 2.0 | 2.8 |
| Campbell County | 46,133 | 45,450 | 47,710 | -1.5 | 5.0 |
| Carbon County | 15,885 | 14,770 | 14,100 | -7.0 | -4.5 |
| Converse County | 13,833 | 13,840 | 14,650 | 0.1 | 5.9 |
| Crook County | 7,083 | 7,590 | 8,420 | 7.2 | 10.9 |
| Fremont County | 40,123 | 39,380 | 40,180 | -1.9 | 2.0 |
| Hot Springs County | 4,812 | 4,510 | 4,370 | -6.3 | -3.1 |
| Johnson County | 8,569 | 8,550 | 9,270 | -0.2 | 8.4 |
| Laramie County | 91,738 | 100,900 | 112,580 | 10.0 | 11.6 |
| Lincoln County | 18,106 | 19,940 | 22,490 | 10.1 | 12.8 |
| Natrona County | 75,450 | 78,810 | 83,090 | 4.5 | 5.4 |
| Niobrara County | 2,484 | 2,350 | 2,240 | -5.4 | -4.7 |
| Park County | 28,205 | 29,640 | 31,780 | 5.1 | 7.2 |
| Platte County | 8,667 | 8,660 | 8,990 | -0.1 | 3.8 |
| Sheridan County | - | - | - | - | - |
| Sublette County | 10,247 | 9,730 | 10,470 | -5.0 | 7.6 |
| Sweetwater County | 43,806 | 42,440 | 41,780 | -3.1 | -1.6 |
| Uinta County | 21,118 | 20,160 | 19,790 | -4.5 | -1.8 |
| Washakie County | 8,533 | 7,780 | 7,440 | -8.8 | -4.4 |
| Weston County | 7,208 | 6,940 | 6,840 | -3.7 | -1.4 |
| **State of Wyoming** | **563,626** | **580,390** | **614,820** | **3.0** | **5.9** |

Sources: Wyoming Department of Administration and Information, Economic Analysis Division 2019; US Department of Commerce 2022

**Table 2-20. Wyoming Analysis Area Unemployment Rate**

| Geographic Area | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 |
|---|---|---|---|---|---|---|---|
| Albany County | 3.1 | 3.2 | 3.0 | 3.3 | 3.2 | 3.7 | 3.3 |
| Big Horn County | 4.4 | 5.0 | 4.4 | 4.7 | 4.4 | 5.0 | 4.6 |
| Campbell County | 3,9 | 7.2 | 5.0 | 4.1 | 3.8 | 6.8 | 5.3 |
| Carbon County | 3.7 | 4.7 | 4.1 | 3.7 | 3.5 | 4.6 | 3.9 |
| Converse County | 3.6 | 6.3 | 4.6 | 3.7 | 2.9 | 5.9 | 4.9 |
| Crook County | 3.5 | 4.6 | 3.6 | 3.2 | 3.3 | 3.9 | 3.4 |
| Fremont County | 5.5 | 7.2 | 5.7 | 5.2 | 4.6 | 6.2 | 4.7 |
| Hot Springs County | 4.1 | 4.8 | 4.0 | 3.7 | 3.5 | 5.0 | 4.0 |
| Johnson County | 4.8 | 5.4 | 4.3 | 4.0 | 3.8 | 5.6 | 4.3 |
| Laramie County | 3.9 | 4.2 | 3.8 | 3.9 | 3.6 | 5.1 | 4.0 |
| Lincoln County | 4.7 | 4.7 | 3.8 | 3.8 | 3.5 | 5.0 | 3.8 |
| Natrona County | 4.8 | 7.2 | 5.4 | 4.6 | 4.0 | 7.7 | 6.1 |
| Niobrara County | 3.0 | 3.3 | 2.8 | 2.8 | 2.9 | 3.6 | 3.6 |
| Park County | 4.2 | 4.8 | 4.4 | 4.4 | 4.2 | 5.4 | 4.1 |
| Platte County | 3.9 | 4.8 | 3.8 | 3.7 | 3.6 | 5.0 | 4.0 |
| Sheridan County | 4.2 | 4.7 | 4.0 | 4.1 | 3.6 | 5.0 | 4.4 |
| Sublette County | 5.1 | 6.5 | 4.6 | 4.3 | 4.7 | 7.2 | 5.6 |
| Sweetwater County | 4.6 | 6.1 | 4.7 | 4.2 | 4.0 | 7.3 | 5.6 |
| Uinta County | 4.9 | 5.8 | 4.7 | 4.3 | 4.0 | 6.3 | 5.0 |
| Washakie County | 4.1 | 4.8 | 4.1 | 4.2 | 4.1 | 5.3 | 4.1 |
| Weston County | 3.4 | 5.0 | 4.1 | 3.5 | 3.0 | 3.8 | 3.2 |
| **State of Wyoming** | **4.2** | **5.4** | **4.3** | **4.1** | **3.7** | **5.8** | **4.5** |

Source: BLS 2023

Several counties declined in population between 2010 and 2021, with Washakie County undergoing the highest decline by 8.8 percent. Other counties that declined in population include Carbon, Hot Springs, and Niobrara Counties, which declined by 7.0 percent, 6.3 percent, and 5.4 percent, respectively. All three counties are expected to decline in population through 2040 (**Table 2-19**).

Key employment service sectors in Wyoming analysis area counties include retail trade, healthcare, and accommodation and food services. The retail and accommodation sectors, which yield average labor incomes of $37,000 and $32,000, respectively, tend to pay a below-average labor income compared to the overall state average of $59,000. Meanwhile, the average labor income for healthcare ($58,000) is more comparable to the state average. None of these three sectors experienced notable changes with respect to employment between 2010 and 2021. Among these three service sectors, employment tended to be concentrated in retail trade as well as accommodation and food services across all counties.

Mining (including quarrying and oil and gas extraction) is also a key industry for employment across Wyoming. Wyoming is one of the top coal and oil and gas producers, and it plays an important role in locatable mineral extraction. However, mining employment decreased from 8.0 percent in 2010 to 4.6 percent in 2021. Mining is especially important for employment in Campbell, Converse, Sublette, and Sweetwater Counties; mining holds the greatest proportions of private employment in these counties (**Table A-20** in **Appendix A**). However, the mining industry is susceptible to boom-and-bust cycles, and since 2010, employment has been decreasing in many counties across Wyoming. Notably, the proportion of mining jobs in Sweetwater County plummeted from 23.4 percent in 2010 to 9.3 percent in 2021, which aligns with its trend of above-average unemployment rates since 2015. This decrease is more drastic than the state-level trend.

Even with the decline in employment, mining still plays an important role in the regional economies. This is highlighted by the average labor wages for mining in these counties, which surpassed county averages across all industries. Moreover, mining represented over 20 percent of labor income in these counties, compared with the state average of 8.7 percent (**Table A-20** in **Appendix A**). This suggests that these counties that rely on mining could be impacted by BLM management decisions that restrict mining in GRSG HMAs.

Farming comprises 3.5 percent of employment at the state level. County-level numbers are roughly comparable, except for Niobrara County, which has the highest concentration of farming employment at 16.3 percent. In Big Horn, Crook, Niobrara, and Platte Counties, farming employment equals approximately 11 to 12 percent. Among these relatively farming-dependent counties, none experienced a meaningful change in employment between 2010 and 2021. The average farming labor income is relatively low, and it did not constitute a major proportion of total labor income for these counties. These counties with high reliance on farming for employment could be sensitive to BLM management decisions that impact livestock grazing.

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# Chapter 3. BLM Land and Resource Use and Revenue

Resources and resources use data levels based on data from recent fiscal years are provided in the sections below for key resources with a potential to be impacted by proposed management, including mineral and energy development and livestock grazing.

Mineral development under the BLM is managed under three main categories: leasable, locatable, and salable minerals/mineral materials. Each is subject to different federal laws and implementing regulations.

## 3.1 LEASABLE MINERALS

Leasable minerals are a category of mineral resources made available for exploration and development by mineral leasing. They are specific types of mineral resources described by the Mineral Leasing Act of 1920. They include fluid minerals (such as crude oil and natural gas), solid energy minerals (such as coal), and select nonenergy minerals (such as sodium, phosphate, and potassium).

### 3.1.1 Fluid Minerals (Oil and Gas)

As mentioned in **Chapter 2**, Demographic and Economic Baseline Conditions, the mining industry is important for supporting the local economies in many communities in the analysis area, especially in areas where a large percentage of employment comes from the mining industry, and a large portion of the mining that occurs on federal lands is for fluid minerals (oil and natural gas). These areas include northwestern Colorado, southeastern Idaho, southeastern Montana, northeastern Nevada, southwestern North Dakota, central to eastern Utah, and northeastern and southwestern Wyoming In addition to these regions, oil and gas extraction is important throughout the states for providing funding for public services through royalties and taxes that are distributed to the states where the extraction occurred.

#### *Oil and Gas Production and Activity*

In 2022, the two biggest producers of natural gas on federal land were Wyoming and Colorado, with about 999 million thousand cubic feet (mcf) and 504 million mcf of gas for Wyoming and Colorado, respectively (see **Table A-22** in **Appendix A**, which shows oil and gas production from 2018 to 2022 on federal lands in the planning area as well as statewide totals, and **Figure 1** and **Figure 2**, which show the trends of gas production from 2018 to 2022 for the statewide total and the socioeconomic analysis, respectively). More than half of the federal natural gas production in Colorado occurs outside the Colorado socioeconomic analysis area, with a large portion of natural gas production occurring in Colorado's southwest, north, or northwest regions. However, there is still a large amount of federal natural gas production in the Colorado socioeconomic analysis area, especially in counties in the west-central region of Colorado, which includes Garfield and Mesa Counties.

More than half of the federal natural gas production in Wyoming occurs in Sublette, Sweetwater, and Fremont Counties, which are in the Green River Basin and the Wind River Basin, in Wyoming's southwestern region. These three counties in Wyoming have a large percentage of the BLM-administered surface acres in GRSG HMAs, which suggests that these counties might be impacted by changes in BLM management decisions on GRSG.

From 2018 to 2022, there was no federal natural gas production in Oregon. Although there was federal natural gas production in California, none of it occurred in the socioeconomic analysis area.

From 2018 to 2022, total gas production increased in North Dakota and Nevada by about 51 million mcf and 1,700 mcf, respectively (which was about a 76.3 percent and 87.2 percent increase, respectively). However, most of the increase in federal natural gas in North Dakota occurred outside the socioeconomic analysis area; all counties in the North Dakota analysis area saw a decrease in natural gas production. Total statewide federal natural gas production decreased in the rest of the states, with the biggest decrease occurring in Wyoming and Colorado, with a decrease of about 426 million mcf and 142 million mcf, respectively (which was a decrease of about 29.9 percent and 22.0 percent, respectively). The county with the largest reduction in magnitude of gas production from 2018 to 2022 was Sublette County in Wyoming, with a reduction of about 334 million mcf (a decrease of about 35.8 percent). The county with the largest increase in magnitude of gas production was Campbell County in Wyoming, with an increase of about 13.6 million mcf (an increase of about 31.3 percent; see **Figure 1** and **Figure 2**, below, and **Table A-22** in **Appendix A**).

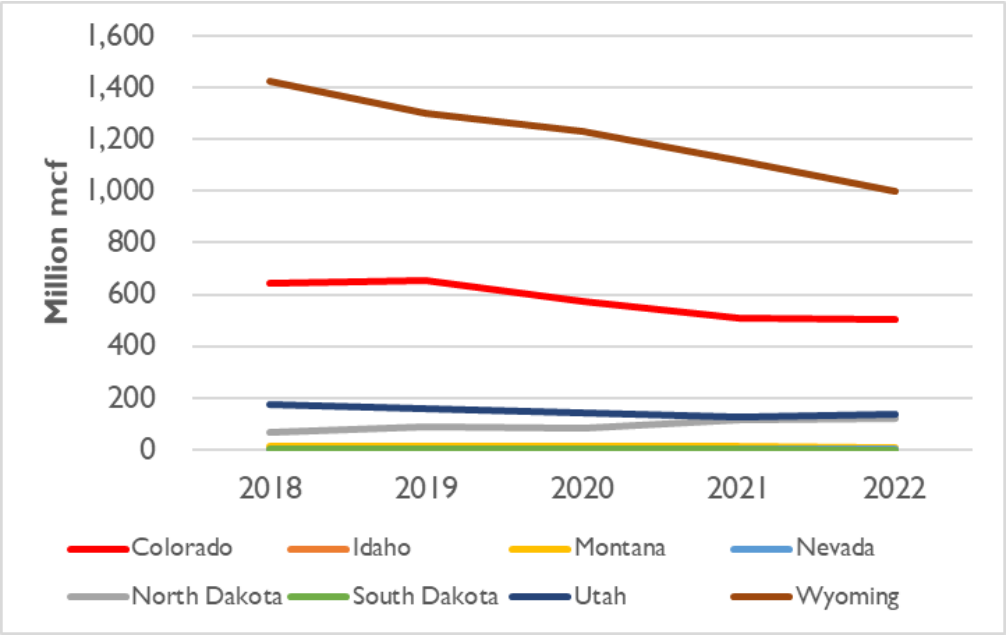
In 2022, the two biggest oil producers on federal land were Wyoming and North Dakota, with about 48 million barrels (bbl) and 43 million bbl of oil, respectively (see **Table A-22** in **Appendix A** and **Figure 3** and **Figure 4**, below). However, most of the federal oil in North Dakota is produced outside the North Dakota socioeconomic analysis area, in the west-central region of North Dakota. The North Dakota socioeconomic analysis area, which is in the southwest corner of North Dakota, produces only about 1 percent of the total federal oil for the state. In contrast, most oil produced in Wyoming occurred in the Wyoming socioeconomic analysis area, largely concentrated in the Powder River Basin, Bighorn Basin, and Green River Basin.

From 2018 to 2022, there was no federal oil production in Oregon. Although there was federal oil production in California, none of it occurred in the socioeconomic analysis area.

From 2018 to 2022, total oil production increased in Colorado, Montana, North Dakota, South Dakota, and Wyoming. The biggest increase in magnitude occurred in North Dakota and Wyoming, with 8.4 million bbl and 5.5 million bbl, respectively. However, except for the increase in oil production in Wyoming, almost all of the increase in federal oil occurred outside the socioeconomic analysis area (all counties in the Colorado, North Dakota, and South Dakota socioeconomic analysis areas and most of the counties in the Montana socioeconomic analysis area saw a decrease in oil production).

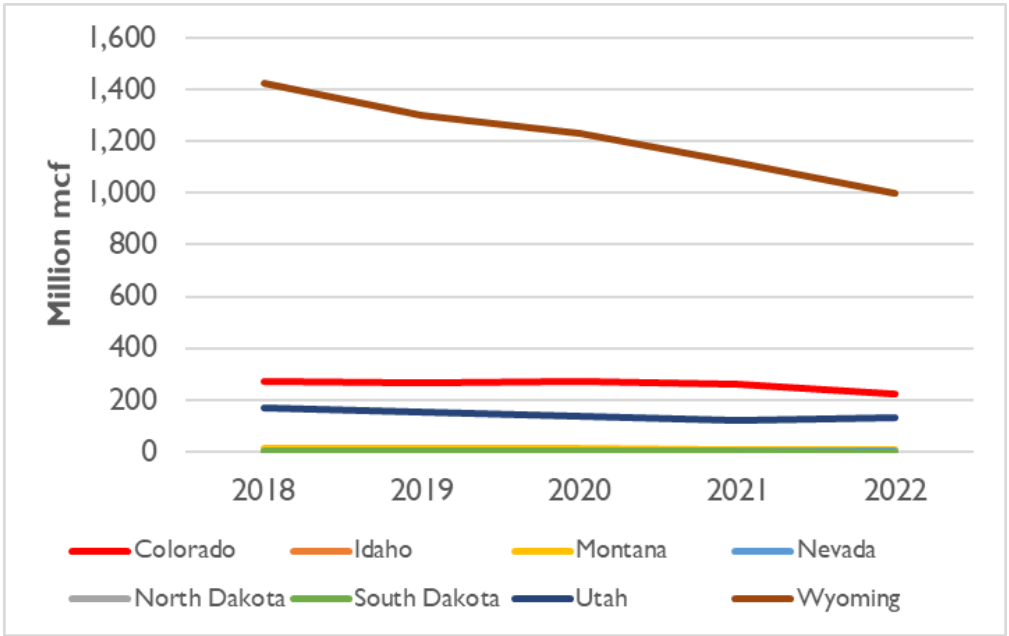
Total statewide federal oil production decreased in the remainder of the states (Idaho, Nevada, and Utah). The biggest decrease in magnitude of federal oil occurred in Utah, with a reduction of about 1.9 million bbl (a decrease of about 22.5 percent from 2018 levels). The county with the largest reduction in magnitude of oil production was Sublette County in Wyoming, with a reduction of about 2.9 million bbl (a decrease of about 49.0 percent). The county with the largest increase in magnitude of oil production was Converse County in Wyoming, with an increase of about 7.7 million bbl (an increase of about 70.1 percent; see **Figure 3** and **Figure 4**, below, and **Table A-22** in **Appendix A**).

**Figure 1. Total Statewide Federal Natural Gas Production, 2018–2022**



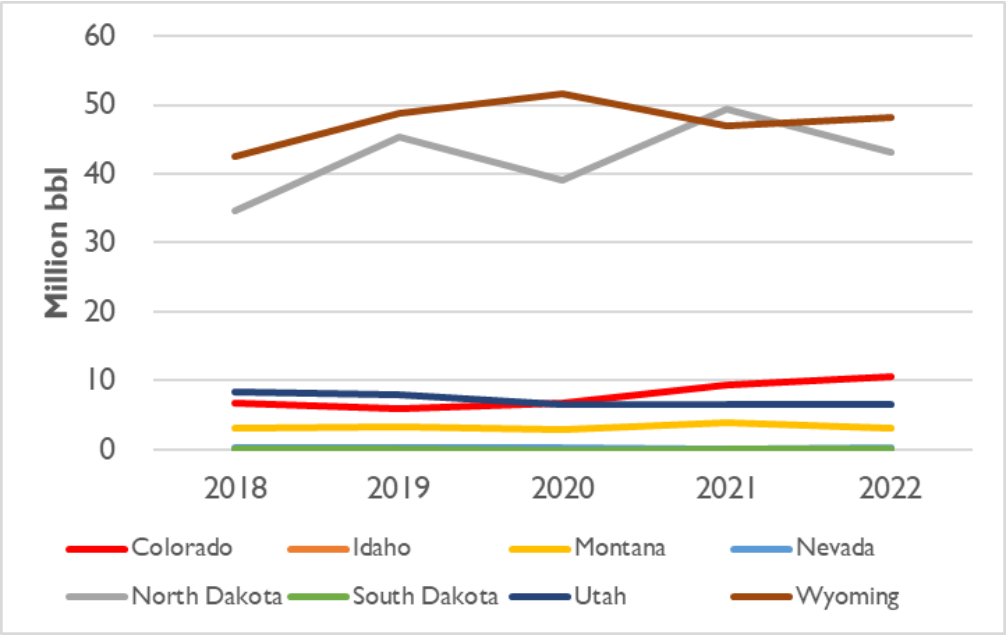

Note: From 2018 to 2022, there was no federal gas production in Oregon. Although there was federal gas production in California, none of it occurred in the socioeconomic analysis area. Therefore, Oregon and California are not included in the figure above.

**Figure 2. Federal Natural Gas Production in the Socioeconomic Analysis Area for Each State, 2018–2022**



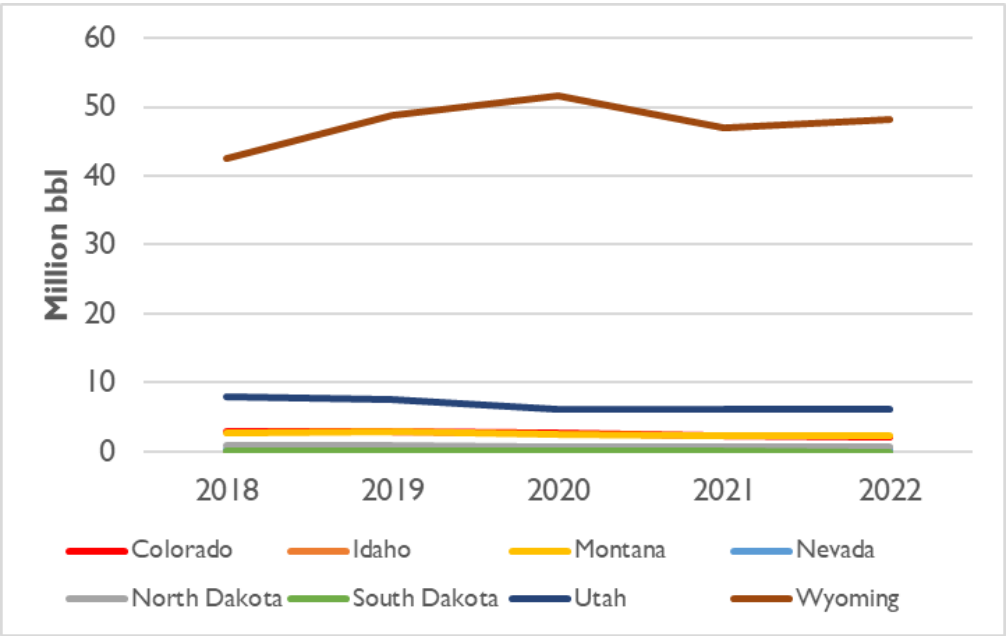

Note: From 2018 to 2022, there was no federal gas production in Oregon. Although there was federal gas production in California, none of it occurred in the socioeconomic analysis area. Therefore, Oregon and California are not included in the figure above.

**Figure 3. Total Statewide Federal Oil Production, 2018–2022**




Note: From 2018 to 2022, there was no federal oil production in Oregon. Although there was federal oil production in California, none of it occurred in the socioeconomic analysis area. Therefore, Oregon and California are not included in the figure above.

**Figure 4. Federal Oil Production in the Socioeconomic Analysis Area for Each State, 2018–2022**




Note: From 2018 to 2022, there was no federal oil production in Oregon. Although there was federal oil production in California, none of it occurred in the socioeconomic analysis area. Therefore, Oregon and California are not included in the figure above.

**Table 3-1** shows federal oil and gas activity, including cumulative producing leases and acres in producing status, as well as applications for permits to drill (APDs) received and approved in fiscal year 2021 and wells started and completed in fiscal year 2021. In 2021, Wyoming had the most activities on federal land overall, including the most acres in producing status (3.9 million acres), APDs approved (1,432 APDs), wells started (233 wells), and wells completed (1,069 wells). **Table 3-2** shows the historical average annual new federal wells spud[6] by state and area, broken out separately by oil and gas. The annual wells spud is averaged over two time periods: 2013–2014, which is prior to GRSG management changes from the previous 2015 Record of Decisions, and 2015–2022, which includes wells spud after GRSG management changes. On the total federal land in the planning area (on and off GRSG HMAs), the average annual spud rate decreased over the two time periods in every state, except oil wells in Idaho and gas wells in North Dakota.

Many factors not directly related to GRSG management changes contribute to the difference in annual spud rates, such as changes in demand and the price for oil and gas. For example, the crude oil market crash of 2016 and other external constraints, such as fluctuating litigation activities, have significantly affected federal oil and gas production. From 2015 to 2022, average annual spud rates for oil wells over the planning area ranged from less than 1 well per year in Idaho, Nevada, and Utah to about 881 wells per year in Colorado. Gas wells ranged from less than 1 well per year in Colorado to about 245 wells in Wyoming. Additionally, well spud rates on GRSG HMAs were lower than total spud rates; however, this is likely due to the difference in the size of the area.

**Table 3-1. Oil and Gas Activity on Federal Land in the Planning Area (Fiscal Year 2021)**

| State | Cumulative Producible and Service Completions | Cumulative Producing Leases | Cumulative Acres in Producing Status | APDs Received in Fiscal Year 2021 | APDs Approved in Fiscal Year 2021 | Wells Started in Fiscal Year 2021 | Wells Completed in Fiscal Year 2021 |
|---|---|---|---|---|---|---|---|
| California | 6,327 | 318 | 91,446 | 200 | 61 | 47 | 116 |
| Colorado | 7,397 | 2,159 | 1,476,291 | 82 | 282 | 161 | 133 |
| Idaho | 0 | 2 | 2,333 | 0 | 0 | 0 | 0 |
| Montana | 2,472 | 1,356 | 647,280 | 3 | 2 | 1 | 10 |
| Nevada | 97 | 37 | 25,281 | 3 | 1 | 0 | 1 |
| North Dakota | 2,814 | 1,403 | 607,676 | 261 | 301 | 109 | 71 |
| Oregon | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| South Dakota | 69 | 76 | 36,752 | 1 | 1 | 2 | 0 |
| Utah | 8,306 | 1,467 | 1,067,945 | 275 | 295 | 62 | 16 |
| Wyoming | 28,081 | 7,315 | 3,861,590 | 1,078 | 1,432 | 233 | 1,069 |

Sources: BLM 2022b, 2022c

Note: Data provided are state-level data for all BLM-administered lands and minerals.

[6] Well spud means wells that have begun drilling operations.

**Table 3-2. Average Annual New Federal Wells Spud by State, Commodity, and Area**

| State | Area | Oil | | Gas | |
|---|---|---|---|---|---|
| | | 2013–2014 Average | 2015–2022 Average | 2013–2014 Average | 2015–2022 Average |
| Idaho | GRSG HMAs | 0 | 0 | 0 | 0 |
| | Total | 0 | 0.1 | 2 | 1.4 |
| Colorado | GRSG HMAs | 1.5 | 1.1 | 2 | 0.4 |
| | Total | 1,053 | 881.4 | 392 | 281.5 |
| Nevada | GRSG HMAs | 0.5 | 0.4 | 0 | 0 |
| | Total | 1.5 | 0.4 | 0 | 0 |
| South Dakota | GRSG HMAs | 0 | 0 | 0 | 0 |
| | Total | 7.5 | 1.1 | 0 | 0 |
| North Dakota | GRSG HMAs | 0 | 0 | 0 | 0 |
| | Total | 1,970 | 954 | 1 | 1.3 |
| Utah | GRSG HMAs | 4.5 | 0.9 | 14 | 4.6 |
| | Total | 590 | 202.3 | 201.5 | 60.5 |
| Wyoming | GRSG HMAs | 96.5 | 45.6 | 297 | 186.8 |
| | Total | 494 | 317.3 | 458 | 245 |

Sources: BLM 2023a, 2023b, 2023c, 2023d, 2023e, 2023f, 2023g, 2023h, 2023i

***Federal Oil and Gas Disbursement Payments***

The government collects revenues from leasable mineral extraction on public lands through bonuses, royalties, and rents paid by producers. These funds are collected and subsequently distributed to the federal and state government. The Department of the Interior, through the Office of Natural Resources Revenue (ONRR), collects a set percentage of the sales value of federal leasable minerals; this is known as a royalty. In August 2022, the US Congress passed H.R. 5376–Inflation Reduction Act of 2022 (the IRA), which updated federal oil and gas leasing terms, including the royalty rate, rental rate, and minimum bonus bid rate. The IRA increased federal royalty rates for new oil and natural gas leases from 12.5 percent to 16.67 percent.

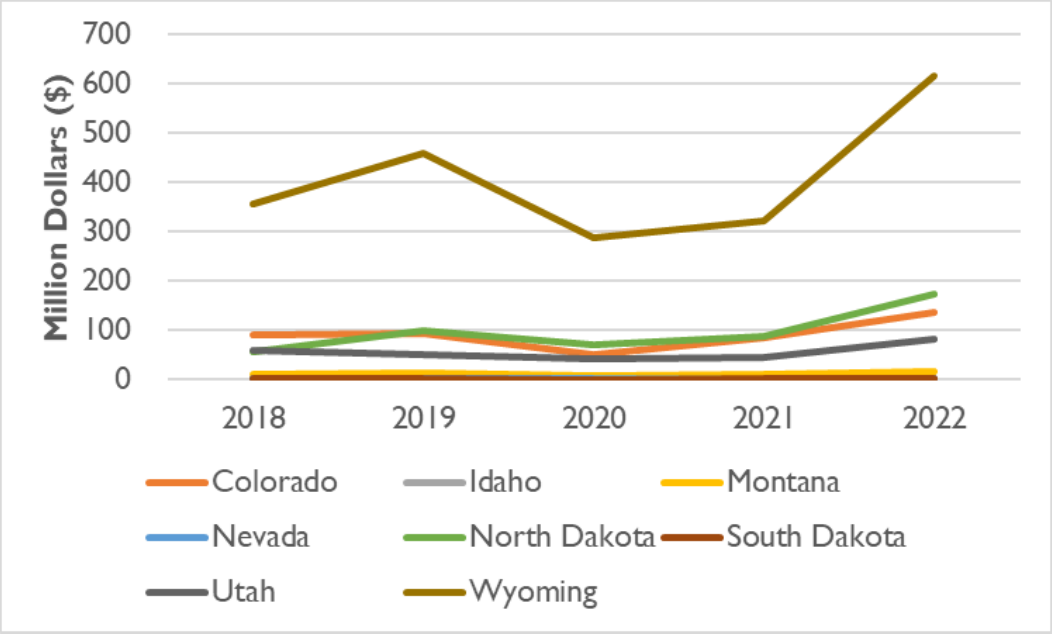
Leaseholders can competitively bid, pay an initial bonus (that is, higher than the minimum bonus bids), and subsequently pay rent for the right to develop the resources on public lands (the IRA eliminated the option for noncompetitive lease sales). The IRA increased the annual rental rates for new competitive oil and gas leases from $1.50 per acre (or fraction thereof) in the first 5 years and $2.00 per acre each year thereafter to $3 per acre from the first 2 years, $5 per acre for years 3 through 8, and $15 per acre for years 9 and 10. After 10 years, those set rental rates will be the minimum. The IRA also increased the minimum bonus bid from $2 per acre to $10 per acre for 10 years; after 10 years, $10 per acre is the statutory minimum.

Other revenues that are not included in the royalty, rent, or bonus categories include settlement agreements and expression of interest fees. Approximately 50 percent of revenues collected from the leasing and production of federal minerals go to the US Treasury, and 49 percent of these mineral revenues are transferred to the state in which they were generated. The portion of revenue allocated to the state, in turn, is distributed to counties, cities, and school districts based on the state's own laws and policies (see **Table A-28** in **Appendix A**, which lists the policies for expenditures at the state level and distributions to local governments and school districts).

Lease revenues and royalties distributed to the state and county provide an additional economic contribution from mineral resource extraction. **Figure 5** shows the disbursement payments made to the states from federal oil and gas extraction from 2018 to 2022 (see **Table A-23** in **Appendix A** for the data).[7] Wyoming had the highest disbursement from oil and gas extractions, in 2022, with about $615 million. From 2018 to 2019, oil and gas disbursements made to the states increased in California, Colorado, Montana, North Dakota, and Wyoming, but decreased in Idaho, Nevada, South Dakota, and Utah. From 2019 to 2021, oil and gas disbursements declined for all states in the planning area. In 2022, disbursements increased and returned to 2019 levels or higher; however, disbursements in 2022 were lower than 2018 levels in Idaho, Nevada, and South Dakota.

Over the 5-year time period, Wyoming and North Dakota saw the largest magnitude increase in oil and gas disbursements, with an increase of about $260 million and $117 million, respectively. Nevada and South Dakota saw the largest magnitude decrease in disbursements of about $123,000 and $98,000, respectively. These decreases in disbursements could impact the local economies and public services such as education. If oil and gas disbursements continue to decline in Nevada and South Dakota, public services that are funded through oil and gas disbursements could be impacted.

**Figure 5. Federal Disbursements to States from Oil and Gas Extraction, Fiscal Years 2018–2022**




Note: From 2018 to 2022, there was no federal oil and gas production or disbursement made to Oregon. Although there was federal oil and gas production and disbursements made to California, none of the production occurred in the socioeconomic analysis area. Therefore, Oregon and California are not included in the figure above.

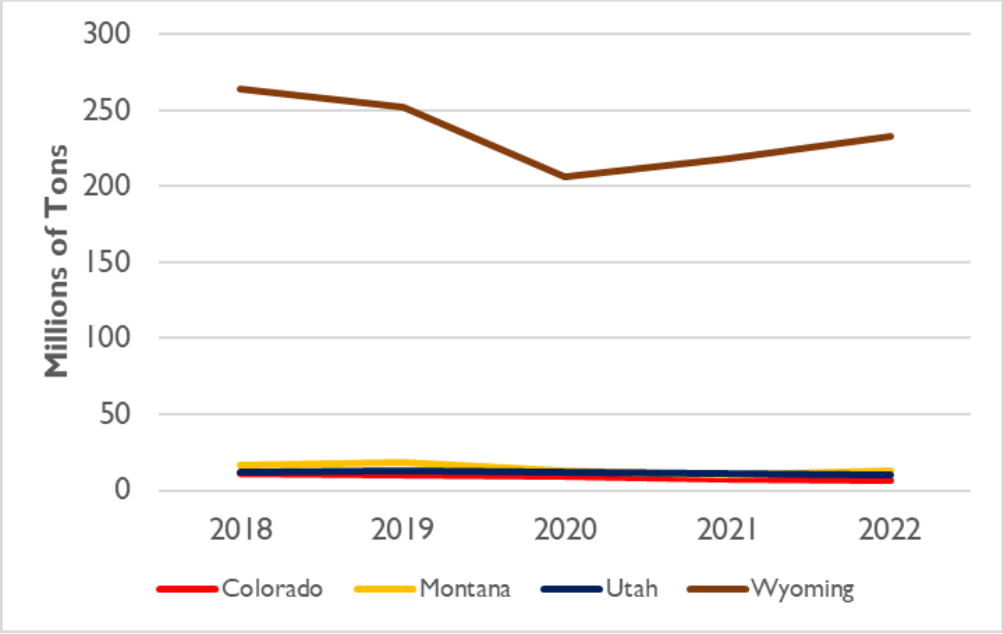
[7] The disbursements shown are from revenue prior to the passing and implementation of the IRA. While existing leasing will not be affected by the IRA, the new royalty rates, rental rates, and minimum bonus bids from the IRA will apply to new leases that are issued after the IRA passed. Revenue, production, and disbursements to states from new oil and gas leases are expected to change as a result of the IRA; however, the magnitude of this change is not yet known.

### 3.1.2 Coal

***Coal Mines and Production***

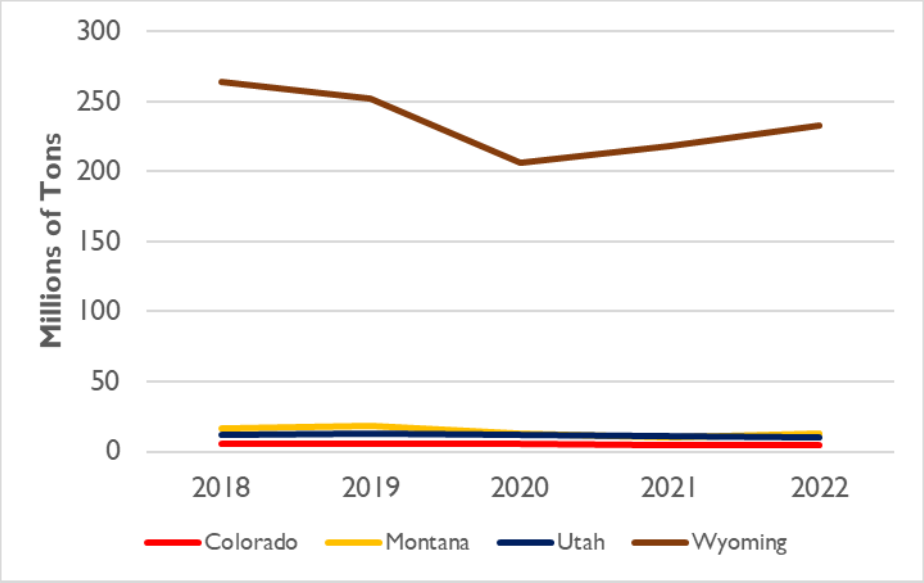
Coal is used primarily in the United States to generate electricity. Western coal-producing states with GRSG populations include Colorado, Montana, North Dakota, Utah, and Wyoming. In 2022, Wyoming and Montana were the largest producers of coal on federal lands across the socioeconomic analysis area (see **Table A-24** in **Appendix A**, which shows the coal production in counties included in each state's socioeconomic analysis area between 2018 and 2022, and see **Figure 6** and **Figure 7**, below, which show the total coal production for each state and each state's socioeconomic analysis area, respectively). From 2018 to 2022, there was no federal coal production in California, Idaho, Nevada, Oregon, and South Dakota; while there was federal coal production in North Dakota, none of it occurred in the socioeconomic analysis area.

**Figure 6. Total Statewide Federal Coal Production, 2018–2022**




Note: From 2018 to 2022, there was no federal coal production in California, Idaho, Nevada, Oregon, and South Dakota. Although there was federal coal production in North Dakota, none of it occurred in the socioeconomic analysis area. Therefore, these states are not included in the figure above.

**Figure 7. Federal Coal Production in the Socioeconomic Analysis Area for Each State, 2018–2022**




Note: From 2018 to 2022, there was no federal coal production in California, Idaho, Nevada, Oregon, and South Dakota. Although there was federal coal production in North Dakota, none of it occurred in the socioeconomic analysis area. Therefore, these states are not included in the figure above.

Although coal accounts for a small percentage of total economic contributions and employment in the local communities, the jobs associated with coal mining tend to be high paying compared with other types of employment in these rural communities (see **Chapter 2**, Demographic and Economic Baseline Conditions, for more details on employment and labor income by industry in each state). All states, except North Dakota, saw a decline in coal production from 2018 to 2022, with the largest percentage decline occurring in Colorado (with a reduction in production of about 77.9 percent over the 5-year period). This reduction of coal production was observed globally. The reduction was largely driven by the reduction in natural gas prices that increased the demand for natural gas and reduced the demand for coal (EIA 2021).[8]

In the coming decade, coal is expected to continue to decrease. The reduction in demand for coal is also expected to continue, and the US is expected to retire about half of its coal-fired capacity by 2026 (Institute for Energy Economics and Financial Analysis 2023).

***Federal Coal Disbursement Payments***

Due to the reduction in demand for coal-fired generation, many economies throughout the socioeconomic analysis area could face significant financial impacts from the loss of the associated coal mining jobs and tax revenue in the next decade. For example, Moffatt County, Colorado, received over $12 million in ad valorem taxes in 2018 from coal power plants and mines in the county (Mesa University, undated). In Wyoming, continued revenue decreases from coal production have spurred the review of funding mechanisms for state school systems and education services. The Wyoming School Capital Construction Account has been historically funded through federal coal lease bonuses (see **Table A-25** in **Appendix A**). However, the federal coal lease bonuses in Wyoming peaked at $229.6 million in 2012–2013 and have declined since then,

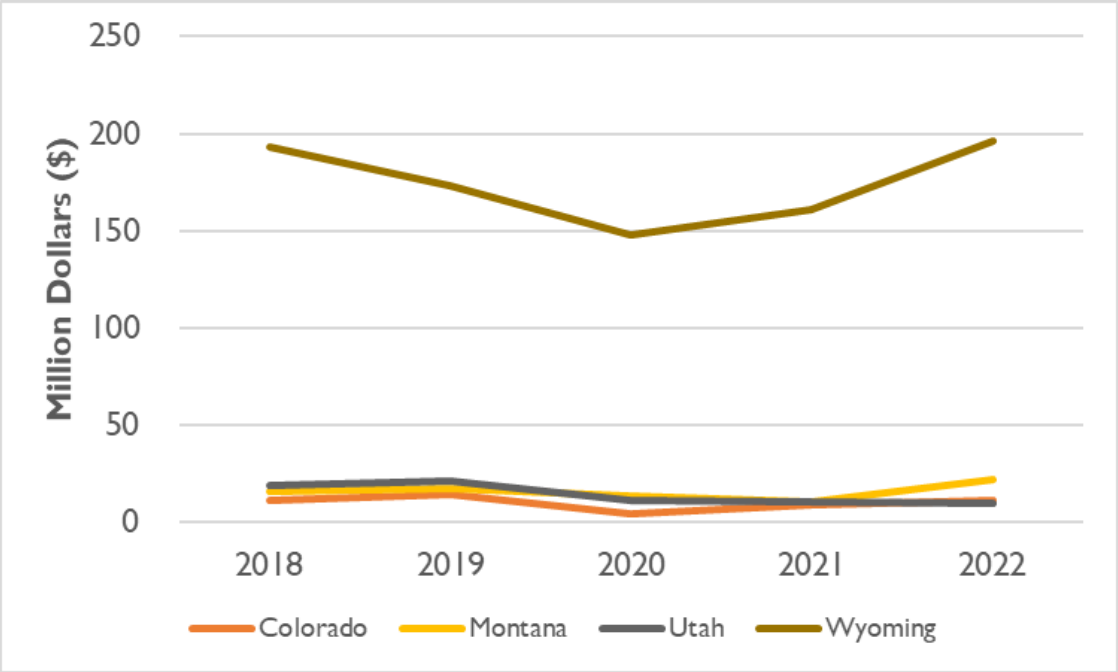
[8] Coal and natural gas are substitute goods and compete for the same demand for energy (Abraham 2018). This means that when the demand for one energy source increases (due to factors such as a decrease in price), the demand for the other energy source decreases.

with no foreseeable return through at least 2026 (Wyoming Legislative Service Office 2022; Wyoming Consensus Revenue Estimating Group 2023).

**Figure 8** shows the disbursements to the states in the planning area from federal coal extraction (see **Table A-25** in **Appendix A** for the data). Similar to oil and gas, the government collects royalties, rents, bonuses, and other revenues from coal production. Federal royalties for coal are set at a rate of 12.5 percent for surface coal and 8.0 percent for coal extracted from underground mines (US Department of the Treasury 2021). Federal coal leases require payment of an annual rental fee of not less than $3 per acre or fraction thereof (BLM 2022d). The revenues are disbursed to the states, and the states then allocate a portion of the disbursements to counties, local governments, municipalities, and school districts (see **Table A-28** in **Appendix A**, which lists the polices for expenditures at the state level and distributions to local governments and school districts).

All states in the planning area, except Montana and Utah, had stagnant disbursements from coal extraction over the last 5 years. Utah experienced a decline in disbursements of about 48 percent. Montana had a decline in disbursements from 2018 to 2021, but then disbursements increased from 2021 to 2022.

**Figure 8. Federal Disbursements to States from Coal Extraction, Fiscal Years 2018–2022**



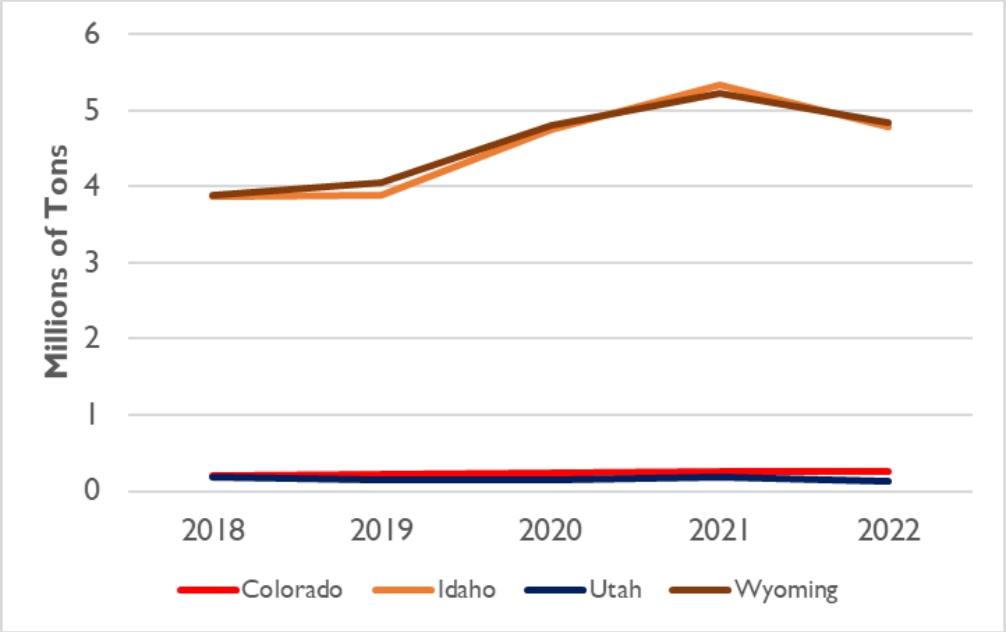

Note: From 2018 to 2022, there was no federal coal production in or disbursement made to California, Idaho, Nevada, Oregon, and South Dakota. Although there was federal coal production in and disbursements made to North Dakota, none of the production occurred in the socioeconomic analysis area. Therefore, these states are not included in the figure above.

### 3.1.3 Nonenergy Leasable Minerals

***Nonenergy Mineral Extraction***

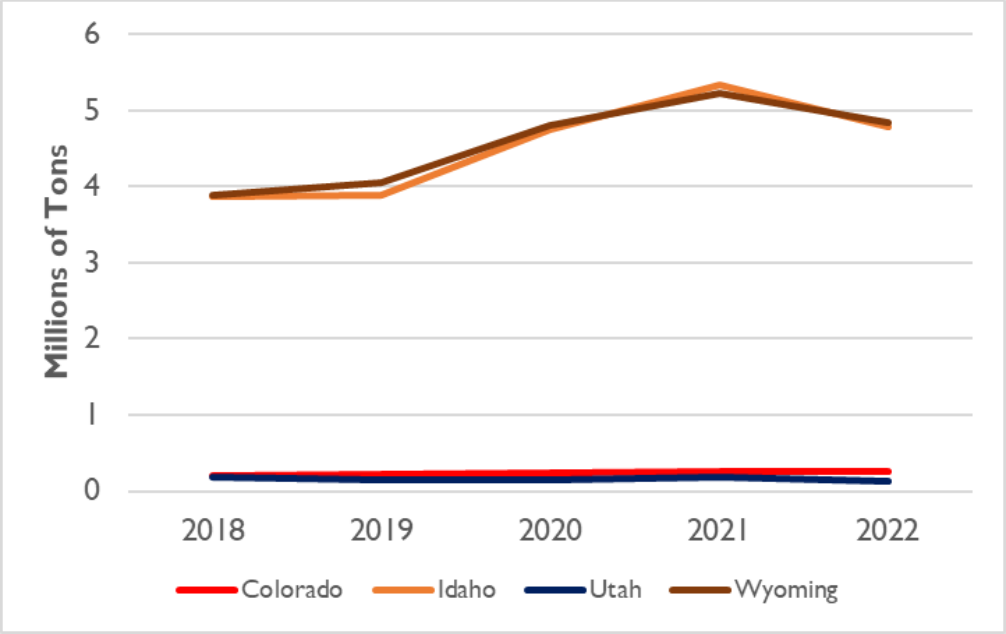
**Figure 9** and **Figure 10**, below, show the total federal nonenergy mineral extraction for each state in the planning area and the nonenergy mineral extraction for the counties in each state's socioeconomic analysis area, respectively (see **Table A-26** in **Appendix A** for the data by county). In 2022, Wyoming and Idaho were the biggest producers of nonenergy minerals, with over 4.8 million tons of sodium bicarbonate, trona, soda ash, and sodium sesquicarbonate, as well as other by-products extracted in Wyoming and almost 4.8 million tons of phosphate extracted in Idaho. Nonenergy mineral extraction increased in both Wyoming and Idaho through 2021; it decreased slightly in 2022, but was still above 2018 levels by about 943,000 and 911,000 tons for Wyoming and Idaho, respectively. In Colorado, nonenergy mineral extraction, which is made up of sodium bicarbonate extractions, increased slightly (by about 60,000 tons) from 2018 to 2022. In the Utah, nonenergy mineral extraction, which is made up of clay and gilsonite extractions, decreased slightly from 2018 to 2022, with a reduction of about 54,000 tons.

**Figure 9. Total Statewide Federal Nonenergy Mineral Extraction, 2018–2022**




Note: Montana, Nevada, Oregon, and South Dakota did not have any federal nonenergy mineral extraction from 2018 to 2022. Although there was federal nonenergy mineral extraction in California and North Dakota, the extraction occurred outside the socioeconomic analysis area. Therefore, these states are not included in the figure above.

**Figure 10. Federal Nonenergy Mineral Extraction in the Socioeconomic Analysis Area for Each State, 2018–2022**



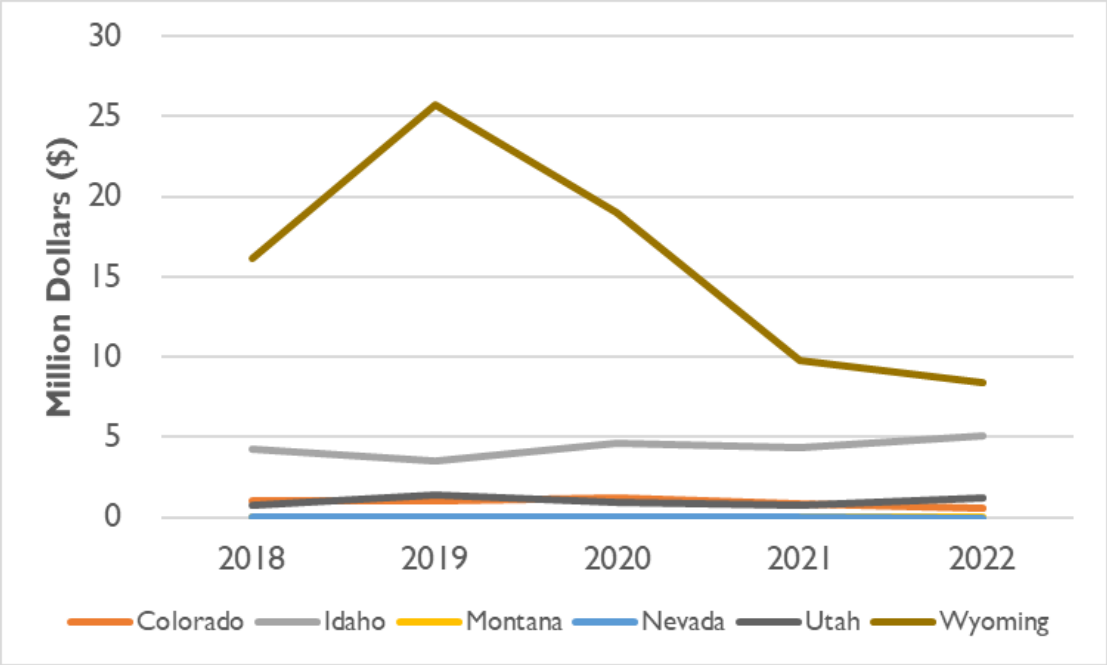

Note: Montana, Nevada, Oregon, and South Dakota did not have any federal nonenergy mineral extraction from 2018 to 2022. Although there was federal nonenergy mineral extraction in California and North Dakota, the extraction occurred outside the socioeconomic analysis area. Therefore, these states are not included in the figure above.

### *Federal Nonenergy Mineral Disbursement Payments*

Similar to oil, gas, and coal, the government collects revenue from nonenergy minerals. The BLM determines and discloses the royalty rate for nonenergy minerals before the lease is offered; the minimum royalty rates are 5 percent of gross value of output for phosphate and sulfur 2 percent of quantity or gross value of output for sodium and potassium, and 25 cents per ton for asphalt. Gilsonite and hard-rock minerals have no minimum royalty rate. A portion of the revenues collected by the government are disbursed to the states, and the states then allocate a portion of the disbursements to counties, local governments, municipalities, and school districts (see **Table A-28** in **Appendix A**, which lists the polices for expenditures at the state level and distributions to local governments and school districts).

**Figure 11** shows the disbursements to the states in the planning area from all federal nonenergy extraction, including sodium, potassium, phosphate, hard rock, and gilsonite (see **Table A-27** in **Appendix A** for the data). Wyoming had the highest disbursement from nonenergy mineral extractions, in 2022, with about $8.4 million (all of which came from sodium-based minerals such as trona). However, these disbursements in Wyoming declined from 2019 to 2022 by over $7.7 million, which was the largest decline in magnitude across the planning area. All states, except Idaho and Utah, had either a decline in disbursements or stagnation in disbursements over the 2019–2022 period. Idaho has large deposits of phosphate and disbursements to Idaho over the last five years ranged from about $3.5 million in 2019 to $5.1 million in 2022. Disbursements in Idaho decreased from 2018 to 2019 but increased from 2019 to 2022, which raised the disbursements above 2018 levels by $863,000. Utah disbursements, which are largely from potassium and gilsonite, fluctuated between a low of about $739,000 in 2018 and a high of about $1.4 million in 2019.

**Figure 11. Federal Disbursements to States from Nonenergy Leasable Mineral Extraction, Fiscal Years 2018–2022**




Note: North Dakota, Oregon, and South Dakota did not have any disbursements from nonenergy minerals from 2018 to 2022. California received disbursements for federal nonenergy minerals extracted in the state; however, the minerals were extracted outside the California socioeconomic analysis area. Montana and Nevada received small disbursements for rents, bonuses, and other distributions from nonenergy minerals, but there were no nonenergy minerals extracted from 2018 to 2022. Therefore, these states are not included in the figure above.

California receives disbursements for nonenergy minerals produced in the state; however, minerals are extracted outside the California socioeconomic analysis area; therefore, changes in BLM management decision on GRSG HMAs would likely not impact disbursements for nonenergy minerals in California. Therefore, the disbursements are not included in this report.

In addition to the public services that nonenergy leasable minerals help support, nonenergy leasable mining jobs tend to be some of the highest paying jobs in rural communities, especially in Idaho (see **Chapter 2**, Demographic and Economic Baseline Conditions, for more information on employment and wages in the mining industry).

## 3.2 Locatable Minerals

Locatable minerals are minerals for which the right to explore or develop the mineral resource on federal land is established by the location (or staking) of lode or placer mining claims and is authorized under the General Mining Law of 1872. Locatable minerals include metallic minerals, such as gold, silver, copper, lead, zinc, molybdenum, and uranium, and nonmetallic minerals, such as fluorspar, asbestos, talc, and mica.

Acquisition of locatable minerals is executed by staking a mining claim over the deposit and acquiring the necessary permits to explore or mine. Within a mining claim located after the Surface Resources Act of July 23, 1955, the surface lands remain open to the public for other multiple uses that do not materially interfere with exploration, mining, and reasonably incident activities. Miners locate claims to acquire the right to develop the mineral values in a specified area. For operations other than casual use, the claimant is required

to submit a notice or a plan of operations. Regulations require the claimant to prevent unnecessary or undue degradation of the land. The BLM may petition the Secretary of the Interior through the process outlined in Section 204 of FLPMA to withdraw areas from further location of mining claims or sites.

Locatable mineral exploration and production occur throughout the planning area, on and off GRSG HMAs. **Table 3-3** shows locatable minerals found in the planning area by state.

**Table 3-3. Locatable Mineral Types on Federal Lands in the Planning Area***

| States | Precious and Base Metals | Industrial Minerals |
|---|---|---|
| Colorado | Gold, molybdenum, and uranium | Gypsum |
| Idaho | Gold, silver, copper, lead, iron, molybdenum, beryllium, uranium, and vanadium | Limestone, bentonite, high-alumina clay, and gypsum |
| Montana | Gold, silver, and mercury | Bentonite and diamonds |
| Nevada | Gold, silver, copper, lithium, galena, iron, zinc, cobalt, vanadium, tungsten, antimony, and molybdenum | Gypsum, limestone, diatomite, bentonite, silica sand, magnesium, and barite |
| Oregon | Gold, silver, lead-silver-zinc, copper, uranium, iron, and arsenic | Borax, dimension stone, mercury, limestone, diatomaceous earth, zeolites, kaolinite, perlite, gemstones, and bentonite |
| Utah | Gold, silver, copper, lead, iron, molybdenum, beryllium, uranium, and vanadium | Limestone, bentonite, high-alumina clay, and gypsum |
| Wyoming | Uranium, gold, titanium, and lithium | Limestone, marble, bentonite, and jade |

Source: BLM and Forest Service 2015; Muntean et. al 2022; USGS 2016
*This list includes locatable minerals commonly known to exist in the planning area. It is not an exhaustive list of all locatable minerals in the planning area. Inclusion on this list does not imply that these metals and minerals are being developed or extracted.

Nevada is one of the top hard-rock mining states. The General Mining Law does not require mines to report production or subject these minerals to royalty payments; therefore, production data is not available for all BLM administered lands. however, data on open claims for locatable minerals are available throughout the planning area. Within GRSG priority habitat management areas (PHMAs), Nevada and California, combined, have about 147,160 existing open claims across 21,167,000 acres of BLM-administered locatable minerals.[9] This is the most open claims in GRSG habitat of all the states in the planning area. In Colorado, there are about 552 existing open claims across 3,600,000 acres of BLM-administered locatable minerals on PHMAs. In Idaho, there are about 7,219 existing open claims across 10,203,000 acres of BLM-administered locatable minerals on PHMAs. In Montana, South Dakota, and North Dakota, combined, there are about 2,315 existing open claims across 8,371,000 acres of BLM-administered locatable minerals on PHMAs. In Oregon, there are about 4,993 existing open claims across 12,126,000 acres of BLM-administered locatable minerals on PHMAs. In Utah, there are about 6,418 existing open claims across 3,952,000 acres of BLM-administered locatable minerals on PHMAs. Finally, in Wyoming, there are about 33,401 existing open claims across 26,012,000 acres of BLM-administered locatable minerals on PHMAs (BLM 2023).

Regions in Idaho, Oregon, and Nevada have had sharp increases in the average number of annual claims since 2016. There could be a number of reasons for the increase, including a potential increase in demand for critical minerals in the area, a potential increase in the price of locatable commodities, or operators looking to secure claims, in the event the Secretary decides to withdraw the areas proposed in the 2016 SFA Withdrawal process which is currently underway.. Claims that exist in a withdrawal area before the date of

[9] As of November 2023, there were over 250,000 active mining claims across all BLM-administered lands in Nevada, on and off-PHMAs.

a withdrawal are not subject to the withdrawal and could potentially be developed in the future, subject to a validity examination. However, validity examinations typically cost at least $50,000 per claim to complete and have the potential to delay the start of locatable mineral development on a valid claim, which could add risks and costs to the operators (BLM 2023).

Locatable mineral production data is available for some BLM field offices, including those in Nevada, where locatable mineral production represents an important use. **Table 3-4** shows locatable minerals production by state for states and field offices where data is available.

**Table 3-4. Locatable Mineral Annual Production in the Planning Area (Fiscal Year 2022)**

| Locatable Minerals | Colorado | Nevada | Wyoming |
|---|---|---|---|
| Bentonite (tons) | — | — | 1,200 |
| Cement (ton) | — | 24,208 | — |
| Dolomite | — | 23,393 | — |
| Diatomite | — | 1,654,736 | — |
| Gold (troy oz) | — | 1,021,455 | — |
| Gypsum (ton) | 1,698 | — | — |
| Limestone | 229,100 | 77,403 | — |
| Lithium (lb) | — | 2,054 | — |
| Perlite (tons) | — | 2,230,151 | — |
| Pozzolan (ton) | — | 92,836 | — |
| Quartzite (ton) | — | 3,340 | — |
| Salt (ton) | — | 5,050 | — |
| Silver (Troy oz) | — | 2,660,875 | — |
| Turquoise (lb) | — | 1,200 | — |

Source: BLM 2023

Note: Data provided are state-level data for all BLM-administered lands and minerals as available. Data are not reported for all states. No production data is available for California, Idaho, Montana, North Dakota, Oregon, South Dakota or Utah.

The value of minerals and their contribution to local and regional economies vary based on market conditions and the volume extracted. Within the planning area, all the states, except South Dakota and North Dakota, impose taxes on locatable hard-rock mining activities. The taxes in most states are collected regardless of landownership (see **Table A-29** in **Appendix A** for information on state taxes for hard-rock mining activities on all lands). The type of taxes and amount collected vary across states; however, the distributions of the taxes are important in supporting public services and infrastructure by providing funds for schools; local counties, cities, and towns; highways and road construction; and water infrastructure (State of Wyoming Legislature 2021). In addition to the public services that locatable minerals help support, hard-rock mining jobs tend to be some of the highest paying jobs in rural communities, especially in Nevada (see **Chapter 2**, Demographic and Economic Baseline Conditions, for more information on employment and wages in the mining industry).

Economic contributions from locatable mineral development for states in which production data on BLM administered lands is available are provided in **Table 3-5**, below.

**Table 3-5. Locatable Mineral Annual Direct Economic Contributions in the Planning Area (Fiscal Year 2022)**

| Locatable Mineral | Impact | Colorado | Nevada | Wyoming |
|---|---|---|---|---|
| Bentonite | Direct Jobs | — | — | 12 |
| | Direct output ($) | — | — | 4,147,821 |
| Cement | Direct Jobs | — | 140 | — |
| | Direct output ($) | — | 29,031,529 | — |
| Dolomite | Direct Jobs | — | 0 | — |
| | Direct output ($) | — | 12,277 | — |
| Diatomite | Direct Jobs | — | 210 | — |
| | Direct output ($) | — | 53,539,913 | — |
| Gold (troy oz) | Direct Jobs | — | 6,385 | — |
| | Direct output ($) | — | 3,705,631,299 | — |
| Gypsum (ton) | Direct Jobs | 0 | — | — |
| | Direct output ($) | 13,874 | — | — |
| Limestone | Direct Jobs | 1 | 23 | — |
| | Direct output ($) | 235,468 | 7,556,817 | — |
| Lithium (lb) | Direct Jobs | — | 38 | — |
| | Direct output ($) | — | 9,797,308 | — |
| Perlite (tons) | Direct Jobs | — | 0 | — |
| | Direct output ($) | — | 52,386 | — |
| Pozzolan (ton) | Direct Jobs | — | 12 | — |
| | Direct output ($) | — | 2,968,837 | — |
| Salt (ton) | Direct Jobs | — | 1 | — |
| | Direct output ($) | — | 289,240 | — |
| Silver (Troy oz) | Direct Jobs | — | 132 | — |
| | Direct output ($) | — | 70,434,335 | — |
| Turquoise (lb) | Direct Jobs | — | 43 | — |
| | Direct output ($) | — | 11,053,469 | — |

Source: BLM 2023

## 3.3 MINERAL MATERIALS

Salable minerals or mineral materials are common minerals sold or given away to local governments, other government entities, and nonprofit groups. Salable minerals are defined as lower-value, common-variety materials, such as rock, gravel, and soil. The term "salable minerals" is synonymous with "mineral materials" and can also be called "common-variety minerals." The BLM has discretion to manage the sale or removal of these materials, with the sale regulated by commercial permits. Salable minerals are also sometimes provided free of charge to local governments for public projects under free-use permits. The volume of material sold and used varies by state.

**Table 3-6** shows the number of permits and quantity of federal salable minerals extracted in the 2021 fiscal year, separated out by free-use permits and exclusive and nonexclusive permits. Idaho had the largest number of existing free-use permits, with 93 permits and almost 78,000 cubic yards of extracted mineral materials. Nevada had the largest quantity of extracted mineral materials under free-use permits, with almost 95,000 cubic yards extracted across 78 permits. Wyoming had the largest number of new free-use permits issued in 2021, with 24 new permits and over 3,000 cubic yards of mineral materials extracted. Colorado had the largest quantity of extracted mineral materials under free-use permits, with over 2.1 million cubic yards of mineral materials across 9 permits.

**Table 3-6. Disposition of Mineral Materials on Federal Land, Fiscal Year 2021**

| Method by Administrative State | Material[a] | New Contract Sales/Use Permits Issued during Fiscal Year[b] | | Production Reports for All Existing Contracts/Permits[c] | |
|---|---|---|---|---|---|
| | | Number | Quantity[d] | Number | Quantity[d] |
| **Free-Use Permits** | | | | | |
| Northeastern California | Sand and gravel | 6 | 3,332 | 1 | 11,748 |
| | **State total** | **6** | **3,332** | **1** | **11,748** |
| Colorado | Sand and gravel | 7 | 219,681 | 20 | 16,603 |
| | Stone | 2 | 1,900,041 | 4 | 1,246 |
| | **State total** | **9** | **2,119,722** | **24** | **17,849** |
| Idaho | Pumice | 1 | 50 | 0 | 0 |
| | Sand and gravel | 6 | 89,074 | 66 | 6,207 |
| | Soil - other | 0 | 0 | 1 | 200 |
| | Stone | 0 | 0 | 26 | 10,513 |
| | **State total** | **7** | **89,124** | **93** | **77,920** |
| Montana[e] | Sand and gravel | 2 | 438,000 | 0 | 0 |
| | **State total** | **2** | **438,000** | **0** | **0** |
| Nevada | Sand and gravel | 6 | 66,600 | 68 | 93,635 |
| | Soil | 0 | 0 | 4 | 920 |
| | Stone | 0 | 0 | 6 | 432 |
| | **State total** | **6** | **66,600** | **78** | **94,987** |
| Oregon[f] | Sand and gravel | 2 | 355 | 5 | 2,845 |
| | Stone | 6 | 1,675 | 9 | 69,240 |
| | **State total** | **8** | **2,030** | **14** | **72,085** |
| Utah | Sand and gravel | 6 | 172,000 | 5 | 29,196 |
| | Stone | 2 | 95,000 | 1 | 570 |
| | **State total** | **8** | **267,000** | **6** | **29,766** |
| Wyoming[g] | Sand and gravel | 24 | 3,140 | 75 | 36,302 |
| | Stone | 0 | 0 | 1 | 18 |
| | **State total** | **24** | **3,140** | **76** | **36,320** |
| **Total Free-Use Permits** | | **70** | **2,988,948** | **292** | **340,675** |
| **Exclusive and Nonexclusive Sales** | | | | | |
| California | Pumice | 1 | 30,534 | 0 | 0 |
| | Sand and gravel | 18 | 336,600 | 102 | 442,339 |
| | Stone | 0 | 0 | 11 | 31,882 |
| | Soil - other | 4 | 302 | 4 | 302 |
| | **State total** | **23** | **367,436** | **117** | **474,523** |
| Colorado | Calcium | 0 | 0 | 12 | 9,144 |
| | Clay | 5 | 174 | 17 | 4,414 |
| | Sand and gravel | 2 | 2 | 13 | 233,545 |
| | Stone | 70 | 33,369 | 144 | 274,001 |
| | **State total** | **77** | **33,545** | **186** | **521,104** |
| Idaho | Clay | 5 | 2,480 | 4 | 1,600 |
| | Pumice | 3 | 326 | 3 | 326 |
| | Sand and gravel | 68 | 26,334 | 67 | 25,404 |
| | Soil - other | 3 | 1,078 | 3 | 1,078 |
| | Stone | 94 | 743 | 94 | 1,296 |
| | **State total** | **173** | **30,961** | **171** | **29,754** |
| Montana[f] | Sand and gravel | 2 | 2 | 3 | 1202 |
| | Stone | 1 | 2 | 1 | 2 |
| | **State total** | **3** | **4** | **4** | **1,204** |

| Method by Administrative State | Material[a] | New Contract Sales/Use Permits Issued during Fiscal Year[b] | | Production Reports for All Existing Contracts/Permits[c] | |
|---|---|---|---|---|---|
| | | Number | Quantity[d] | Number | Quantity[d] |
| Nevada | Clay | 0 | 0 | 10 | 476 |
| | Sand and gravel | 134 | 7,658,858 | 380 | 3,099,250 |
| | Soil - other | 1 | 1 | 14 | 211 |
| | Stone | 11 | 3,216 | 34 | 81,433 |
| | **State total** | **146** | **7,662,075** | **438** | **3,181,370** |
| Oregon[g] | Clay | 1 | 1 | 1 | 1 |
| | Pumice | 12 | 907,865 | 15 | 38,751 |
| | Sand and gravel | 33 | 910,221 | 36 | 41,107 |
| | Stone | 29 | 12,144 | 29 | 12,144 |
| | **State total** | **75** | **1,830,231** | **81** | **92,003** |
| Utah | Clay | 2 | 1,551 | 2 | 1,551 |
| | Pumice | 68 | 25,382 | 83 | 76,017 |
| | Sand and gravel | 110 | 384,984 | 140 | 232,972 |
| | Soil - other | 5 | 581 | 6 | 610 |
| | Stone | 177 | 1,454,120 | 202 | 333,568 |
| | **State total** | **362** | **1,866,618** | **433** | **644,718** |
| Wyoming[h] | Sand and gravel | 46 | 444,565 | 187 | 228,847 |
| | Soil | 0 | 0 | 4 | 43,511 |
| | Stone | 17 | 1,804 | 97 | 320,536 |
| | **State total** | **63** | **446,369** | **288** | **592,894** |
| **Total Exclusive and Nonexclusive[i]** | | **922** | **12,237,239** | **1,718** | **5,537,570** |

Source: BLM 2022

Note: Materials were disposed of under the Materials Act of 1947 (61 Statute 681; 30 US Code 601), as amended by the Multiple-Use Mining Act of 1955 (69 Statute 367).

[a] The data are aggregated into eight standard material groups.

[b] New disposals this year showing the total quantity and value over the full term of the authorization.

[c] Reports show the quantity and dollar values of production this year from all new and previously issued sale contracts and permits.

[d] Includes sales and permit data originally reported in both tons and cubic yards. For this table, all data have been converted automatically to cubic yards.

[e] Total exclusive and nonexclusive numbers are combined together.

[f] Includes North Dakota and South Dakota

[g] Includes Washington

[h] Includes Nebraska

[i] The sum of each state's exclusive and nonexclusive totals

Nevada had the largest number of existing exclusive and nonexclusive permits and the largest quantity of mineral materials extracted across these permits, with 438 existing permits and almost 3.2 million cubic yards of mineral materials. Nevada also had the largest quantity of mineral materials extracted under new existing exclusive and nonexclusive permits, with almost 7.7 million cubic yards. Utah had the largest number of new existing exclusive and nonexclusive permits, with 362 total permits.

Because mineral materials generally do not represent scare commodities, they can be found throughout the analysis areas, on and off GRSG HMAs. Sand and gravel, used often as construction aggregate, are an extremely important resource. The extraction of these resources varies directly with the amount of development—road building and maintenance, and urban development—nearby; this is because sand and gravel are necessary for the development of that infrastructure. The proximity of both transportation and markets are key elements in the potential for deposits to be developed, even more so than for other types of mineral deposits (Burgex Mining Consultants 2023).

Future demand for mineral materials will vary depending on market conditions, which differ according to economic conditions and construction activity. One major driver of construction activity is road and well pad construction for oil and gas exploration and development and residential and commercial construction projects. As new oil and gas development continues to occur, it is expected that mineral materials activity will continue. Another driver of demand for mineral materials is to improve road access for fire suppression activities. The construction, maintenance, and effectiveness of fuel breaks can be impacted by availability of mineral material pits.

Community pits are sites established by governmental agencies for the public to acquire mineral materials through sales contracts. Local government agencies and nonprofit organizations may obtain these materials free of cost for community purposes. County and state road construction divisions are the significant users of gravel and sand resources. A negotiated sale is an exclusive site proposed by a single party, often commercial, as the party must pay for the BLM to process the permit. The number of sales out of a community pit varies by site, from less than one to more than 50 per year. Most sales are for less than 1 ton. Free-use permit sites are used sporadically and may be scattered throughout a field office (FO) or district office; this way, when the county needs material, it has a nearby source, thereby reducing haul costs. A pit may be inactive for several years before it is needed for a road project in the area.

## 3.4 RENEWABLE ENERGY

### 3.4.1 Geothermal Energy

Geothermal reservoirs are naturally occurring areas of hydrothermal resources, where the natural heat of the earth's interior heats groundwater in porous or fractured rock. This geothermal hot water and steam can be harnessed as a source of renewable energy when they are brought to the surface, either naturally or by drilling. The most active natural reservoirs tend to occur close to the boundaries of tectonic plates. The areas in the US with the highest potential for geothermal power are in western states where large areas have hydrothermal resources near the earth's surface and can be accessed more economically. More than 90 percent of all US geothermal power generation occurs in California and Nevada (NREL 2021). Other states in the planning area with geothermal production are Idaho, Oregon, and Utah. However, only Nevada and Utah had geothermal production with a federal stake that was in the counties within the socioeconomic analysis area; therefore, the focus of this discussion is on Nevada and Utah (see **Table 3-7**).

Geothermal resources exist in significant portions of the Nevada socioeconomic analysis area. Based on US Geological Survey data, the highest potential for geothermal development likely occurs along Nevada's western border, which is outside GRSG HMAs. However, there is also moderate to high potential for geothermal development in northeastern Nevada, which contains a high percentage of land in GRSG HMAs (Williams et al. 2008). Nevada currently has 25 operating geothermal power plant units in 18 locations (State of Nevada Commission on Mineral Resources 2023). Twenty-two of these operating geothermal units are in counties within the analysis area, and 10 of these plants are within or near GRSG PHMAs.

Between 2015 and 2019, geothermal project development growth in Nevada surpassed growth in all other states; five new geothermal plants came online in Nevada during this period (NREL 2021) Nevada's geothermal electricity generation was the second highest in the US, after California. In 2021, geothermal power plants in Nevada collectively produced 825 megawatts (MW) of electricity (State of Nevada Commission on Mineral Resources 2021).

**Table 3-7** shows the total electrical generation from geothermal resources administered by the BLM from 2018 to 2022. In Nevada, geothermal energy increased from 2018 to 2022 by about 375 million kilowatt-hours (kWh), which was an increase of about 16.3 percent. This increase in geothermal energy in Nevada is a trend that has continued since the 2015 Record of Decisions. Of the counties in the analysis area, Lander County in Nevada had the largest increase in the amount of generation, with an increase of about 368 million kWh (an increase of about 52.7 percent).

**Table 3-7. Total Geothermal Electrical Generation with a Federal Stake, 2018–2022 (kWh)**

| State | County | 2018 | 2019 | 2020 | 2021 | 2022 |
|---|---|---|---|---|---|---|
| | | | **Nevada** | | | |
| Nevada | Churchill | 1,017,103,246 | 1,041,364,192 | 1,073,703,579 | 1,056,899,531 | 1,037,842,637 |
| | Eureka | 2,771,582 | 2,758,357 | 2,796,512 | 2,742,214 | 2,636,571 |
| | Humboldt | 89,658,929 | 87,726,220 | 85,401,613 | 87,067,771 | 83,626,740 |
| | Lander | 698,497,471 | 835,316,237 | 1,050,022,803 | 1,035,549,619 | 1,066,678,185 |
| | Pershing | 62,804,904 | 65,525,526 | 60,834,841 | 57,464,921 | 58,057,322 |
| | Washoe | 105,383,393 | 29,671,073 | 90,888,431 | 187,749,075 | 195,320,151 |
| | **State total** | **2,305,046,455** | **2,350,760,180** | **2,631,932,422** | **2,682,374,360** | **2,680,263,182** |
| | | | **Utah** | | | |
| Utah | Beaver | 110,546,660 | 104,210,267 | 120,466,808 | 92,850,025 | 97,660,969 |
| | Millard | 24,536,466 | 34,897,548 | 4,925,961 | 27,208,578 | 27,968,671 |
| | **State total** | **135,083,126** | **139,107,815** | **125,392,769** | **120,058,603** | **125,629,640** |

Source: ONRR 2023
Note: The data include all planning area counties for which the ONRR reported data; while there was geothermal production in California, no geothermal production occurs in the California socioeconomic analysis areas.

**Table 3-8** shows the historical average annual new geothermal wells spud with a federal stake in Nevada, broken out by total land area and limited to only on GRSG HMAs. The annual wells spud is averaged over two time periods: 2013–2014, which is prior to GRSG management changes from the previous 2015 Record of Decisions, and 2015–2022, which includes wells spud after GRSG management changes. The average annual spud rate for geothermal wells in Nevada increased slightly over the two time periods across the total land in the analysis area (on and off GRSG HMAs), and the annual spud rate decreased over the two time periods on GRSG HMAs. However, the differences between spud rates across the two time periods were minimal, with changes of less than one well per year.

**Table 3-8. Average Annual New Wells Spud with a Federal Stake in Nevada, by Area**

| Area | 2013–2014 Average | 2015–2022 Average |
|---|---|---|
| GRSG HMAs | 2.00 | 1.37 |
| Total | 2.00 | 2.75 |

Source: BLM 2023

Over the next 20 years, there could be about 20 power plants developed on federal leases in the GRSG planning area, which would amount to about 589 MW of geothermal generation capacity (BLM 2023e).

Geothermal resources in Utah are plentiful in the middle and northern portions of the state, although a lack of transmission capacity may hinder development, especially in the northwest corner. Geothermal resources in Utah have been estimated to have the potential to supply 15,000 MW of electricity. There are currently three geothermal power plants in Utah with capacity of 72.5 MW (BLM 2023h). Two of the three geothermal power plants in Utah (Blundell and Cove Fort-Sulpherdale power plants) are partially on BLM-administered lands with federal geothermal leases.

**Table 3-7** shows the total geothermal electrical generation with a federal stake, from 2018 to 2022, in counties in the Utah analysis area and the total for the state of Utah. Although generation has fluctuated from year to year, both counties in the analysis area that produced geothermal generation, as well as the state of Utah, saw a reduction in geothermal generation in 2022 from 2019 levels. Beaver County in Utah saw the largest reduction in magnitude of geothermal generation, with a decrease of nearly 13 million kWh from 2018 to 2022 (a reduction of about 11.7 percent over the 5-year period).

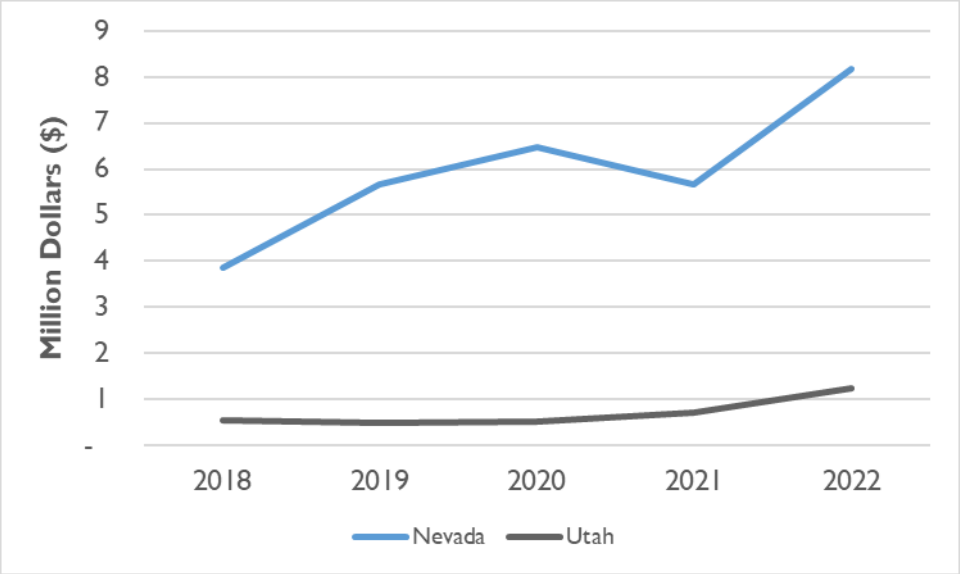
There are areas with moderate levels of geothermal energy development potential within the GRSG HMAs in Beaver and Iron Counties in southwestern Utah and Carbon, Uintah, Duchesne, and Grand Counties in the eastern region of the state. These overlapping areas are small, and there are other nearby areas that could have better potential for geothermal energy development that are not on GRSG HMAs; however, there could be up to one 30 MW geothermal power facility developed on BLM-administered lands in GRSG HMAs over the next 20 years (BLM 2015, 2023h).

Industry surveys show geothermal power plants employ about 0.74–1.17 people per MW to maintain and operate a facility; an additional 0.96 secondary jobs per MW are generated for every power plant built. Additionally, there are temporary jobs in the manufacturing and construction sectors created by the construction of new power plants. Over the 17–33 months in which an average plant is constructed, about 3.1 people per MW of full-time employment are needed to construct the plant, and 3.3 people per MW are needed to manufacture the plant equipment (Geothermal Energy Association 2015).

***Federal Geothermal Disbursement Payments***

The government collects revenues from leasable mineral extraction and geothermal production on public lands, which are subsequently distributed to the federal, state, and local governments. These revenues that are distributed to the state and county provide important economic contributions that often support public services, like education. **Figure 12** shows the disbursement payments made to the states from geothermal with a federal stake from 2018 to 2022 (see **Table A-23** in **Appendix A** for the data). In 2022, Nevada and Utah saw disbursements of about $8.2 million and $1.2 million, respectively. Over the 5-year time period, the disbursements from geothermal with a federal stake in Nevada and Utah increased by over two times.

**Figure 12. Disbursements to States from Geothermal with a Federal Stake, Fiscal Years 2018–2022**




Note: From 2018 to 2022, there was no geothermal production with a federal stake in Colorado, Idaho, Montana, North Dakota, Oregon, South Dakota, and Wyoming. Although there was federal oil and gas production and disbursements made to California, none of the production occurred in the socioeconomic analysis area. Therefore, only Nevada and Utah are included in the figure above.

### 3.4.2 Wind and Solar

Wind and solar projects on BLM-administered lands are authorized under right-of-way (ROW) leases or grants. A ROW is a permit that authorizes the use of a specific parcel of BLM-administered land for projects, such as renewable (wind or solar) energy sites. A ROW authorizes the holder to construct, operate, maintain, and terminate a facility for the life of the project.

**Table 3-9** shows the number of Federal Land Policy and Management Act of 1976 ROWs for energy only, which includes wind and solar projects. Northeastern California and Nevada reported the largest number of ROWs for energy projects, with 48 ROWs and 16 ROWs, respectively. As of 2021, five wind projects were operating on public lands in the analysis area (in Nevada, Oregon, Utah, and Wyoming), and one project (in Wyoming) was pending construction (BLM 2021). As of 2022, there were only two solar projects operating on public lands in the analysis area (in Nevada and Wyoming), and one project (in Utah) was pending construction (BLM 2022).

**Table 3-9. Number of Federal ROWs for Energy (Solar and Wind), Fiscal Year 2021**

| Administrative State | Total ROWs for Energy | Solar ROWs in Analysis Area Counties (Operating and Pending Construction) | Wind ROWs in Analysis Area Counties (Operating and Pending Construction) |
|---|---|---|---|
| California | 48 | 0 | 0 |
| Colorado | 0 | 0 | 0 |
| Idaho | 1 | 0 | 0 |
| Montana | 1 | 0 | 0 |
| Nevada | 16 | 1 | 1 |
| North Dakota | 0 | 0 | 0 |

| Administrative State | Total ROWs for Energy | Solar ROWs in Analysis Area Counties (Operating and Pending Construction) | Wind ROWs in Analysis Area Counties (Operating and Pending Construction) |
|---|---|---|---|
| Oregon | 2 | 0 | 1 |
| South Dakota | 0 | 0 | 0 |
| Utah | 2 | 1 | 2 |
| Wyoming | 7 | 1 | 2 |

Sources: BLM 2021, 2022b, 2022e

## 3.5 LIVESTOCK GRAZING

The BLM administers public land grazing primarily in accordance with the 1934 Taylor Grazing Act, 1976 Federal Land Policy and Management Act, and 1978 Public Rangelands Improvement Act. Grazing use on public land is administered through grazing authorizations (leases or permits) issued by FOs to qualified applicants, who are assigned grazing preference. Preference is expressed in animal unit months (AUMs) or the amount of forage consumed by one cow and calf for 1 month.

**Table 3-10** shows the 5-year average billed AUMs associated with the total permitted allotments and permitted allotments with greater than 15 percent PHMA land on BLM-administered lands in the planning area, by allotment type. Wyoming and Nevada had the most total billed AUMs on average, with about 1.4 million AUMs and 1.2 million AUMs, respectively. In Wyoming, 98 percent of the billed AUMs are on allotments with greater than 15 percent of PHMA land. In Nevada, about 87.6 percent of billed AUMs are on allotments with PHMA land. This suggests that BLM management decisions that affect livestock grazing could impact these states.

The species (type) and age (class) of livestock that graze across the planning area vary across FOs; however, they are primarily cow-calf pairs or yearling cattle in all states. Some allotments graze other kinds of livestock, including sheep, goats, bison, and horses.

The BLM-administered lands and other public and private lands support values to the local economies across the socioeconomic study area by providing forage for local farmers to raise their cattle, sheep, goats, bison, and horses. These, in turn, provide food to the farmers, their families, and the surrounding communities. Under the Taylor Grazing Act, a portion of BLM grazing revenue is returned to the county of origin; 50 percent of Section 15[10] fees collected are returned to counties, and 12.5 percent of Section 3[11] fees are returned to counties. Grazing revenue and the disbursement that is returned to the county vary by county and may have a higher level of importance at the local level for some communities. In addition, the lands provide value through the social and cultural connections with livestock grazing in the analysis areas; these values are discussed in **Chapter 4**, Social Setting and Nonmarket Values.

Across the US there are different types of farms and ranches that operate and make business decisions in different ways. The USDA Economic Research Service developed a classification, or "typology", of farms and ranches based on annual gross cash farm income (the ranch or farm's revenue prior to deducting expenses), primary occupation of the operator, and ownership of the farm or ranch. Farms and ranches are broadly

[10] Section 15 lands are public lands that lie outside a grazing district administered by the BLM under Section 15 of the Taylor Grazing Act. The BLM authorizes livestock grazing on these lands by issuing leases to private parties.
[11] Section 3 of the Taylor Grazing Act concerns grazing permits issued on BLM-administered lands within the grazing districts established under the act. It gave leasing preference to landowners and homesteaders in or adjacent to the grazing district lands.

categorized into family and non-family ranches based on whether the majority of the ranching business is owned by the primary operator and relatives of the primary operator (non-family ranches are those where the operator and individuals who are related to the operator do not own a majority of the business). Family ranches are further categorized by size and primary occupation of the operator as described below (USDA Economic Research Service 2024):

- Small family ranches are those that have gross cash farm income of less than $350,000 per year. These ranches are broken into four types based on the primary occupation of the operator and size of the ranch: retirement ranches (where the operators are retired but continue to ranch on a small scale), off-ranch primary occupation (where the operators report a primary occupation other than farming or ranching), ranch primary occupation with low sales (where the operators report that farming or ranching is their primary occupation and the gross cash farm income of their farm is less than $150,000), and ranch primary occupation with moderate sales (where the operators report that farming or ranching is their primary occupation and the gross cash farm income of their ranch is at least $150,000 but less than $350,000).
- Midsize family ranches are those that have gross cash farm income of at least $350,000 but less than $1 million.
- Large family ranches are those that have gross cash farm income of at least $1 million but less than $5 million.
- Very large family ranches are those that have gross cash farm income of at least $5 million.

**Table 3-11** shows the percentage of farms and ranches in the beef cattle ranching and farming or sheep goat farming industries by the ranch typology described above for each state in the analysis area. The data provided include farms and ranches in as well as outside of the analysis area and on and off BLM-managed lands; however, the data can be used for illustrative purposes to examine how different types of farms and ranches might be impacted by the BLM-management decisions differently. Additionally, the data shown is for farms and ranches that produced or sell at least $1,000 of agricultural products per year, so it does not include very small farms and ranches that produce less than $1,000 of agricultural products or where the operators normally consume the products that are produced. In all of the states in the analysis area, except California, the largest percentage of ranches fell in the category of small family ranch with off-ranch primary occupation (with percentages ranging from 28.6 percent of ranches in Montana to 47.8 percent of ranches in Utah). Ranches that fell into the category of small family ranch with ranch primary occupation and low sales made up a large percentage of total ranches, especially in Colorado, Montana, North Dakota, South Dakota, and Wyoming, where the percentages of this type of ranch was above 20 percent. Furthermore, when considering all small family ranches where ranching is the primary occupation (both low sales and moderate sales together), the percentage was larger than small family off-ranch primary occupation ranches in Montana, North Dakota, South Dakota, and Wyoming (USDA Economic Research Service 2012). The BLM-management decisions that impact livestock grazing would likely have a greater effect on small family ranches where ranching is the primary occupation than other types of ranches. This is because small family ranches where ranching is the primary occupation rely more heavily on ranching than other types of small family ranches and they tend to have less flexibility and resources for modifying business practices based on the BLM-management decisions than larger ranches (for example, they have less ability to absorb higher costs, if ranching costs were to increase).

**Table 3-10. 5-Year Average Livestock Grazing Billed AUMs on BLM-Administered Lands (2018–2022)**

| State | Livestock Type | 5-Year Average Billed AUMs (2018–2022) | 5-Year Average Billed AUMs on Allotments with Greater than 15 Percent PHMA Land | Percentage of Billed AUMs on Allotments with Greater than 15 Percent PHMA Land |
|---|---|---|---|---|
| **California** | | | | |
| California | Total | 125,340 | 121,325 | 96.8 |
| | Cattle or yearlings | 119,062 | 115,259 | 96.8 |
| | Sheep or goats | 6,253 | 6,066 | 97.0 |
| | Horses | 25 | 0 | 0.0 |
| **Colorado** | | | | |
| Colorado | Total | 220,393 | 126,183 | 57.3 |
| | Cattle or yearlings | 179,459 | 102,713 | 57.2 |
| | Sheep or goats | 37,685 | 21,577 | 57.3 |
| | Horses | 3,248 | 1,893 | 58.3 |
| **Idaho** | | | | |
| Idaho | Total | 951,401 | 741,979 | 78.0 |
| | Cattle or yearlings | 889,655 | 693,751 | 78.0 |
| | Sheep or goats | 57,896 | 45,261 | 78.2 |
| | Horses | 3,850 | 2,968 | 77.1 |
| **Montana** | | | | |
| Montana | Total | 1,172,025 | 885,551 | 75.6 |
| | Cattle or yearlings | 1,142,298 | 863,412 | 75.6 |
| | Sheep or goats | 24,798 | 18,597 | 75.0 |
| | Horses | 4,930 | 3,542 | 71.9 |
| **Nevada** | | | | |
| Nevada | Total | 1,246,931 | 1,092,825 | 87.6 |
| | Cattle or yearlings | 1,161,276 | 1,017,420 | 87.6 |
| | Sheep or goats | 82,934 | 73,219 | 88.3 |
| | Horses | 2,720 | 2,186 | 80.3 |
| **North Dakota** | | | | |
| North Dakota | Total | 6,656 | 3,871 | 58.2 |
| | Cattle or yearlings | 6,643 | 3,863 | 58.2 |
| | Sheep or goats | 13 | 8 | 59.6 |
| | Horses | 0 | 0 | 0 |

| State | Livestock Type | 5-Year Average Billed AUMs (2018–2022) | 5-Year Average Billed AUMs on Allotments with Greater than 15 Percent PHMA Land | Percentage of Billed AUMs on Allotments with Greater than 15 Percent PHMA Land |
|---|---|---|---|---|
| **Oregon** | | | | |
| Oregon | Total | 729,029 | 678,191 | 93.0 |
| | Cattle or yearlings | 723,561 | 672,765 | 93.0 |
| | Sheep or goats | 4,242 | 4,069 | 95.9 |
| | Horses | 1,227 | 1,356 | 100 |
| **South Dakota** | | | | |
| South Dakota | Total | 67,020 | 35,588 | 53.1 |
| | Cattle or yearlings | 59,483 | 31,602 | 53.1 |
| | Sheep or goats | 7,430 | 3,950 | 53.2 |
| | Horses | 107 | 71 | 66.3 |
| **Utah** | | | | |
| Utah | Total | 631,994 | 258,438 | 40.9 |
| | Cattle or yearlings | 492,945 | 201,581 | 40.9 |
| | Sheep or goats | 138,283 | 56,598 | 40.9 |
| | Horses | 766 | 258 | 33.7 |
| **Wyoming** | | | | |
| Wyoming | Total | 1,362,534 | 1,334,637 | 98.0 |
| | Cattle or yearlings | 1,206,723 | 1,182,489 | 98.0 |
| | Sheep or goats | 145,971 | 142,806 | 97.8 |
| | Horses | 9,840 | 9,342 | 94.9 |

Source: BLM 2023

**Table 3-11. Percentage of Beef Cattle and Sheep and Goat Farms and Ranches by Ranch Type for Each State in the Analysis Area (2012)**

| Ranch Size | Ranch Type | California | Colorado | Idaho | Montana | Nevada | North Dakota | Oregon | South Dakota | Utah | Wyoming | US Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Small family ranches | Retirement ranch | 37.1 | 25.3 | 26.1 | 18.1 | 30.8 | 13.0 | 37.5 | 11.2 | 28.8 | 18.0 | 32.6 |
| | Off-ranch primary occupation | 36.7 | 39.1 | 45.0 | 28.6 | 34.1 | 35.8 | 39.7 | 32.2 | 47.8 | 31.6 | 44.1 |
| | Ranch primary occupation with low sales | 17.2 | 21.9 | 19.5 | 25.2 | 15.7 | 26.7 | 15.7 | 23.9 | 13.9 | 20.5 | 16.7 |
| | Ranch primary occupation with moderate sales | 2.3 | 5.1 | 3.6 | 11.4 | 5.2 | 12.3 | 2.1 | 12.9 | 2.9 | 11.5 | 2.0 |
| Midsize family ranches | | 2.1 | 4.2 | 2.6 | 9.8 | 6.0 | 8.2 | 2.2 | 13.9 | 2.5 | 10.8 | 1.8 |
| Large-scale family ranches | | 1.0 | 0.9 | 0.9 | 2.4 | 1.6 | 1.9 | 0.8 | 3.7 | 0.5 | 2.3 | 0.6 |
| Very large-scale family ranches | | 0.3 | 0.1 | 0.1 | 0.2 | 0.1 | 0.1 | 0.0 | 0.1 | 0.0 | 0.3 | 0.1 |
| Non-family ranches | | 3.4 | 3.4 | 2.2 | 4.3 | 6.4 | 2.0 | 2.0 | 2.1 | 3.7 | 5.0 | 2.2 |
| Total | | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |

Source: USDA Economic Research Service 2012

## 3.6 WILD HORSE AND BURROS

The Wild Free-Roaming Horses and Burros Act of 1971, as amended by the Federal Land Policy and Management Act of 1976 and the Public Rangeland Improvement Act of 1978, directs the protection and management of wild horses and burros on BLM-administered lands. Responsibility for wild horse and burro management is governed by 43 Code of Federal Regulations 4700. One of the BLM's top priorities is to ensure the health of the public lands so that the species depending on them, including the nation's wild horses and burros, can thrive. The BLM policies and regulations also direct that wild horses and burros are to be managed as self-sustaining populations of healthy animals.

The 53.8 million acres across the western US where wild horses or burros were found roaming at the time the 1971 Wild Free-Roaming Horses and Burros Act was passed are known as herd areas. A subset of these areas (approximately 31.6 million acres nationwide) have been determined suitable for long-term management of wild horses and burros and are known as herd management areas (WHB HMAs). Wild horses and burros within WHB HMAs are managed with the goal of maintaining sustainable ecological conditions and multiple-use relationships on federal lands. Both herd areas and WHB HMAs can include private or state lands, but the BLM has management authority only over public lands.

To carry out its duties under the 1971 law, the BLM periodically evaluates each herd area to determine whether it has adequate food, water, cover, and space to sustain healthy and diverse wild horse and burro populations over the long term. The BLM may designate an appropriate management level (AML) and specify an allowable range in horse numbers for each WHB HMA, based on the available forage and other resources necessary to sustain the horse or burro populations, as well as resource objectives and other designated uses of the BLM-administered lands.

In the planning area, there are approximately 15 million acres of wild horse and burro WHB HMAs. The BLM administers 168 WHB HMAs within California, Colorado, Idaho, Montana, Nevada, Oregon, Utah, and Wyoming. Current conditions within the planning area show that wild horse populations continue to grow, often exceeding AMLs. As wild horse and burro populations exceed AMLs, wild horses and burros can be causal factors for failing to meet applicable standards (**Table 3-12**).

**Table 3-12. Wild Horse and Burro Herd Management Areas by State**

| State | Acres of WHB HMAs | Statewide "High" AML | Estimated Current Population | Percent above AML |
|---|---|---|---|---|
| California | 2,053,082 | 2,200 | 10,140 | 361 |
| Colorado | 365,988 | 827 | 1,873 | 126 |
| Idaho | 383,894 | 617 | 555 | 0 |
| Montana | 27,094 | 120 | 195 | 63 |
| Nevada | 14,032,947 | 12,811 | 46,570 | 264 |
| Oregon | 2,733,577 | 2,700 | 4,532 | 68 |
| Utah | 3,644,013 | 3,795 | 4,017 | 6 |
| Wyoming | 26,917,766 | 2,200 | 4,734 | 115 |
| **Total** | **50,158,361** | **25,270** | **72,616** | **208** |

Source: BLM 2022

Wild horses are often termed "living symbols of the historic and pioneer spirit of the West." (16 U.S.C. § 1331). As such, some stakeholders place a social value on horses related to this symbolism. Wild horses may also hold value for some due to an emotional connection related to the long history of human-horse interactions throughout civilization (Scasta, Henning and Beck 2018).

As discussed in Rodriguez (2020) people's emotional responses to horses as well as the increasing need for management of wild populations have resulted in controversy about this issue throughout the West (Michaels 2018; Scasta, Henning and Beck 2018; Scasta 2019) Concerns over increasing wild horse and burro populations and program costs have prompted discussions, studies, and proposals. The BLM uses wild horse and burro funding for a variety of activities, including off-range holding activities, gathers, and other activities. For fiscal year 2021, expenditures totaled an estimated $122.2 million (CRS 2022).

## 3.7 PUBLIC FINANCES

A summary of revenue collected from BLM mineral and energy development and public finances related to BLM public land use are included below.

### 3.7.1 State and Local Revenues

State and local governments collect a variety of revenues related to the use of natural resources. These revenues could be indirectly impacted by BLM management decisions on GRSG HMAs, if the decisions affect the level of use of natural resources. The following is a description of major sources of revenue and the potential link to BLM resources and resource uses.

Tax revenue at the state level is collected from various sources, including the following:

- State business income taxes and personal income taxes on employee earnings are collected for earnings on employment and industries in certain states (there is no state income tax in Wyoming).
- Severance tax is imposed on nonrenewable natural resources that are removed from the earth. Natural resources that are subject to severance taxation include metallic minerals, molybdenum, oil and gas, oil shale, and coal. Rates of taxation vary by mineral resource and state (see **Table 3-13** for the severance tax rates for oil and gas for each state in the planning area).
- State sales tax is imposed on purchases directly or indirectly associated with BLM-administered lands and resource uses (for example, purchases of household goods by livestock operators on BLM-administered lands).
- Other state revenue sources include sources such as State Conservation Fees or Wyoming's Impact Assistance Tax Program, which require developers on public lands to pay impact assistance payments as warranted by the application/plan of development approval (State of Wyoming 2021).

**Table 3-13. Severance Tax Rate by State, 2023**

| State | Severance Tax (as a percentage of production revenue) | Severance Tax (per bbl of oil) | Severance Tax (per 50,000 cubic feet of gas) |
|---|---|---|---|
| California | N/A | $0.5038349 | $2.52 |
| Colorado | 2.0 to 5.0 | N/A | N/A |
| Idaho | 2.5 | N/A | N/A |
| Montana | 9.0 | N/A | N/A |
| Nevada | N/A | $0.20 | $0.20 |
| Utah | 3.0 to 5.0 | N/A | N/A |
| Oregon | 6.0 | N/A | N/A |
| Wyoming | 6.0 | N/A | N/A |
| South Dakota | 4.5 | N/A | N/A |
| North Dakota | 5.0 (for oil production) | N/A | $3.53 (for gas production) |

Source: National Conference of State Legislatures 2018
N/A = data not applicable

Tax rates can vary widely across local taxing entities within a state, and a county often includes many different taxing entities (e.g., counties, school districts, municipalities, special districts). At the local level, taxes that can be impacted by BLM-administered land uses include the following:

- Local sales tax is imposed at a variable rate based on jurisdiction. It is imposed on purchases directly or indirectly associated with BLM-administered lands and resource uses.
- Ad valorem and other property taxes, which are determined based on local mill levy rates, property valuations, and the gross value of minerals produced within their jurisdiction (including federal minerals located within their jurisdiction).

In addition to state and local taxes, states and local governments receive revenue sharing payments associated with mineral development and grazing on BLM-managed lands and minerals.

As discussed in **Section 3.1**, the leasing and development of minerals and geothermal resources generates federal revenues through rents and royalties. The Office of Natural Resource Revenue collects, accounts for, and verifies energy and mineral revenues and distributes a portion of these funds to states and counties in accordance with governing laws. As shown below, ONRR distributes millions of dollars back to mineral and energy producing states each year. The allocation of these federal disbursements between state expenditures, local distributions, and savings is dictated by statutes in each State.

**Table 3-14. Office of Natural Resource Revenue Disbursements to State and Local Governments**

| State | 2018 | 2019 | 2020 | 2021 | 2022 |
|---|---|---|---|---|---|
| Utah | $76,192,140 | $71,694,837 | $53,902,022 | $55,144,537 | $89,592,227 |
| Idaho | $4,368,184 | $3,713,807 | $4,575,241 | $4,328,968 | $4,990,428 |
| Colorado | $112,567,174 | $108,050,475 | $57,115,433 | $90,875,874 | $142,599,470 |
| North Dakota | $53,223,775 | $93,654,132 | $66,717,834 | $83,389,365 | $163,646,101 |
| Nevada | $5,352,679 | $6,813,611 | $7,750,788 | $6,712,843 | $9,380,215 |
| Wyoming | $563,955,988 | $641,109,256 | $457,474,034 | $479,888,613 | $785,726,557 |

Source: Office of Natural Resource Revenue: Disbursements FY 2018 - 2022 (accessed from https://revenuedata.doi.gov/query-data#)

Since fiscal revenues are collected from federal mineral extraction at multiple levels, revenue associated with federal mineral leasing and production can account for a significant portion of annual budgets at both the State and local level. Even if a State is not heavily reliant on revenues from federal mineral production, the mining sector (including oil and gas extraction) may account for a greater percentage of the local tax base and local funding for schools, roads, and a variety of public services within communities may be more closely tied to the collection of ad valorem taxes.

In additional to federal mineral and energy revenue sharing payments, a portion of BLM grazing receipts are returned to county of origin. Under the Taylor Grazing Act, ; 50 percent of Section 15[12] fees collected are returned to counties, and 12.5 percent of Section 3[13] fees are returned to counties. Grazing revenue and

[12] Section 15 lands are public lands that lie outside a grazing district administered by the BLM under Section 15 of the Taylor Grazing Act. The BLM authorizes livestock grazing on these lands by issuing leases to private parties.
[13] Section 3 of the Taylor Grazing Act concerns grazing permits issued on BLM-administered lands within the grazing districts established under the act. It gave leasing preference to landowners and homesteaders in or adjacent to the grazing district lands.

the disbursement that is returned to the county vary by county and may have a higher level of importance at the local level for some communities.

***Payments in Lieu of Taxes (PILTs)***

PILTs are federal payments to local governments that help offset losses in property taxes due to nontaxable federal lands within their boundaries.[14] However, PILTs are not guaranteed and are subject to annual congressional budget appropriations.

BLM-administered lands fall under Section 6902 of the PILT law, which establishes a formula for calculating payments for qualifying acres of entitlement lands. Payment is typically made directly to the eligible local government. Section 6902 of the PILT act states that PILTs may be used by recipients (usually counties) for any governmental purpose; they are not required to be further distributed to other local government units.

The Department of the Interior computes payments authorized under Section 6902 of the act using the greater of the following two alternatives: (1) $2.94 (in 2022) multiplied by the number of acres of qualified federal surface land, reduced by the amount of funds received by the locality in the prior fiscal year, such as from the Secure Rural Schools program or the mineral leasing program; or (2) $0.42 (in 2022) multiplied by the number of acres of qualified federal surface land in the unit of local government, with no deduction for the prior year's payments. Both alternatives are subject to a population ceiling limitation computed by multiplying the county population by a corresponding dollar value (adjusted annually for inflation) contained in the act. Mineral revenue-sharing programs are factored in the PILT calculations, which means that BLM management decisions that impact mineral extractions and operations could impact PILTs disbursed to local governments.

PILTs are transferred to county or local governments, as applicable, and are in addition to other federal payments, including those from grazing fees. Counties in the Utah analysis area received about $38.2 million in PILTs in 2023 for nearly 27.9 million acres of federal lands. About 70.5 percent of the federal land in the Utah analysis area was BLM-administered land. After applying the calculated payment per acre of federal land for each county to the BLM acres, the estimated BLM-related portion of PILT revenue in the Utah analysis area was about $24.7 million. This was the highest BLM-related portion of PILT revenue to counties across all states in the analysis areas (see **Table 3-15**).

**Table 3-15. Estimated BLM-Related PILT Revenue**

| State | County | 2023 Total PILTs to County ($000) | Total Approximate Entitlement Acres (thousand acres) | 2023 Average Payment per Acre | BLM-Administered Acres (thousand acres) | Estimated BLM-Related Portion of PILT Revenue to County ($000) |
|---|---|---|---|---|---|---|
| **Counties in California** | | | | | | |
| California | Lassen | $2,542 | 1,670 | $1.52 | 1,011 | $1,540 |
| | Modoc | $798 | 1,734 | $0.46 | 273 | $126 |
| | **Analysis area total** | **$3,340** | **3,404** | **$0.98** | **1,284** | **$1,666** |
| | **State total** | **$61,030** | **43,713** | **$1.40** | **15,143** | **$21,142** |

[14] Public Law 94-565, dated October 20, 1976, was rewritten and amended by Public Law 97-258 on September 13, 1982, and was codified at 31 US Code 69. The law recognizes that local governments' inability to collect property taxes on federally owned land can create a financial impact. PILTs are in place to help mitigate the financial impact. See Public Law 94-565 and Public Law 97-258 for more details on limits and appropriations.

| State | County | 2023 Total PILTs to County ($000) | Total Approximate Entitlement Acres (thousand acres) | 2023 Average Payment per Acre | BLM-Administered Acres (thousand acres) | Estimated BLM-Related Portion of PILT Revenue to County ($000) |
|---|---|---|---|---|---|---|
| **Counties in Colorado** | | | | | | |
| Colorado | Eagle | $2,677 | 851 | $3.14 | 235 | $740 |
| | Garfield | $3,721 | 1,189 | $3.13 | 670 | $2,097 |
| | Grand | $1,928 | 795 | $2.42 | 135 | $328 |
| | Jackson | $232 | 515 | $0.45 | 176 | $79 |
| | Mesa | $4,128 | 1,557 | $2.65 | 961 | $2,548 |
| | Moffat | $989 | 1,672 | $0.59 | 1,482 | $876 |
| | Rio Blanco | $674 | 1,499 | $0.45 | 1,140 | $513 |
| | Routt | $2,051 | 663 | $3.09 | 80 | $249 |
| | **Analysis area total** | **$16,399** | **8,740** | **$1.88** | **4,880** | **$7,430** |
| | **State total** | **$45,525** | **23,714** | **$1.92** | **8,159** | **$15,663** |
| **Counties in Idaho** | | | | | | |
| Idaho | Adams | $454 | 551 | $0.82 | 53 | $44 |
| | Bear Lake | $771 | 286 | $2.70 | 41 | $111 |
| | Bingham | $946 | 301 | $3.15 | 285 | $896 |
| | Blaine | $2,708 | 1,325 | $2.04 | 606 | $1,238 |
| | Bonneville | $1,657 | 589 | $2.81 | 91 | $256 |
| | Butte | $453 | 895 | $0.51 | 504 | $255 |
| | Camas | $199 | 444 | $0.45 | 124 | $56 |
| | Caribou | $607 | 446 | $1.36 | 70 | $95 |
| | Cassia | $2,732 | 919 | $2.97 | 503 | $1,497 |
| | Clark | $168 | 702 | $0.24 | 345 | $83 |
| | Custer | $938 | 2,935 | $0.32 | 813 | $260 |
| | Elmore | $3,071 | 1,357 | $2.26 | 585 | $1,323 |
| | Fremont | $1,480 | 702 | $2.11 | 144 | $303 |
| | Gem | $367 | 133 | $2.75 | 71 | $195 |
| | Gooding | $793 | 252 | $3.15 | 252 | $793 |
| | Jefferson | $599 | 190 | $3.15 | 190 | $599 |
| | Jerome | $303 | 96 | $3.15 | 90 | $284 |
| | Lemhi | $1,188 | 2,642 | $0.45 | 576 | $259 |
| | Lincoln | $1,059 | 585 | $1.81 | 577 | $1,044 |
| | Madison | $141 | 63 | $2.23 | 19 | $42 |
| | Minidoka | $557 | 177 | $3.15 | 91 | $286 |
| | Oneida | $917 | 408 | $2.25 | 270 | $605 |
| | Owyhee | $1,687 | 3,628 | $0.46 | 3,628 | $1,686 |
| | Payette | $200 | 64 | $3.12 | 64 | $199 |
| | Power | $923 | 293 | $3.15 | 197 | $621 |
| | Twin Falls | $2,009 | 638 | $3.15 | 542 | $1,704 |
| | Washington | $963 | 341 | $2.83 | 220 | $621 |
| | **Analysis area total** | **$27,890** | **20,965** | **$1.33** | **10,949** | **$15,354** |
| | **State total** | **$38,198** | **32,635** | **$1.17** | **11,619** | **$13,600** |

| State | County | 2023 Total PILTs to County ($000) | Total Approximate Entitlement Acres (thousand acres) | 2023 Average Payment per Acre | BLM-Administered Acres (thousand acres) | Estimated BLM-Related Portion of PILT Revenue to County ($000) |
|---|---|---|---|---|---|---|
| **Counties in Montana** | | | | | | |
| Montana | Beaverhead | $943 | 2,053 | $0.46 | 658 | $302 |
| | Big Horn | $19 | 41 | $0.45 | 27 | $12 |
| | Blaine | $1,186 | 452 | $2.62 | 451 | $1,184 |
| | Carbon | $1,360 | 575 | $2.37 | 220 | $520 |
| | Carter | $267 | 594 | $0.45 | 504 | $227 |
| | Chouteau | $462 | 156 | $2.97 | 111 | $330 |
| | Custer | $1,037 | 332 | $3.12 | 332 | $1,037 |
| | Dawson | $61 | 64 | $0.95 | 62 | $59 |
| | Fallon | $52 | 116 | $0.45 | 116 | $52 |
| | Fergus | $1,462 | 484 | $3.02 | 345 | $1,042 |
| | Garfield | $256 | 815 | $0.31 | 493 | $155 |
| | Madison | $1,187 | 1,056 | $1.12 | 248 | $279 |
| | McCone | $360 | 274 | $1.31 | 201 | $264 |
| | Musselshell | $39 | 88 | $0.45 | 87 | $39 |
| | Petroleum | $110 | 335 | $0.33 | 282 | $92 |
| | Phillips | $619 | 1,377 | $0.45 | 1,078 | $485 |
| | Powder River | $267 | 594 | $0.45 | 256 | $115 |
| | Prairie | $192 | 427 | $0.45 | 427 | $192 |
| | Roosevelt | $2 | 4 | $0.45 | 4 | $2 |
| | Rosebud | $224 | 326 | $0.69 | 230 | $158 |
| | Stillwater | $553 | 199 | $2.78 | 6 | $15 |
| | Sweet Grass | $688 | 294 | $2.34 | 16 | $37 |
| | Treasure | $2 | 0.748 | $2.54 | 0.748 | $2 |
| | Valley | $1,336 | 1,122 | $1.19 | 919 | $1,094 |
| | Wibaux | $12 | 27 | $0.45 | 27 | $12 |
| | Yellowstone | $244 | 78 | $3.12 | 77 | $239 |
| | **Analysis area total** | **$12,939** | **11,884** | **$1.09** | **7,179** | **$7,947** |
| | **State total** | **$40,331** | **27,467** | **$1.47** | **7,836** | **$11,505** |
| **Counties in Nevada** | | | | | | |
| Nevada | Churchill | $2,797 | 2,135 | $1.31 | 2,033 | $2,664 |
| | Elko | $4,129 | 7,905 | $0.52 | 6,830 | $3,567 |
| | Eureka | $403 | 2,157 | $0.19 | 2,013 | $376 |
| | Humboldt | $2,184 | 4,979 | $0.44 | 4,318 | $1,894 |
| | Lander | $1,191 | 3,332 | $0.36 | 3,007 | $1,074 |
| | Lincoln | $959 | 6,388 | $0.15 | 5,611 | $842 |
| | Nye | $3,844 | 8,548 | $0.45 | 6,470 | $2,910 |
| | Pershing | $1,308 | 2,919 | $0.45 | 2,903 | $1,301 |
| | Washoe | $4,199 | 2,935 | $1.43 | 2,652 | $3,795 |
| | White Pine | $1,456 | 5,186 | $0.28 | 4,344 | $1,220 |
| | **Analysis area total** | **$22,470** | **46,483** | **$0.48** | **40,182** | **$19,644** |
| | **State total** | **$31,196** | **56,565** | **$0.55** | **47,729** | **$26,323** |

| State | County | 2023 Total PILTs to County ($000) | Total Approximate Entitlement Acres (thousand acres) | 2023 Average Payment per Acre | BLM-Administered Acres (thousand acres) | Estimated BLM-Related Portion of PILT Revenue to County ($000) |
|---|---|---|---|---|---|---|
| **Counties in North Dakota** | | | | | | |
| North Dakota | Bowman | $18 | 40 | $0.45 | 33 | $15 |
| | Slope | $61 | 136 | $0.45 | 0 | $0 |
| | **Analysis area total** | **$79** | **175** | **$0.45** | **33** | **$15** |
| | **State total** | **$2,006** | **1,819** | **$1.10** | **59** | **$65** |
| **Counties in Oregon** | | | | | | |
| Oregon | Baker | $1,473 | 1,016 | $1.45 | 367 | $532 |
| | Crook | $1,835 | 940 | $1.95 | 496 | $968 |
| | Deschutes | $3,317 | 1,445 | $2.29 | 457 | $1,048 |
| | Grant | $794 | 1,766 | $0.45 | 171 | $77 |
| | Harney | $1,387 | 4,463 | $0.31 | 3,880 | $1,206 |
| | Lake | $1,387 | 3,693 | $0.38 | 2,484 | $933 |
| | Malheur | $3,327 | 4,299 | $0.77 | 4,260 | $3,297 |
| | Union | $1,382 | 624 | $2.21 | 6 | $14 |
| | **Analysis area total** | **$14,902** | **18,247** | **$0.82** | **12,121** | **$8,075** |
| | **State total** | **$27,162** | **31,323** | **$0.87** | **15,063** | **$13,062** |
| **Counties in South Dakota** | | | | | | |
| South Dakota | Butte | $505 | 160 | $3.15 | 146 | $459 |
| | Harding | $254 | 100 | $2.54 | 30 | $76 |
| | **Analysis area total** | **$759** | **260** | **$2.91** | **176** | **$534** |
| | **State total** | **$8,050** | **2,813** | **$2.86** | **274** | **$785** |
| **Counties in Utah** | | | | | | |
| Utah | Beaver | $1,308 | 1,285 | $1.02 | 1,145 | $1,165 |
| | Box Elder | $3,776 | 1,213 | $3.11 | 1,063 | $3,311 |
| | Cache | $869 | 283 | $3.07 | 0 | $0 |
| | Carbon | $1,357 | 436 | $3.11 | 403 | $1,255 |
| | Dagget | $163 | 362 | $0.45 | 110 | $50 |
| | Duchesne | $2,351 | 897 | $2.62 | 150 | $393 |
| | Emery | $1,464 | 2,245 | $0.65 | 2,031 | $1,324 |
| | Garfield | $1,059 | 2,613 | $0.41 | 1,101 | $446 |
| | Grand | $1,441 | 1,744 | $0.83 | 1,621 | $1,340 |
| | Iron | $3,905 | 1,243 | $3.14 | 994 | $3,123 |
| | Juab | $1,448 | 1,538 | $0.94 | 1,406 | $1,324 |
| | Kane | $1,226 | 2,299 | $0.53 | 1,589 | $847 |
| | Millard | $1,726 | 3,355 | $0.51 | 2,988 | $1,538 |
| | Morgan | $38 | 16 | $2.37 | 0 | $0 |
| | Piute | $303 | 362 | $0.84 | 165 | $138 |
| | Rich | $550 | 221 | $2.48 | 169 | $420 |
| | Sanpete | $1,638 | 535 | $3.06 | 136 | $416 |
| | Sevier | $2,439 | 968 | $2.52 | 232 | $584 |
| | Summit | $1,602 | 532 | $3.01 | 0.454 | $1 |
| | Tooele | $4,043 | 2,106 | $1.92 | 1,946 | $3,737 |
| | Uintah | $3,605 | 1,830 | $1.97 | 1,495 | $2,946 |
| | Wasatch | $1,375 | 462 | $2.98 | 5 | $14 |

| State | County | 2023 Total PILTs to County ($000) | Total Approximate Entitlement Acres (thousand acres) | 2023 Average Payment per Acre | BLM-Administered Acres (thousand acres) | Estimated BLM-Related Portion of PILT Revenue to County ($000) |
|---|---|---|---|---|---|---|
| Utah *(cont.)* | Wayne | $542 | 1,328 | $0.41 | 887 | $362 |
| | **Analysis area total** | **$38,229** | **27,872** | **$1.37** | **19,637** | **$24,734** |
| | **State total** | **$46,208** | **32,971** | **$1.40** | **22,298** | **$31,250** |
| | **Counties in Wyoming** | | | | | |
| Wyoming | Albany | $1,758 | 674 | $2.61 | 300 | $784 |
| | Big Horn | $1,379 | 1,545 | $0.89 | 1,106 | $988 |
| | Campbell | $967 | 368 | $2.63 | 228 | $598 |
| | Carbon | $1,601 | 2,721 | $0.59 | 2,028 | $1,193 |
| | Converse | $985 | 405 | $2.43 | 145 | $354 |
| | Crook | $875 | 334 | $2.62 | 149 | $392 |
| | Fremont | $3,081 | 3,186 | $0.97 | 2,083 | $2,014 |
| | Hot Springs | $953 | 570 | $1.67 | 514 | $860 |
| | Johnson | $1,268 | 830 | $1.53 | 502 | $767 |
| | Laramie | $30 | 10 | $3.15 | 10 | $30 |
| | Lincoln | $1,755 | 1,946 | $0.90 | 1,015 | $916 |
| | Natrona | $4,235 | 1,485 | $2.85 | 1,449 | $4,134 |
| | Niobrara | $393 | 125 | $3.14 | 124 | $390 |
| | Park | $2,420 | 3,593 | $0.67 | 562 | $379 |
| | Platte | $334 | 106 | $3.14 | 82 | $258 |
| | Sheridan | $1,191 | 439 | $2.71 | 49 | $133 |
| | Sublette | $1,092 | 2,428 | $0.45 | 1,256 | $565 |
| | Sweetwater | $3,824 | 4,602 | $0.83 | 4,304 | $3,577 |
| | Uinta | $1,749 | 568 | $3.08 | 531 | $1,633 |
| | Washakie | $1,365 | 959 | $1.42 | 922 | $1,312 |
| | Weston | $655 | 309 | $2.12 | 75 | $158 |
| | **Analysis area total** | **$31,909** | **27,202** | **$1.17** | **17,436** | **$21,434** |
| | **State total** | **$34,308** | **29,849** | **$1.15** | **17,472** | **$20,083** |

Source: US DOI 2023

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# Chapter 4. Social Setting and Nonmarket Values

## 4.1 Social Conditions and Community Interests

The 10-state range-wide planning area encompass a diverse landscape of social conditions, including both rural and urban populations. The socioeconomic analysis areas for each state where GRSG HMAs are located tend to be more rural areas of each state; however, the attitudes, beliefs, values, opinions, and perceptions about BLM-managed public resources and the effects of policies and actions can vary substantially across social and geographic groups around and associated with the socioeconomic analysis areas. These views and beliefs of residents, visitors, commercial users, traditional or subsistence users, tribes, and interest-based or place-based groups reflect different cultural and economic linkages that people have with BLM-administered lands. Those with common interests can typically be defined by communities of place or communities of interest, or both, as detailed below.[15]

### 4.1.1 Communities of Place

Communities of place are communities of people who are bound together because of where they reside, work, visit, or otherwise spend a continuous portion of their time. The various communities in the socioeconomic study areas share a strong link to the land and natural resources. Due to the size of the planning area, a narrative is not included here for all relevant communities of place. Please see state-specific discussions of key geographic areas in the 2015 Sage-Grouse Plan Amendments /EISs (BLM 2015a, 2015b, 2015c, 2015d, 2015e, 2015f, 2015g). While some changes to the population and economic conditions have occurred in communities (as described in **Chapter 2** at the county level), the key communities and concerns described in the previous plans are still applicable.

Some key concerns expressed in public comments and outlined in 2015 revolved around concern for the preservation of rural characteristics and values. For example, a shift toward larger, more mechanized agricultural operations, as well as the increasing diversification of local economies, have challenged traditional ways of life in many communities. Nevertheless, farming and ranching remain important parts of the economy, society, and culture across the socioeconomic study areas.

In some areas, particularly those with scenic and recreational amenities, farmlands and ranches are being sold and used for recreational purposes or subdivided for homesites. This is part of a larger trend in which many rural communities in the western United States have witnessed "migration turnaround," which is a reversal of the rural-to-urban migration that characterized much of the United States prior to the 1970s. Some rural areas are now experiencing a significant increase in population after decades of stability or decline.

Despite population increases across many regions of the study areas, some rural communities continue to lose population. This is due, in part, to the out-migration of young people and the aging of the existing population. In contrast to communities where in-migration is occurring, residents of these communities

[15] Additional information on social characteristics of counties in Nevada can be found in the county-level socioeconomic baseline reports published by the Nevada Economic Assessment Project, accessed here: https://extension.unr.edu/neap/about-neap-program.aspx.

may be more concerned about the economic survival of their communities. Multiple-use management of and access to BLM-administered lands, which comprise a large portion of lands in many counties, are cited as paramount concerns in these areas (BLM 2006a).

Residents expressed some similar themes during public scoping and the June 2012 Economic Strategies Workshop (BLM and Forest Service 2012; BLM 2012b). Comments supported maintaining or expanding access to BLM-administered lands for grazing, recreational purposes, and mineral extraction. Many expressed concern that placing additional constraints on these activities might create economic hardship within their communities and alter traditional cultural values and lifestyles. Additionally, some argued that constraints on livestock grazing would exacerbate existing trends of conversion of ranch lands to agricultural and residential uses, perhaps with the unintended consequence of decreasing open space and wildlife habitat.

### 4.1.2 Communities of Interest

Communities of interest are organizations and groups of individuals who have common interests and views in the use and management of BLM-managed public resources. Many organizations or groups of individuals may belong to or share values with more than one community of interest. While the specific relevant communities of interest, and the relative importance of these groups in a given area, vary through the planning area, key overall groups have been identified based on input from the 2015 Sage-Grouse Plan Amendments/EISs and public input. These are summarized below.

Habitat and resource conservation communities of interest are organizations and groups of individuals who have a number of conservation objectives; most believe broadly that protecting at-risk species and maintaining habitats and ecosystems for all species, including GRSG habitats, are fundamental values that should be a high priority in public policy (Brown et al. 2015). Within the socioeconomic analysis areas, many conservation communities believe in the intrinsic value of GRSG and well-functioning, healthy sagebrush ecosystems. Conservation communities could also include persons and organizations concerned with protecting wild horses and burros. These communities emphasize the need to safeguard nonuse values associated with natural resources, as further described in the section below.

Other interest groups with ties to use values of GRSG include those who hunt GRSG for recreational purposes and those who hunt GRSG for subsistence use. While the rational for valuation of the species may vary from those groups who emphasize conservation, both groups are generally supportive of management that would provide for sustained habitat to support the species for the long term.

Mineral development and production communities of interest are organizations and groups of individuals who believe mineral development is a vital component of national, state, and local economies—creating jobs, generating income, and contributing tax and royalty payments to all levels of government. Throughout the socioeconomic analysis areas, many of these communities also believe mineral development and production are socially important, because they support the social systems of local communities by providing private sector livelihoods and revenues to governments. With respect to oil and gas production, these communities believe that domestic development and production are important to national energy security. They believe that many years of compatible development have been achieved in the area, providing significant benefits to the local and regional economy. This group can also include businesses with a tie-in to oil and gas development and production. Those with development as a common interest are likely to prioritize management that emphasizes continued economic contributions associated with this use.

Intertwined with the above communities of shared interest are state, county, and local governments and local residents. State, county, and local governments strive to protect the interests of the residents, and they support various communities by funneling tax revenue into important public infrastructure and services. Some residents across the socioeconomic analysis areas seek to preserve the historical agricultural setting of the community and are reluctant to embrace change, especially changes that could impact the way of life and the character of the community. Some residents are concerned about increased demands on local government services and infrastructure. Other residents are concerned about changes that could impact economic and business opportunities, in the form of changes in employment and earnings. Local chambers of commerce are another example of a specific group with an interest in economic tie-ins with GRSG management.

Other specific types of business groups with a tie-in to GRSG management include those associated with real estate, tourism, and recreation. These groups would benefit from management that allows for continued or increased recreational and tourism activities on BLM-administered lands. In addition, individuals and groups who represent farming and ranch operators can be impacted by GRSG management decisions, which impact the level and locations of grazing on BLM-administered lands and the jobs and socioeconomic contributions associated with these uses.

Academic institutions work to preserve, learn, and pass on knowledge about natural resources, such as GRSG, and represent a group with common interests.

Federally recognized tribes are sovereign nations who value public land and resources for their cultural and spiritual significance. For tribal members, protecting cultural resources, combined with maintaining access to traditional cultural sites, is extremely important. These cultural sites include areas of past occupation and also areas where traditional practices, such as plant gathering and hunting, have occurred. Other groups and individuals with interests in archaeology and history also value cultural resources, though these should not be conflated with the unique relationships and responsibilities upheld by the BLM with tribal nations.

The factors that interest groups perceive as impacting GRSG, and the ways in which GRSG management is seen as impacting communities, may vary by the community of interest. One recent study examined different stakeholder groups and their perspectives on factors most important for GRSG species management. Viewpoints toward the role of climate change and predators in sage-grouse management varied most among stakeholder groups, while less division was present related to the importance of sod-busting (breaking up new ground for cultivation) and concerns for the economic impacts of listing GRSG as an endangered species.

## 4.2 NONMARKET VALUES

BLM-administered lands provide a range of goods and services that benefit society in a variety of ways. Some of these goods and services, such as solid and fluid minerals, are bought and sold in markets; hence, they have a readily observed market value. Others have a less clear connection to market activity, even though society derives benefits from them. In some cases, goods and services have both market and nonmarket values. This section provides an overview of several nonmarket values associated with GRSG management.

For the purposes of this effort, the BLM defines "value" as the combination of all benefits that people receive from BLM-managed lands and resources. Total value is the sum of market value from economic activities and nonmarket value. However, it is important to note that nonmarket values, in the discussion below, are not directly comparable to the previous sections that describe various resource uses and revenue on BLM-administered lands. The market indicators discussed above describe the effects on economic (market) activity in the region, and the market values of many of the activities are monetized. However, nonmarket

values tend to differ across groups and individuals based on preferences, so there are challenges associated with monetizing nonmarket values. Therefore, nonmarket values are discussed qualitatively.

The nonmarket values associated with GRSG management on BLM-administered lands include both use (direct and indirect) and nonuse values (such as existence values and bequest values held by the general public from self-sustaining populations of GRSG; BLM 2013). This section provides an overview of the use and nonuse nonmarket values that may be affected by management of GRSG HMAs.

Nonmarket values associated with GRSG and GRSG habitat can also be viewed through the lenses of ecosystem services. Ecosystem services, or the benefits that people receive from nature, are commonly classified within four major categories: regulating, provisioning, cultural, and supporting (Millennium Ecosystem Assessment 2005). Sagebrush environments, which support GRSG populations, provide numerous ecosystem services, such as providing services associated with food products from livestock production; hunting; other recreational opportunities; and the provision of water for municipal, industrial, and irrigation uses. In addition, intact sagebrush ecosystems reduce wildfire return intervals and host many species of wildlife, including game animals and other sensitive, threatened, and endangered species. Healthy sagebrush ecosystems sequester carbon, which can be enhanced through conservation efforts on public lands (Bennett and Pierce 2020).

People also receive intrinsic benefits from nature that are diverse in inspiration but consistently highly valued. These could be intrinsic benefits from seeing or knowing a flourishing, biodiverse sagebrush ecosystem exists; intrinsic benefits from feeling secure such habitats will exist for the enjoyment and health of future friends and family members; or intrinsic benefits from preserving ancestral/heritage/cultural connections established through sagebrush ecosystems and the GRSG species. Comparatively, there are others whose non-market values associated with public lands, including intrinsic and bequest values, are threatened by land use restrictions associated with GRSG HMAs.

### 4.2.1 Mineral Extraction and Development (including Leasable Minerals, Locatable Minerals, and Mineral Materials)

Most of the value associated with mineral extraction is economic value from the market activities. However, many mine operators and workers gain additional value through the lifestyle of working at a mine. Many mine workers come from generations of people who work in mines, and there can be social cohesion from families of mine workers.

### 4.2.2 Livestock Grazing

Public lands managed for livestock grazing provide both market values (for example, forage for livestock) and nonmarket values. The ranching community benefits from multiple sagebrush ecosystem services, including supporting services that provide forage for livestock, which in turn allow for provisioning services, such as beef production.

However, many ranchers value the ranching lifestyle more than the income generated by their ranching operations. Beyond jobs and income associated with ranching, the lands associated with ranching also contribute to the quality of life and enjoyment for many area residents and visitors by supporting open space, wildlife habitat, working landscapes, and a rural lifestyle (Brymer et al. 2018). One primary reason ranchers indicate they own land is for the "tradition, values and culture" rather than primarily for profit (Tanaka et al. 2005).

In a survey of 645 ranchers in the western United States (not exclusive to sagebrush areas), participants identified the cultural values of maintaining their families' traditions and values as the most important reason for owning a ranch, followed by passing on the ranch and ranch lifestyle to future generations (Tanaka and Maczko 2017). Many public land ranchers work elsewhere part-time and rely on the ranch for only 20 percent of their income (Hanus 2011), relying instead on outside jobs or other savings to support their ranching operation. Families that work off the ranch may do so for health insurance reasons as well as supplemental income. Income from outside of the ranch may also be needed due to increased pressure of government regulation. Changes related to regulation and management practices of grazing affect ranching operations, ability to operate, and the continued activity of ranching in the West.

Some studies have found nonmarket values of ranching associated with use values to residents (Mangun et al. 2005) and tourists in the form of open space and western ranch scenery (Ellingson et al. 2006). Others see nonmarket opportunity costs associated with livestock grazing that may, depending on management methods and other variables, reduce native plant species and forage for wildlife (Todres et al. 2003).

### 4.2.3 Wild Horse and Burros

Values associated with wild horses and burros vary depending on the viewpoints of different individual groups. Some groups highly value horses and consider them as beloved animals that should receive a greater share of BLM resources. Groups valuing wild horses and burros emphasize the importance of the existence value associated with the preservation of free-roaming populations; they often note factors such as historical and cultural values and view wild horses as a symbol of the West.

Other groups view free-roaming horses as interlopers that place additional stress on fragile ecosystems, and compete with livestock and native wildlife for forage and water (National Academies of Sciences, Engineering, and Medicine 2013).

Most WHB HMAs contain GRSG habitat in a sagebrush vegetation community. Overall management direction is to manage for healthy populations of wild horses and burros to achieve a thriving natural ecological balance with respect to wildlife, livestock use, and other multiple uses. Protecting areas from surface-disturbing activities for the purpose of protecting GRSG would also protect forage for wild horses and burros and limit conflicts with humans or surface disturbance. BLM management decisions that restrict WHB HMAs for the protection of GRSG might increase the cost associated with managing wild horses, but impacts are not likely to be material.

### 4.2.4 Greater Sage-Grouse Conservation

Economists have long recognized that wildlife species, especially rare, threatened, and endangered species, have economic values beyond just viewing. This is supported by a series of legal decisions and technical analyses. The US Court of Appeals in 1989 first clarified that the Department of the Interior, in assessing damages in Natural Resource Damage Assessment cases, should include what it termed as "passive use values" (that is, existence values provided to nonusers of the species) as a compensable value in addition to any use value. These passive use values are also included in Oil Pollution Act damage assessments. The term "passive use values" is interchangeable with the previously defined term "nonuse values." This ruling and subsequent analysis for Natural Resource Damage Assessment and Oil Pollution Act assessments are consistent with well-established economic theory showing that people derive value from passive use or nonuse as well as active uses of resources (Krutilla 1967). Economists have devoted a great deal of theoretical and empirical work to refining concepts and developing methods to measure these passive use values.

The BLM conducted a literature search to demonstrate the potential range of values that could be associated with species that are candidates for listing as threatened or endangered, such as GRSG populations. Analysts first verified there are no existing studies on the total economic value or nonuse valuation specific to the GRSG. This is not an uncommon occurrence, as there are dozens of rare or potentially threatened species that have not been studied, despite the very high policy relevance of the species and the large magnitude of economic value at stake in these policy decisions.

The BLM used three criteria to identify studies that are most applicable to the current analysis: (1) whether the species valuation study was located in the same geographic region as the GRSG HMAs; (2) whether the species was listed as threatened or endangered; and (3) whether the species was hunted (implying a mix of use and nonuse values). No studies met all three criteria, as there are no other species in the literature in the geographic region (intermountain) for a species that is both hunted and listed as sensitive.

The primary article used by the BLM was the peer-reviewed journal article by Richardson and Loomis (2009), which is a compilation of the economic values of threatened, endangered, and rare species. A literature review was also conducted to determine whether there had been any recent studies on GRSG or closely related species provides a summary of the studies with features most similar to the GRSG species.

**Table 4-1. Existing Estimates of the Annual Total Nonmarket Value of Protecting Habitat for Species Similar to GRSG**

| Region | Species | Listed | Hunted | Annual Value per Household[b] | Change Valued |
|---|---|---|---|---|---|
| Four Corners (Arizona, Colorado, New Mexico, and Utah) | Mexican spotted owl | Yes | No | $77.20 | Avoid extinction in 15 years in the Four Corners region |
| New England | Wild turkey | No | Yes | $22.07 | Avoid extinction in New England |
| Texas (also Louisiana, New York City, Chicago, and Atlanta) | Whooping crane | Yes | No | $57.67 | Avoid extinction |
| Maine | Peregrine falcon | Yes | No | $42.72 | Restore self-sustaining population |
| South Carolina and the rest of the US | Red-cockaded woodpecker | Yes | No | $19.39 | Restore habitat to increase the chance of survival to 99 percent |
| Atlantic coast | Atlantic red knot | Yes | No | $21.64 | Avoid extinction |

Sources: Loomis and Ekstrand 1997 (Mexican spotted owl); Stevens et al. 1991 (New England wild turkey); Bowker and Stoll 1988 (whooping crane); Kotchen and Reiling 2000 (peregrine falcon); Reaves et al. 1999 (red-cockaded woodpecker); Myers 2014 (Atlantic red knot)
All these sources, with the exception of Myers 2014, are as cited in Richardson and Loomis (2009). Myers 2014 is cited in Subroy et al. 2019.
Notes: Stated preference values for households may have a degree of hypothetical bias that could overstate the actual monetary amount households would pay by a factor of two to three. All values are adjusted to $2023.

# Chapter 5. Environmental Justice

## 5.1 Introduction

This section supports the environmental justice screening of the GRSG range-wide analysis area, focusing on the counties within California, Colorado, Idaho, Montana, Nevada, North Dakota, Oregon, South Dakota, Utah, and Wyoming that encompass a substantial amount of BLM-administered acres in GRSG HMAs, as detailed in **Chapter 1**, Introduction.

Environmental justice embodies the principle of fair treatment and meaningful involvement for all individuals, regardless of their race, color, national origin, or income, in relation to the formulation, execution, and enforcement of environmental laws, regulations, and policies. It underscores the essential concept that no specific group, whether defined by race, ethnicity, or socioeconomic status, should disproportionately bear the adverse environmental impacts arising from industrial, municipal, or commercial activities, or the implementation of federal, state, local, and tribal programs and policies (BLM 2005).

Executive Order (EO) 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations (1994), mandates federal agencies to identify and address disproportionately high and adverse human health or environmental effects of their programs, policies, and activities on minority and low-income populations in the United States. The EO mandates that each federal agency "make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations" (59 *Federal Register* 7629 [1994]). EO 14096, Revitalizing Our Nation's Commitment to Environmental Justice for All, enacted on April 21, 2023, complements EO 12898.

Furthermore, the BLM Land Use Planning Handbook (BLM 2005), emphasized by the significance outlined in Instruction Memorandum 2022-059, reinforces the BLM's dedication to environmental justice. This commitment is evident in providing substantial opportunities for low-income, minority, and American Indian and Alaska Native populations to meaningfully participate and in considering these populations when developing mitigation measures, as appropriate.

## 5.2 Environmental Justice Screening Criteria

For this analysis, the BLM analyzed minority populations, low-income populations, and American Indian and Alaska Native populations within each applicable county within each state, as identified above, using the definitions and thresholds outlined in guidance documents from the Council on Environmental Quality (CEQ) and the BLM Instruction Memorandum 2022-059 (CEQ 1997; BLM 2022a).

The CEQ defines minorities as individuals who identify as American Indian or Alaska Native; Asian or Pacific Islander; Black, not of Hispanic origin; or Hispanic. A minority environmental justice population is recognized if the percentage of minority individuals constitutes greater than or equal to 50 percent of the total population within a given area or if the minority population percentage is "meaningfully greater" than the minority population percentage in a reference area (CEQ 1997). To determine whether a minority population is "meaningfully greater," the minority population percentage in the reference area is multiplied by 1.1 (equivalent to 110 percent) to calculate a threshold value (BLM 2022a). Subsequently, each county's minority population percentage within that state is compared against this calculated threshold. Counties with

minority populations meeting or exceeding this threshold are identified as having potential environmental justice populations.

This comprehensive approach ensures that both clear numerical benchmarks and relative comparisons are considered in identifying minority environmental justice populations. For the purposes of this analysis, the state serves as the reference area. In California and Nevada, which are states with large urban metropolitan areas, the percentage of the population in non-metropolitan areas of the state are used as the reference area populations. GRSG HMAs are largely in rural areas, so non-metropolitan areas would allow a more consistent comparison of regions without including any outliers in demographic data from metropolitan areas.

Low-income populations are defined relative to the annual statistical poverty thresholds from the US Census Bureau (CEQ 1997). The CEQ guidance does not provide criteria for determining low-income populations as explicitly as it does for minority populations; however, the BLM defines low-income individuals as people whose income is less than or equal to twice (200 percent of) the federal poverty level (BLM 2022a). For this analysis, low-income populations were identified following guidance in BLM IM 2022-059. A county is considered to have a significant low-income population and contain environmental justice populations when its low-income population percentage is greater than or equal to 50 percent of the overall population or if the low-income population percentage is greater than or equal to the low-income population percentage of a reference area. Similar to minority populations, the state is used as the reference area for low-income populations except as noted above.

American Indian and Alaska Native individuals are defined as those who identify as American Indian and Alaska Native alone or in combination with one or more races, or they are part of a federally recognized tribe. American Indian and Alaska Native populations are included in minority populations; however, to explore key issues and resources in the analysis areas that are important to individuals who identify as American Indian and Alaska Native, this analysis uses a more sensitive threshold than the threshold for minority populations to identify American Indian and Alaska Native environmental justice populations separately from minority environmental justice populations. For the purposes of this analysis, American Indian and Alaska Native environmental justice populations are considered present when the percentage of American Indian and Alaska Native individuals in a county is greater than or equal to 50 percent or greater than or equal to the percentage of American Indian and Alaska Native individuals in the reference area. As with minority and low-income populations, the reference area for comparing American Indian and Alaska Native populations is the state. Non-metropolitan data are used for American Indian and Alaska Native populations in California and Nevada to exclude any outliers in demographic data from metropolitan areas.

The CEQ instructs agencies to seek tribal representation in a manner that is consistent with the government-to-government relationship between the United States and tribal governments, the federal government's trust responsibility to federally recognized tribes, and any treaty rights (CEQ 1997; see Section 5.2.1 of the 2024 Greater Sage-Grouse Draft Resource Management Plan Amendment and Final Environmental Impact Statement for more details on tribal consultation for this effort).

**Appendix A** includes tables showing the percentage of minority, low-income, and American Indian and Alaska Native populations for each state in the range-wide planning area. They include each county in the analysis area with a large portion of BLM-administered lands in GRSG HMAs. The tables also indicate whether the county met the threshold for minority, low-income, and/or American Indian and Alaska Native populations and is therefore identified as an environmental justice population. **Appendix A** also includes

figures of each state that indicate which counties in the analysis areas are identified as an environmental justice population.

Both counties included in the California analysis area for having a large area of BLM-administered land in GRSG HMAs were identified as containing environmental justice populations (see **Table A-30** and **Figure A-11** in **Appendix A**). The state of California overall has a non-metropolitan minority population of 29.3 percent, and the threshold for a minority environmental justice population is 32.2 percent. In the California analysis area, Lassen County exceeds the threshold for minority populations, with a minority population of 36 percent, and qualifies as a minority environmental justice population. The low-income threshold in California is 29 percent. Both Lassen County and Modoc County exceed the threshold for low-income populations and are identified as environmental justice populations. California has a non-metropolitan American Indian and Alaska Native population of 5.9 percent; however, neither county in the California analysis area exceeds the threshold for American Indian and Alaska Native populations.

Overall, seven of the eight counties in the Colorado analysis area were identified as having environmental justice populations (see **Table A-31** and **Figure A-12** in **Appendix A**). The minority population in Colorado is 33.2 percent, and the threshold for minority populations is 36.5 percent. Notably, none of the counties within the Colorado analysis area meet the criteria for a "meaningfully greater" minority population, which would classify them as environmental justice populations. However, the Colorado analysis area does encompass seven counties where the low-income population equals or exceeds the state's designated low-income threshold of 23.6 percent. Furthermore, Moffat County and Rio Blanco County have American Indian and Alaska Native populations that exceed the state's American Indian and Alaska Native population threshold of 2.5 percent, highlighting their significance in relation to American Indian and Alaska Native communities.

In the Idaho analysis area, 25 of the 27 counties meet the criteria for containing environmental justice populations that could face disproportionate and adverse impacts from BLM management decisions on GRSG HMAs (see **Table A-32** and **Figure A-13** in **Appendix A**). In Idaho, the minority population constitutes 19.4 percent of the total population, and the threshold for minority environmental justice populations is 21.3 percent. Fourteen counties surpass the meaningfully greater threshold for a minority population, designating them as environmental justice populations. Across the Idaho analysis area, 24 counties have a low-income population equal to or exceeding the state threshold of 31.3 percent. Additionally, 14 counties in the analysis area have American Indian and Alaska Native populations that meet or exceed the threshold for environmental justice populations, which is 2.6 percent for the state of Idaho.

In the Montana analysis area, 18 of the 26 counties were identified as environmental justice populations that could be adversely affected by BLM management decisions on GRSG HMAs (see **Table A-33** and **Figure A-14** in **Appendix A**). For minority populations, seven counties exceed the threshold for a meaningfully greater minority population of 16.4 percent, marking them as environmental justice populations. Across the analysis area, 18 counties demonstrate a higher low-income population than the state threshold of 31.1 percent. Seven counties also meet or exceed the state threshold of 8.2 percent for American Indian and Alaska Native environmental justice populations. Examining geographic clusters and their connection to the GRSG HMAs is pivotal to understanding the impacts of BLM management decisions on GRSG HMAs. These 18 counties are largely located in central Montana, as well as along Montana's southern, eastern, and western borders.

The entire Nevada analysis area is identified as containing environmental justice populations that could be impacted by BLM management decisions on GRSG HMAs (see **Table A-34** and **Figure A-15** in

**Appendix A**). The non-metropolitan population for minority populations in Nevada is 28.8 percent, with a threshold for minority populations of 31.7 percent. In the Nevada analysis area, four counties—Elko, Humboldt, Pershing, and Washoe Counties—surpass the threshold for a meaningfully greater minority population, marking them as environmental justice populations. Five counties—Eureka, Humboldt, Lander, Nye, and Pershing Counties—have low-income populations equal to or exceeding the state average of 31.2 percent. All 10 counties in the Nevada analysis area meet or exceed the threshold of 2.5 percent for American Indian and Alaska Native populations.

No county in the North Dakota analysis area is identified as containing an environmental justice population (see **Table A-35** and **Figure A-16** in **Appendix A**). In North Dakota, the minority population constitutes 16.9 percent of the total population, and the threshold for minority populations is 18.6 percent. No counties in the North Dakota analysis area surpass the threshold for a meaningfully greater minority population. No counties in the North Dakota analysis area demonstrate a low-income population exceeding the state threshold of 25.2 percent. Also, no counties include a higher American Indian and Alaska Native population than the state threshold of 6.8 percent.

Overall, seven of the eight counties in the Oregon analysis area were identified as environmental justice populations (see **Table A-36** and **Figure A-17** in **Appendix A**). In Oregon, the minority population is 25.9 percent of the total population, with a threshold for a minority population of 28.5 percent. Only one county in the Oregon analysis area, Malheur County, surpasses the threshold, designating it as an environmental justice population. For low-income populations, seven counties in the Oregon analysis area contain low-income populations equal to or exceeding the state average of 28.7 percent. These counties are Baker, Crook, Grant, Harney, Lake, Malheur, and Union Counties. For American Indian and Alaska Native populations, three counties in the Oregon analysis area meet or exceed the state threshold of 3.3 percent: Harney, Lake, and Malheur Counties. These counties identified as environmental justice populations could be impacted by BLM management decisions on GRSG HMAs.

One county in South Dakota's analysis area, Butte County, is identified as containing an environmental justice population, and the environmental justice population in this county could be impacted by the BLM management decisions regarding GRSG HMAs (see **Table A-37** and **Figure A-18** in **Appendix A**). No county in the South Dakota analysis area exceeds the threshold for a meaningfully greater minority population of 21.1 percent or the threshold for American Indian and Alaska Native populations of 10.4 percent. However, Butte County has a higher low-income population than the state's threshold of 29.0 percent. These data indicate that while there are not environmental justice populations based on minority population in South Dakota, attention should be given to the county with a meaningfully greater low-income population to assess its relationship to the GRSG HMAs and potential environmental justice impacts.

Across the Utah analysis area, 18 of the 23 counties are identified as environmental justice populations (see **Table A-38** and **Figure A-19** in **Appendix A**). The minority population in the state of Utah is 22.7 percent, and the threshold for minority population is 25.0 percent; however, no counties in the Utah analysis area surpass the threshold for a meaningful greater minority population. For low-income populations, 17 counties have a higher low-income population than the state's threshold of 24.7 percent. For American Indian and Alaska Native populations, 10 counties meet or exceed the American Indian and Alaska Native population threshold of 2.0 percent. These counties that are identified as containing environmental justice populations could experience impacts from BLM management decisions on GRSG HMAs.

In the Wyoming analysis area, 15 of the 21 counties are identified as containing environmental justice populations (see **Table A-39** and **Figure A-20** in **Appendix A**). Six of these counties surpass the

threshold for a meaningfully greater minority population of 17.6 percent, designating them as environmental justice populations. Moreover, 12 counties in the analysis area contain a higher low-income population than the state threshold of 26.5 percent. For American Indian and Alaska Native populations, two counties, Fremont County and Weston County, exceed the American Indian and Alaska Native population threshold of 3.7 percent. These counties that are identified as containing environmental justice populations could be impacted by the BLM management decisions regarding GRSG HMAs. These data underscore the presence of environmental justice populations and a heightened low-income population in multiple counties in Wyoming, indicating a need for specific attention to these populations in the context of GRSG HMAs and potential environmental justice impacts.

The findings of areas containing environmental justice populations in the analysis areas for each state were instrumental in evaluating potential disparities in the impacts of various alternatives on minority and low-income populations. Because counties were identified as containing environmental justice populations, as discussed above, the BLM management decisions on GRSG HMAs could impact environmental justice populations disproportionately. The following section includes a discussion of environmental justice issues of concern raised in the previous efforts in 2015.

## 5.3 Environmental Justice Issues of Concern

In 2012, the BLM and the Forest Service conducted an economic strategies workshop to identify public concerns related to potential social, economic, and environmental justice impacts resulting from management alternatives. Additionally, the agencies reviewed the scoping report for the current EIS to identify comments related to environmental justice issues. This section summarizes findings from those efforts and discusses the issues that will be addressed in the impacts analysis on environmental justice populations. The BLM also had government-to-government consultation and outreach with Native American tribes (BLM and Forest Service 2012; BLM 2013d; see Section 5.2.1 of the 2024 Greater Sage-Grouse Draft Resource Management Plan Amendment and Final Environmental Impact Statement for more details on tribal consultation for this effort).

A key issue of concern relating to environmental justice populations for many of the states, including California, Nevada, Colorado, Idaho, Montana, Oregon, South Dakota, and Utah, largely pertained to the interests of those who identify as American Indian and Alaska Native, the cultural significance of the GRSG to American Indian and Alaska Native populations, and the importance of hunting and subsistence. Some concerns revolved around the viability of GRSG populations. Historical records highlight the importance of GRSG to individuals who identify as American Indian and Alaska Native across the planning area who traditionally relied on GRSG as a vital food source. GRSG has played a vital role in traditions and customs, and it has served as inspiration for ceremonial dances.

It was noted that the preservation of GRSG habitat would have beneficial effects for those who identify as American Indian and Alaska Native who hold cultural value for the bird (BLM and Forest Service 2012). American Indian and Alaska Native populations across the planning area engage in hunting and subsistence activities on federal lands outside the boundaries of their reservations. Access to hunting and subsistence resources is a concern for many environmental justice populations within the state analysis areas, especially for American Indian and Alaska Native populations. The profound connection between the GRSG habitat and Native American culture underscores the importance of considering these aspects in the planning and decision-making processes. On the other hand, some comments expressed concern that habitat conservation in some alternatives could negatively impact road realignment projects near their reservation and plans to expand their reservation boundaries; this is because their reservation is surrounded by PHMAs.

Another issue of concern for environmental justice populations regarded economic impacts on environmental justice populations from greater restrictions on livestock grazing and mineral, oil, and gas development. This issue was especially of concern in counties with high poverty rates and declining economic opportunities (BLM 2013b). However, there is a lack of evidence that individuals employed in the sectors that are most likely to be impacted by BLM management decisions (such as the farming, ranching, and mining sectors) have a higher percentage of people who identify as a minority, low-income, or American Indian and Alaska Native. Therefore, economic impacts on environmental justice populations will not be carried forward in the impacts analysis on environmental justice populations. However, a discussion on impacts from restrictions on livestock grazing and mineral, oil, and gas development will be included in the impacts analysis on social and economic conditions. The loss of economic activity stemming from the closure of GRSG PHMA or making PHMA unavailable for authorized uses, in terms of affected jobs and labor income, may result in some additional communities meeting low-income criteria for consideration as potential environmental justice communities in the future. Additional screening and consideration of environmental justice populations and disproportionate impacts will occur at the implementation stage at a scale commensurate with the scope and scale of management actions being considered to provide additional protections for local GRSG populations.

In Wyoming and Idaho, issues of concern were brought up relating to impacts on food prices and availability due to restrictions on grazing and mineral development (especially trona mining, which is used in household and food products). These comments were brought up in the context of economic conditions; however, increases in food prices and decreases in food availability tend to disproportionately impact low-income individuals who have more limited means for finding alternatives; therefore, this issue of concern will be carried forward and examined in the impacts analysis on environmental justice populations.

The 2015 EISs contained issues that were not brought up in public comments but were considered important issues for environmental justice populations; these issues were analyzed in the impacts analysis on environmental justice populations. One of these issues was the impact on environmental justice populations from changes in availability for firewood permits. The current BLM management decisions, however, will not change the availability for firewood permits; therefore, this issue of concern will not be carried forward in the impacts analysis.

Visual and auditory impacts on environmental justice populations from mining development and operations and travel management decisions were other issues that were considered in the 2015 EISs. The previous 2015 plans included specific management decisions that could impact areas used for spiritual and religious practices, but these types of site-specific decisions are not included in the current effort. Therefore, impacts on environmental justice populations from visual and auditory disruptions will not be carried forward in the impacts analysis. Impacts on visual and auditory resources will be considered for potential inclusion in the implementation-level NEPA analysis.

In addition to the issues raised by the public, as discussed above, the BLM will consider and analyze other issues of concern for environmental justice populations. These issues include impacts on environmental justice populations from potential changes in water quality, air quality, and climate change from potential mineral development under alternatives with less restrictions. These issues were not analyzed in the 2015 EISs; however, they are considered important to the analysis in the current efforts.

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# Appendix A

## Supplementary Tables and Figures

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# Appendix A. Supplementary Tables and Figures

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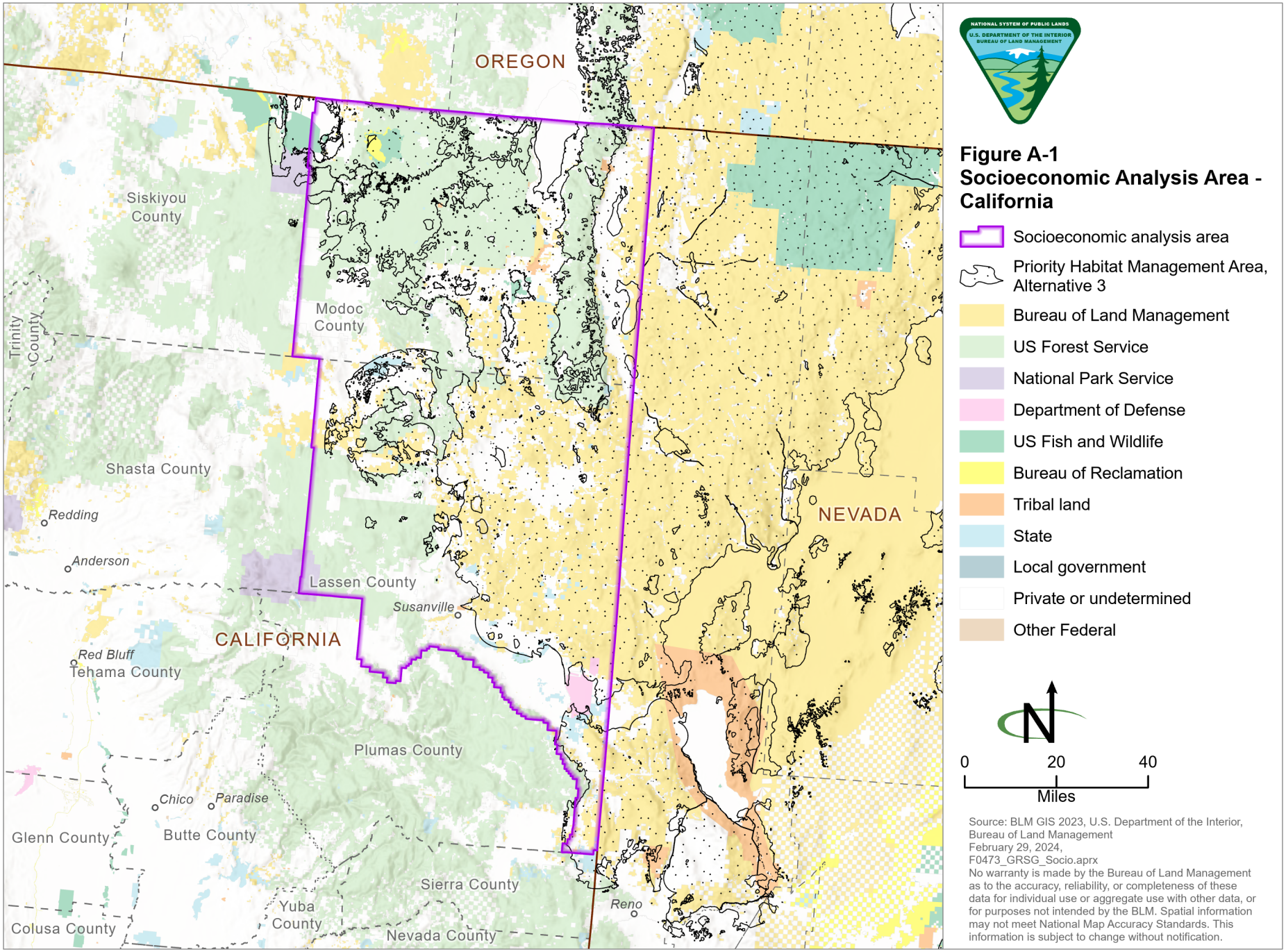
## Table A-1. Analysis Areas Overview

| Analysis Area | BLM Management Unit(s) | Counties* |
|---|---|---|
| California | Eagle Lake FO | Lassen |
| | Applegate FO | Modoc |
| Colorado | Colorado River Valley FO | Eagle, Garfield, Routt |
| | Grand Junction FO | Mesa |
| | Kremmling FO | Garfield, Grand, Jackson |
| | Little Snake FO | Moffatt, Routt |
| | White River FO | Garfield, Rio Blanco |
| Idaho | Bruneau FO | Owyhee |
| | Burley FO | Cassia, Minidoka, Twin Falls |
| | Challis FO | Custer, Lehmi |
| | Four Rivers FO | Washington, Elmore, Adams, Gem, Payette |
| | Jarbidge FO | Owyhee, Twin Falls, Elko |
| | Owyhee FO | Owyhee |
| | Pocatello FO | Oneida, Power, Bear Lake, Bingham, Caribou, Bonneville |
| | Salmon FO | Lehmi |
| | Shoshone FO | Blaine, Camas, Butte, Elmore, Gooding, Jerome, Lincoln, Minidoka, Power |
| | Upper Snake FO | Bingham, Blaine, Bonneville, Butte, Clark, Custer |
| Montana | Miles City FO | Big Horn, Carter, Custer, Dawson, Fallon, Garfield, McCone, Power River, Prairie, Roosevelt, Rosebud, Treasure, Valley, Wibaux |
| | Lewistown FO | Chouteau, Fergus, Meagher, Petroleum |
| | Dillion FO | Beaverhead, Madison |
| | Havre FO | Blaine, Phillips, Chouteau |
| | Malta FO | Phillips |
| | Glasgow FO | Valley |
| | Billings FO | Bighorn, Carbon, Golden Valley, Musselshell, Stillwater, Sweetgrass, Wheatland, Yellowstone |
| | Butte FO | Park, Gallatin, Deer Lodge |
| | Upper Missouri River FO | Blaine, Chouteau, Fergus, Phillips |
| North Dakota | North Dakota FO | Slope, Bowman |
| Nevada | Mountain Lewis FO | Lander, Eureka, Nye, White Pine |
| | Tonopah FO | Nye |
| | Sierra Front FO | Washoe |
| | Stillwater FO | Mineral, Churchill, Nye, Lander |
| | Tuscarora FO | Elko, Eureka, Lander |
| | Wells FO | Elko |
| | Caliente FO | Lincoln, Nye |
| | Wells FO | Elko |
| | Black Rock FO | Humboldt, Washoe, Pershing |
| | Humboldt River FO | Humboldt, Washoe, Pershing |
| | Bristlecone FO | White Pine, Nye |
| | Eagle Lake FO | Washoe |
| | Basin and Range FO | Lincoln, Nye |
| Oregon | Lakeview DO | Harney, Lake |
| | Prineville DO | Crook, Deschutes, Harney, Lake |
| | Vale DO | Union, Malheur, Harney, Grant, Baker |
| | Burns DO | Crook, Grant, Harney, Lake, Malheur |
| South Dakota | South Dakota FO | Butte, Harding |

| Analysis Area | BLM Management Unit(s) | Counties* |
|---|---|---|
| Utah | Salt Lake FO | Box Elder, Morgan, Rich, Summit, Tooele, Wasatch, Cache |
| | Cedar City FO | Beaver, Iron |
| | Fillmore FO | Juab, Millard |
| | Kanab FO | Garfield, Iron, Kane |
| | Moab FO | Grand |
| | Price FO | Carbon, Emery |
| | Richfield FO | Garfield, Piute, Sanpete, Wayne |
| | Vernal FO | Daggett, Duchesne, Uintah |
| Wyoming | Casper FO | Converse, Goshen, Natrona, Platte |
| | Newcastle FO | Campbell, Crook, Niobrara, Weston |
| | Worland FO | Big Horn, Hot Springs, Park, Washakie |
| | Rawlins FO | Carbon, Fremont, Laramie, Sweetwater |
| | Rock Springs FO | Fremont, Lincoln, Sublette, Sweetwater, Uinta |
| | Cody FO | Bighorn, Park |
| | Buffalo FO | Campbell, Johnson, Sheridan |
| | Lander FO | Carbon, Fremont, Hot Springs, Natrona, Sweetwater |

Source: BLM GIS 2023

*Includes counties with GRSG mapped HMAs and more than 1,000 acres of BLM-administered lands in the planning area, or those included for social and economic connections with GRSG HMAs counties


OREGON
Siskiyou County
Modoc County
Trinity County
Shasta County
Redding
Anderson
Lassen County
Susanville
CALIFORNIA
Red Bluff
Tehama County
NEVADA
Plumas County
Chico
Paradise
Glenn County
Butte County
Sierra County
Yuba County
Colusa County
Nevada County
Reno
NATIONAL SYSTEM OF PUBLIC LANDS
U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
Figure A-1
Socioeconomic Analysis Area - California
Socioeconomic analysis area
Priority Habitat Management Area, Alternative 3
Bureau of Land Management
US Forest Service
National Park Service
Department of Defense
US Fish and Wildlife
Bureau of Reclamation
Tribal land
State
Local government
Private or undetermined
Other Federal
N
0
20
40
Miles
Source: BLM GIS 2023, U.S. Department of the Interior, Bureau of Land Management
February 29, 2024,
F0473_GRSG_Socio.aprx
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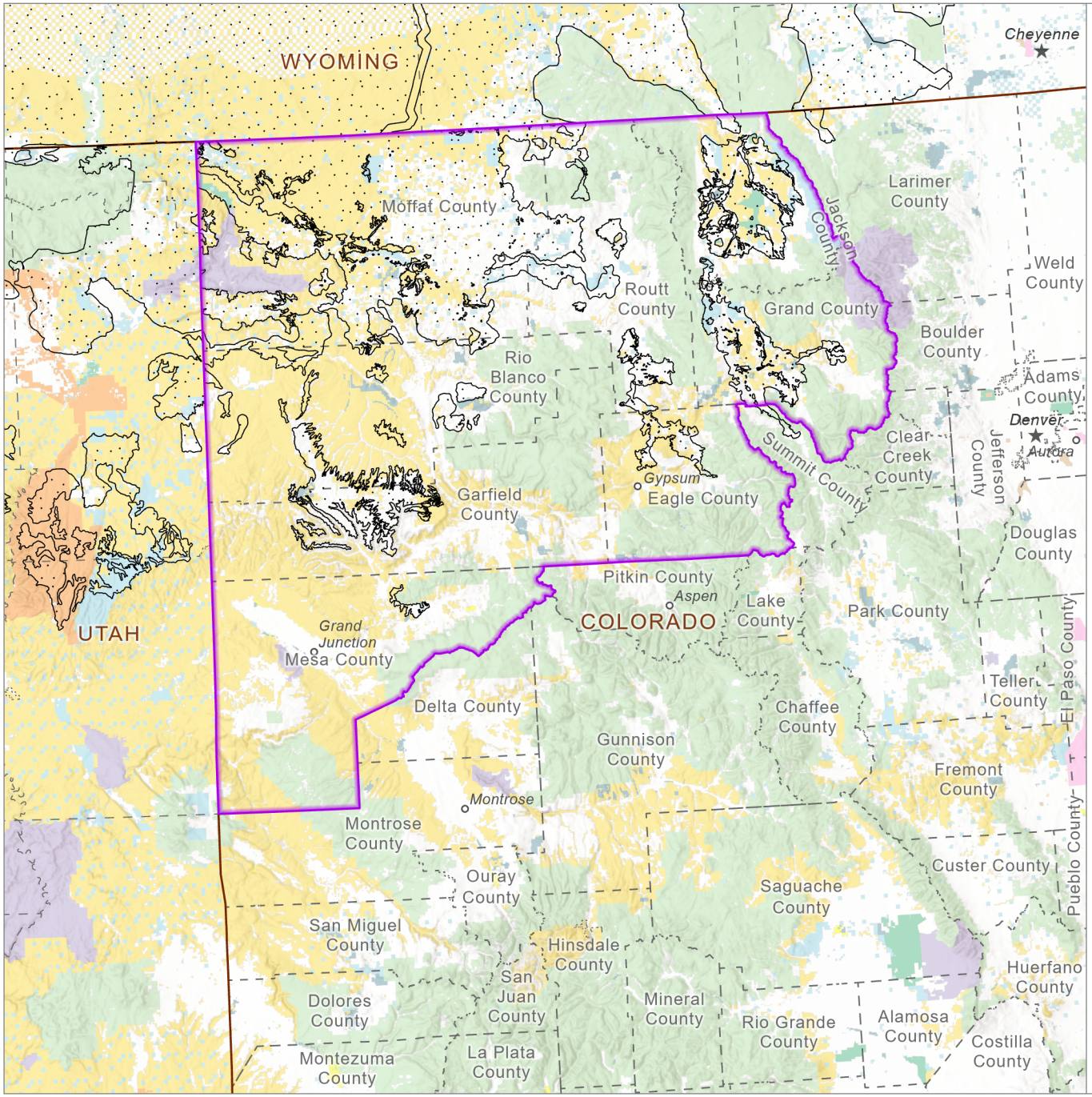



**Figure A-2**
**Socioeconomic Analysis Area - Colorado**

- Socioeconomic analysis area
- Priority Habitat Management Area, Alternative 3
- Bureau of Land Management
- US Forest Service
- National Park Service
- Department of Defense
- US Fish and Wildlife
- Bureau of Reclamation
- Tribal land
- State
- Local government
- Private or undetermined
- Other Federal

N

0 30 60
Miles

Source: BLM GIS 2023, U.S. Department of the Interior, Bureau of Land Management
February 29, 2024,
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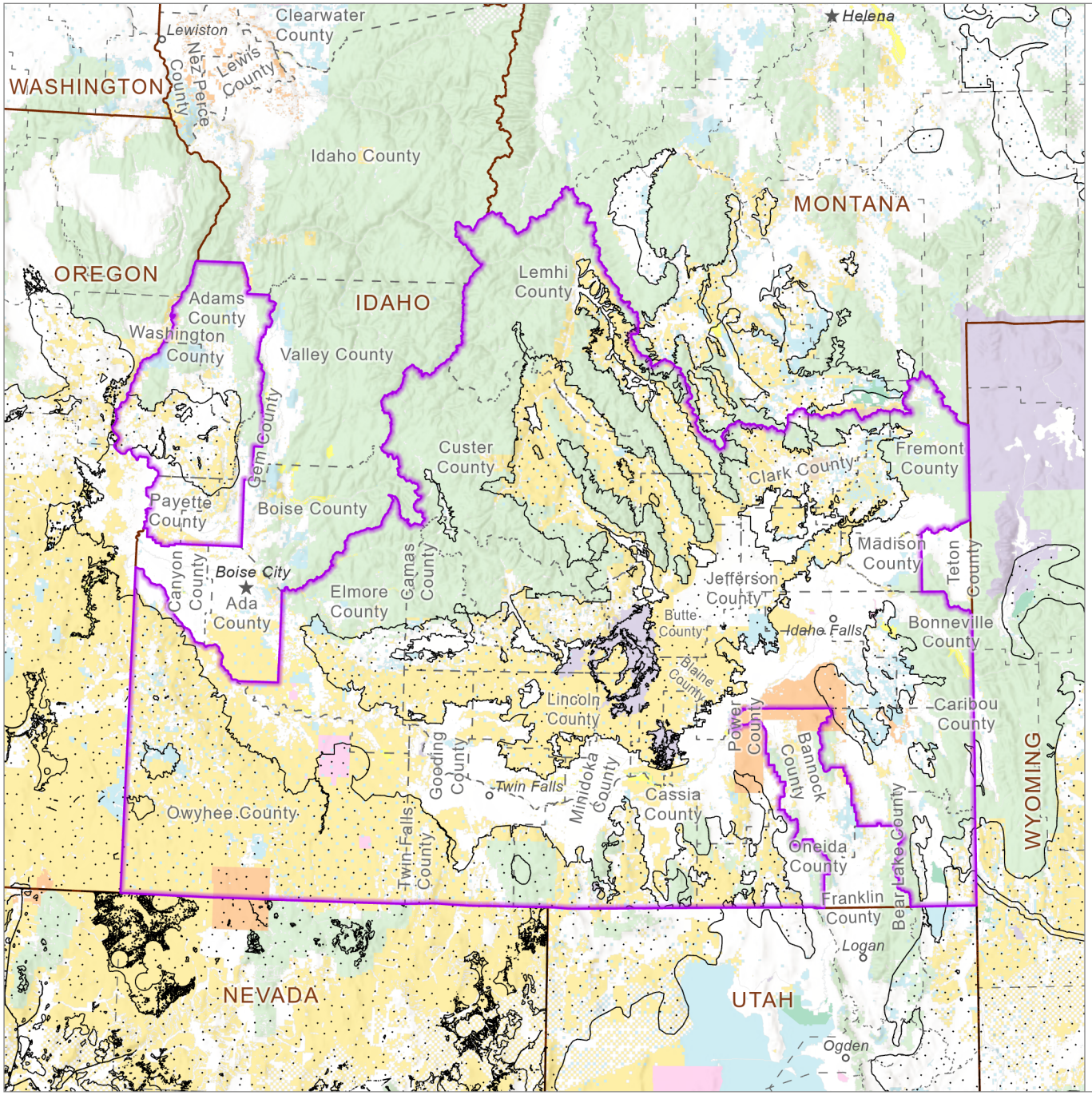


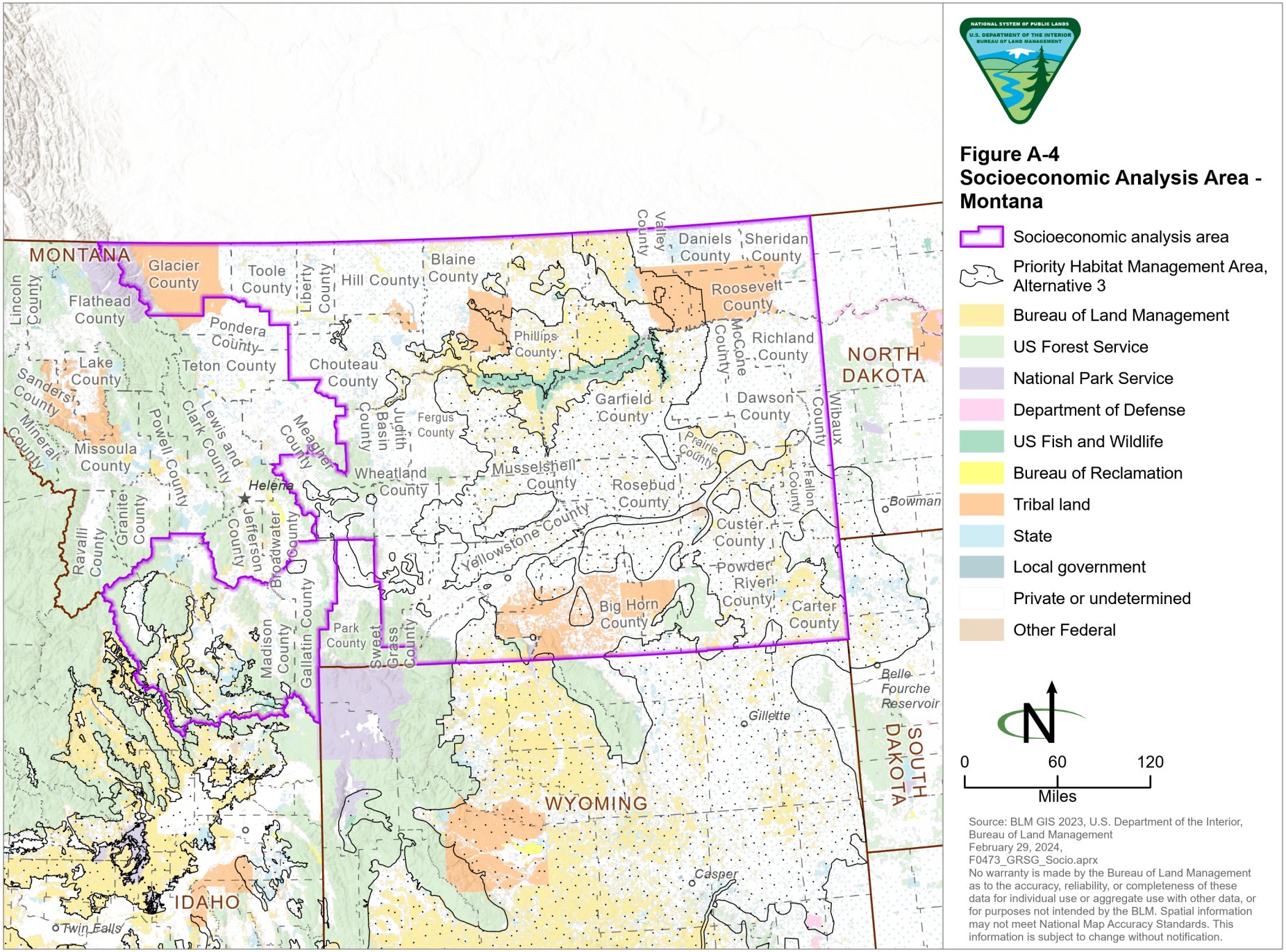

**Figure A-3**
**Socioeconomic Analysis Area - Idaho**

- Socioeconomic analysis area
- Priority Habitat Management Area, Alternative 3
- Bureau of Land Management
- US Forest Service
- National Park Service
- Department of Defense
- US Fish and Wildlife
- Bureau of Reclamation
- Tribal land
- State
- Local government
- Private or undetermined
- Other Federal

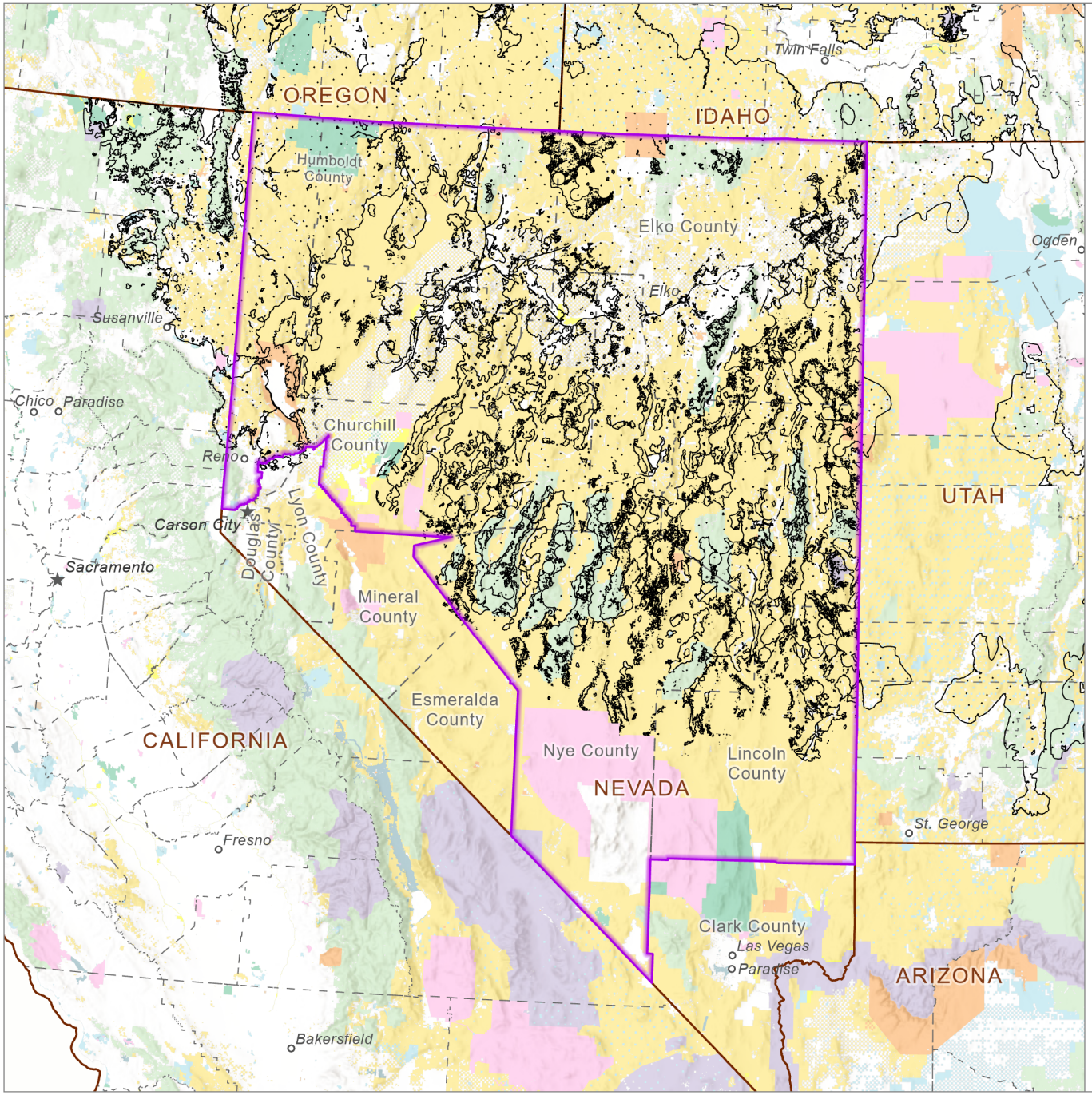
N

0 40 80
Miles

Source: BLM GIS 2023, U.S. Department of the Interior, Bureau of Land Management
February 29, 2024,
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Source: BLM GIS 2023, U.S. Department of the Interior, Bureau of Land Management
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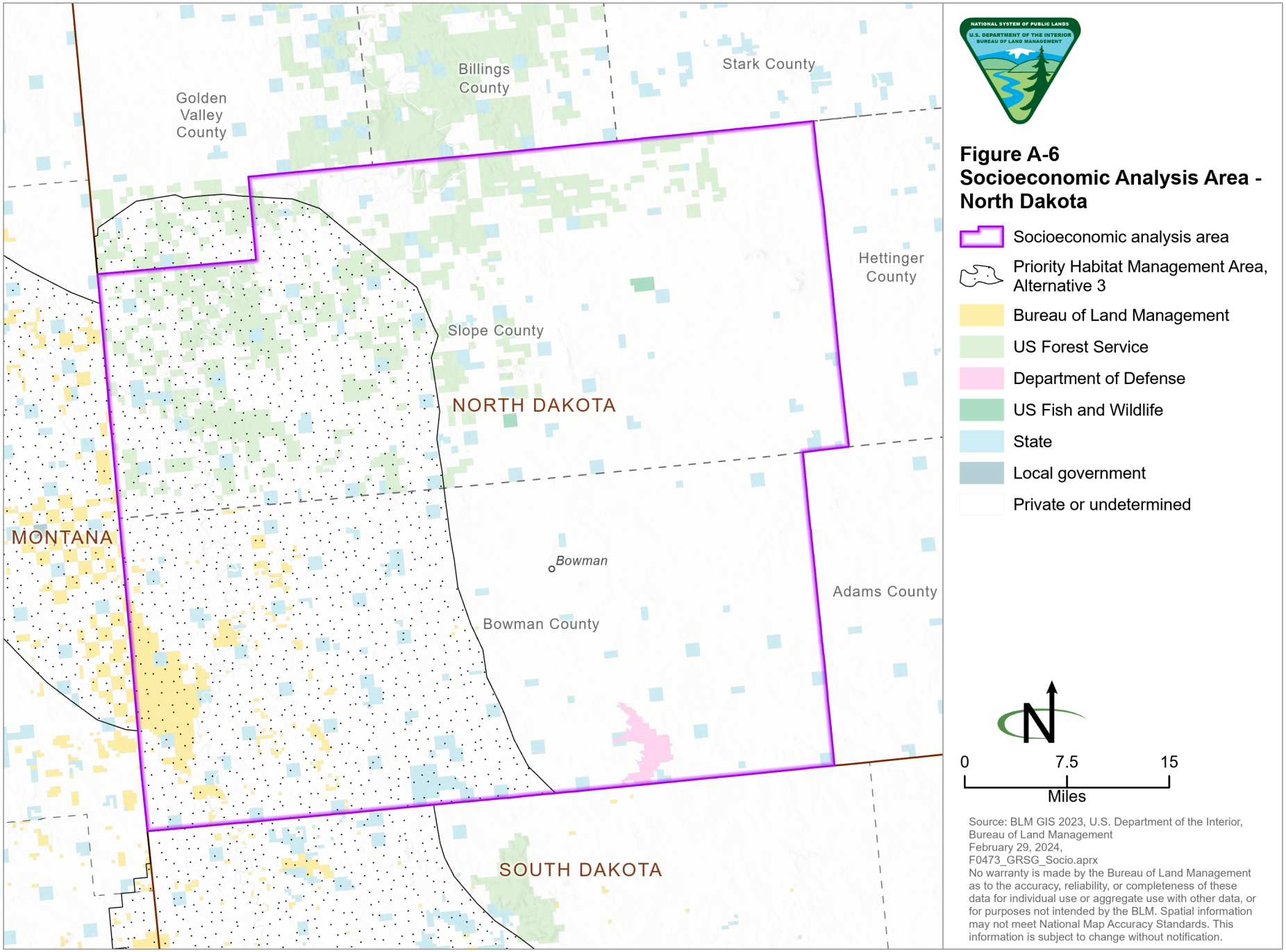

## Figure A-5
## Socioeconomic Analysis Area - Nevada

- Socioeconomic analysis area
- Priority Habitat Management Area, Alternative 3
- Bureau of Land Management
- US Forest Service
- National Park Service
- Department of Defense
- US Fish and Wildlife
- Bureau of Reclamation
- Tribal land
- State
- Local government
- Private or undetermined
- Other Federal

N

0 50 100
Miles

Source: BLM GIS 2023, U.S. Department of the Interior, Bureau of Land Management
February 29, 2024,
F0473_GRSG_Socio.aprx
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Billings County
Stark County
Golden Valley County
Hettinger County
Slope County
NORTH DAKOTA
MONTANA
Bowman
Adams County
Bowman County
SOUTH DAKOTA
Figure A-6
Socioeconomic Analysis Area - North Dakota
Socioeconomic analysis area
Priority Habitat Management Area, Alternative 3
Bureau of Land Management
US Forest Service
Department of Defense
US Fish and Wildlife
State
Local government
Private or undetermined
N
0
7.5
15
Miles
Source: BLM GIS 2023, U.S. Department of the Interior, Bureau of Land Management
February 29, 2024,
F0473_GRSG_Socio.aprx
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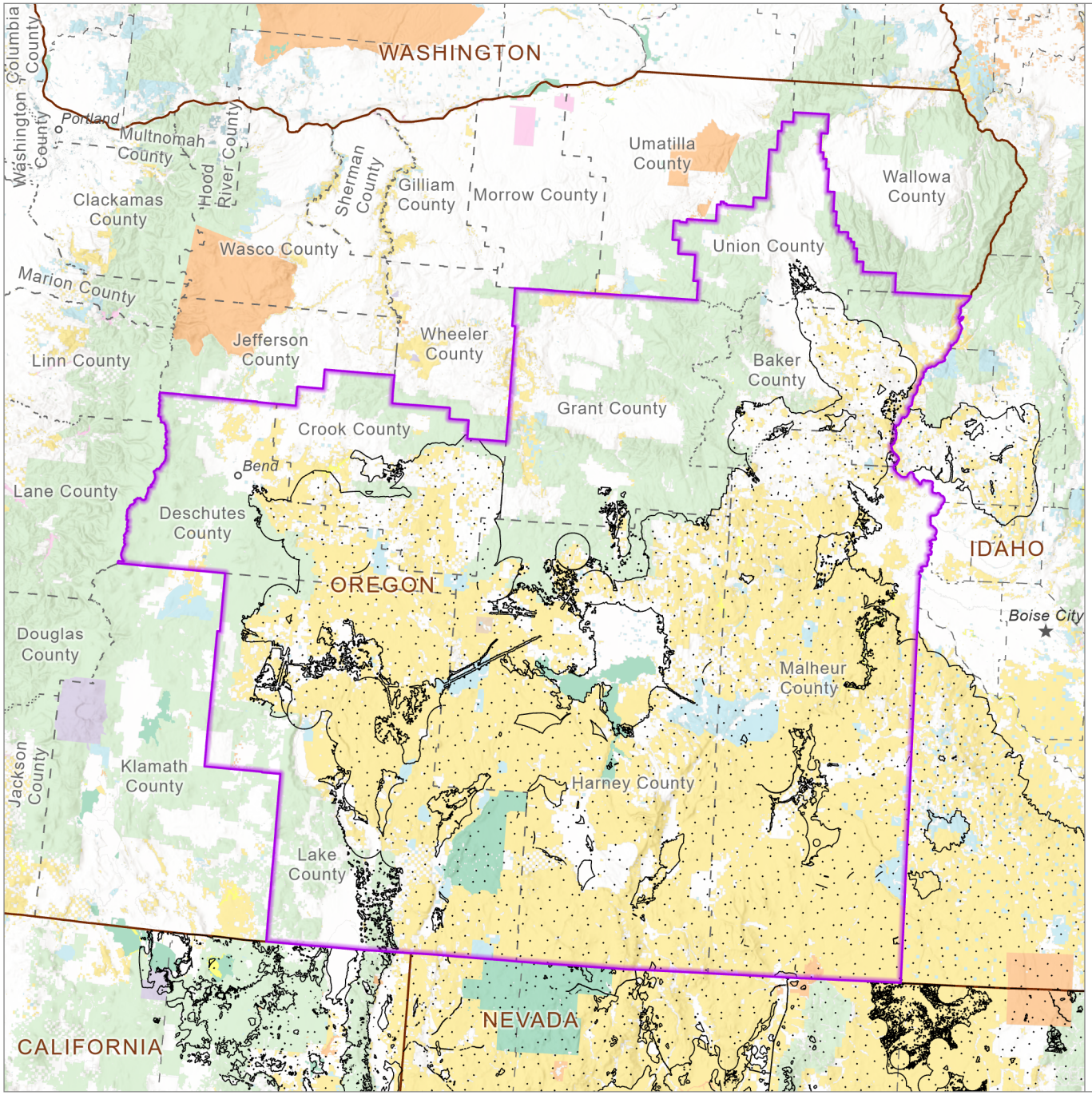


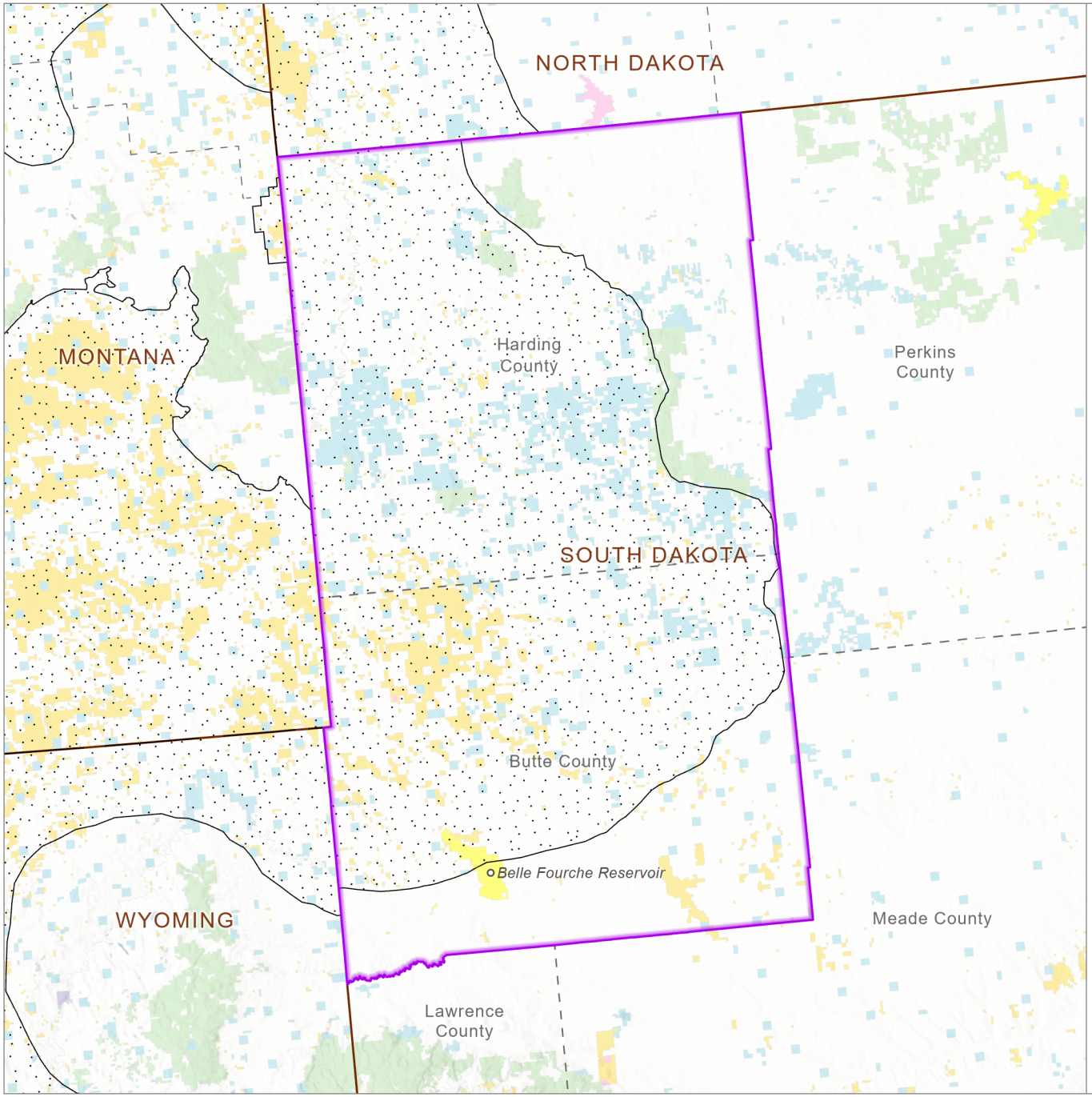

**Figure A-7**
**Socioeconomic Analysis Area - Oregon**

- Socioeconomic analysis area
- Priority Habitat Management Area, Alternative 3
- Bureau of Land Management
- US Forest Service
- National Park Service
- Department of Defense
- US Fish and Wildlife
- Bureau of Reclamation
- Tribal land
- State
- Local government
- Private or undetermined
- Other Federal

N

0 30 60
Miles

Source: BLM GIS 2023, U.S. Department of the Interior, Bureau of Land Management
February 29, 2024,
F0473_GRSG_Socio.aprx
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U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

## Figure A-8
## Socioeconomic Analysis Area - South Dakota

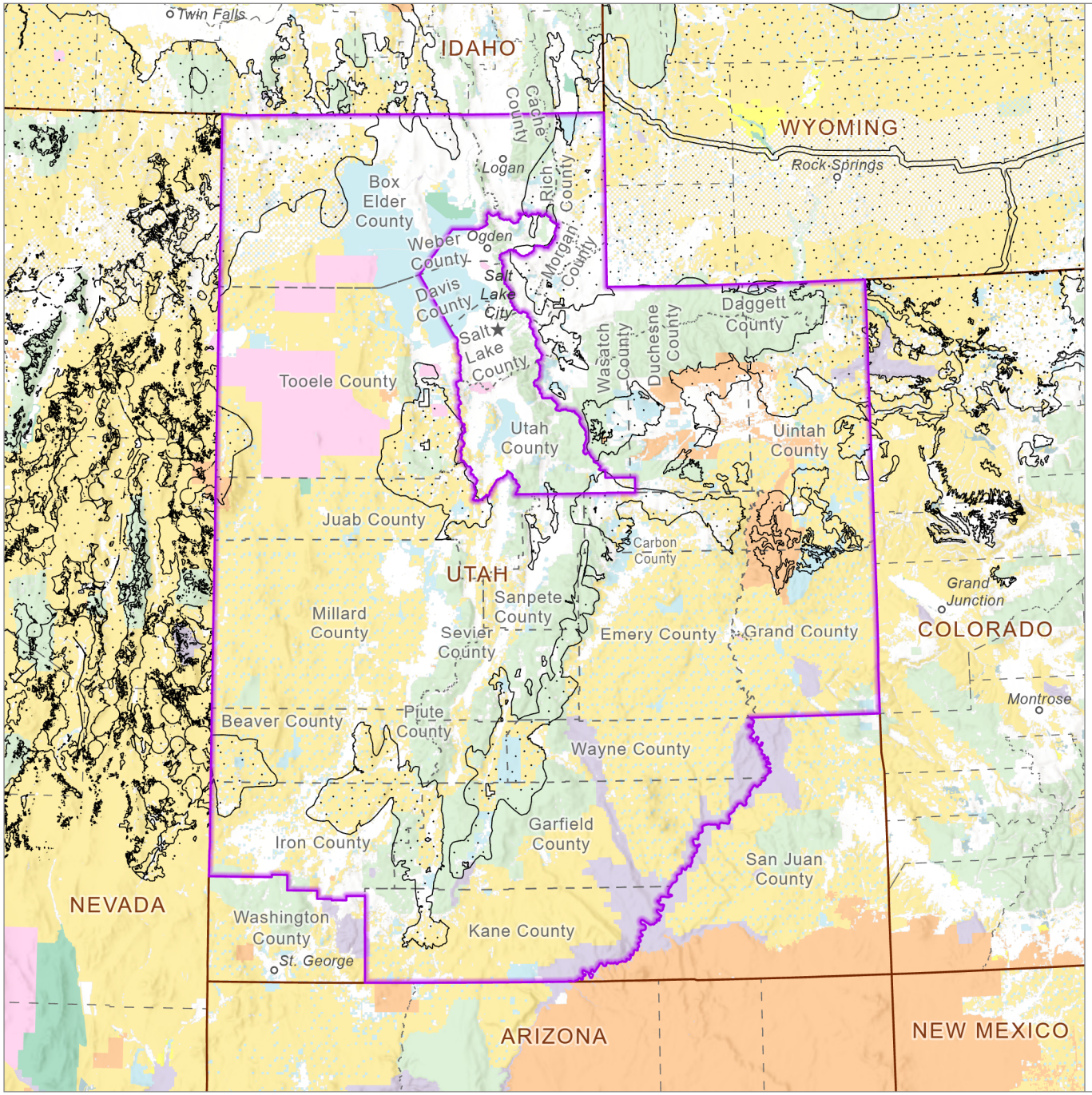
- Socioeconomic analysis area
- Priority Habitat Management Area, Alternative 3
- Bureau of Land Management
- US Forest Service
- National Park Service
- Department of Defense
- Bureau of Reclamation
- Tribal land
- State
- Local government
- Private or undetermined

N

0 10 20
Miles

Source: BLM GIS 2023, U.S. Department of the Interior, Bureau of Land Management
February 29, 2024,
F0473_GRSG_Socio.aprx

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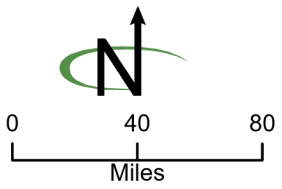






## Figure A-9
## Socioeconomic Analysis Area - Utah

- Socioeconomic analysis area
- Priority Habitat Management Area, Alternative 3
- Bureau of Land Management
- US Forest Service
- National Park Service
- Department of Defense
- US Fish and Wildlife
- Bureau of Reclamation
- Tribal land
- State
- Local government
- Private or undetermined
- Other Federal




Source: BLM GIS 2023, U.S. Department of the Interior, Bureau of Land Management
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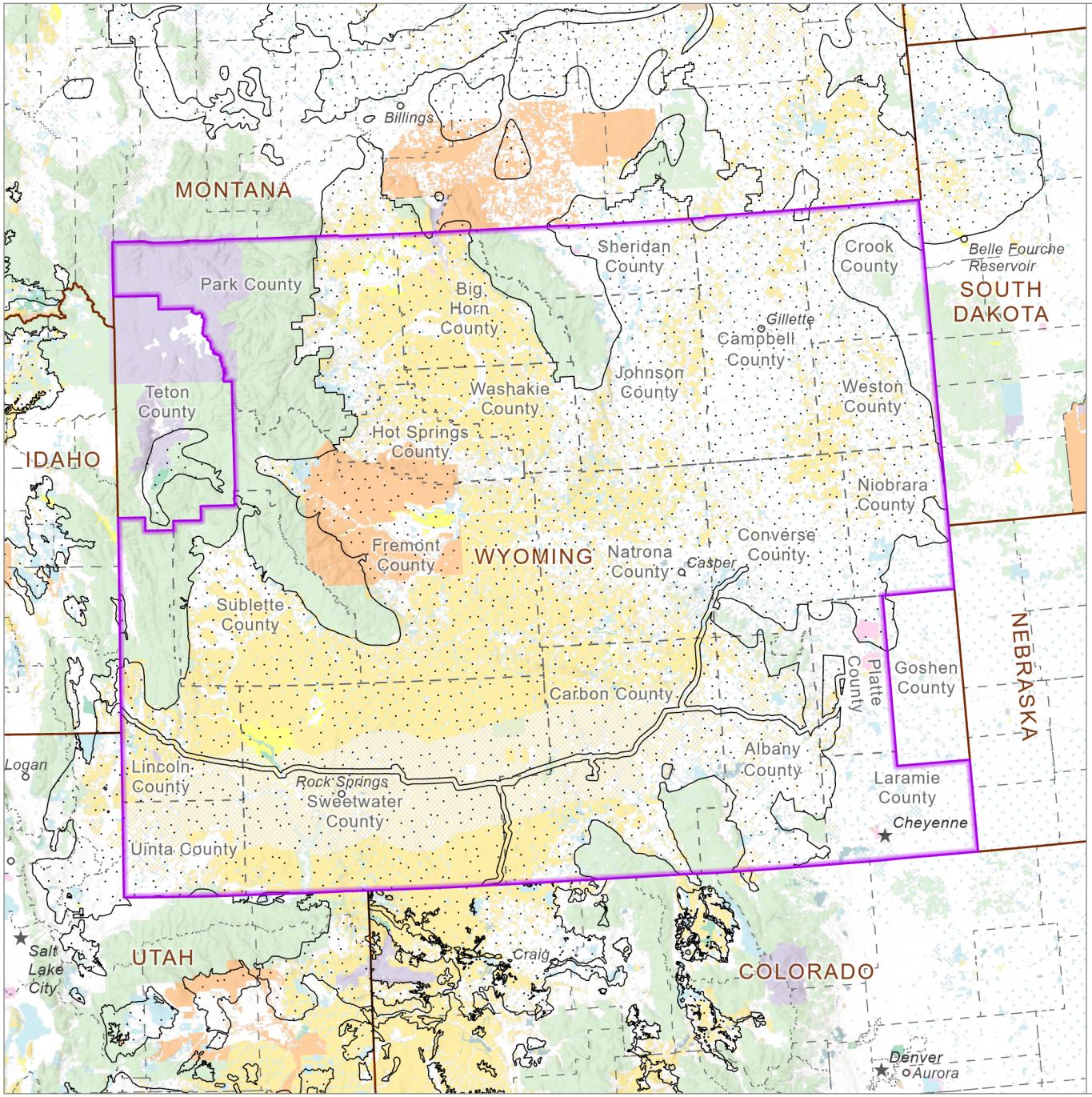



**Figure A-10**
**Socioeconomic Analysis Area - Wyoming**

- Socioeconomic analysis area
- Priority Habitat Management Area, Alternative 3
- Bureau of Land Management
- US Forest Service
- National Park Service
- Department of Defense
- US Fish and Wildlife
- Bureau of Reclamation
- Tribal land
- State
- Local government
- Private or undetermined
- Other Federal

N

0 50 100
Miles

Source: BLM GIS 2023, U.S. Department of the Interior, Bureau of Land Management
February 29, 2024,
F0473_GRSG_Socio.aprx
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## Table A-2. California Analysis Area Employment by Sector (2010 and 2021)

| Sector | Lassen County | | Modoc County | | California | |
|---|---|---|---|---|---|---|
| | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 |
| Total employment (number of jobs) | 13,221 | 12,147 | 4,084 | 4,144 | 19,642,444 | 23,906,353 |
| Wage and salary employment | 10,792 | 9,761 | 2,771 | 2,843 | 14,946,231 | 17,891,462 |
| Proprietors employment | 2,429 | 2,386 | 1,313 | 1,301 | 4,696,213 | 6,014,891 |
| Farm proprietors employment | 388 | 330 | 369 | 310 | 65,373 | 56,890 |
| Nonfarm proprietors employment | 2,041 | 2,056 | 944 | 991 | 4,630,840 | 5,958,001 |
| Farm employment | 743 | 547 | 550 | 531 | 232,546 | 229,419 |
| Nonfarm employment | 12,478 | 11,600 | 3,534 | 3,613 | 19,409,898 | 23,676,934 |
| Private nonfarm employment | 5,644 | 5,554 | 2,274 | 2,472 | 16,731,726 | 20,952,239 |
| **By Industry (Number of Jobs/Percentage of Total Employment)** | | | | | | |
| Forestry, fishing, and related activities | (D) | 179 | 165 | 173 | 212,034 | 250,669 |
| | N/A | 1.5 | 4.0 | 4.2 | 1.1 | 1.0 |
| Mining (including quarrying and oil and gas extraction) | (D) | 31 | 23 | 16 | 60,321 | 33,528 |
| | N/A | <1 | <1 | <1 | <1 | <1 |
| Utilities | 52 | 19 | (D) | (D) | 59,325 | 65,390 |
| | <1 | <1 | N/A | N/A | <1 | <1 |
| Construction | 340 | (D) | (D) | 230 | 865,760 | 1,253,884 |
| | 2.6 | N/A | N/A | 5.6 | 4.4 | 5.2 |
| Manufacturing | 53 | (D) | (D) | 49 | 1,322,661 | 1,375,410 |
| | <1 | N/A | N/A | 1.2 | 6.7 | 5.8 |
| Wholesale trade | 103 | 125 | 106 | 111 | 724,350 | 731,178 |
| | <1 | 1.0 | 2.6 | 2.7 | 3.7 | 3.1 |
| Retail trade | 1,059 | 1,147 | 350 | 347 | 1,880,146 | 2,031,941 |
| | 8.0 | 9.4 | 8.6 | 8.4 | 9.6 | 8.5 |
| Transportation and warehousing | 144 | 176 | (D) | (D) | 567,979 | 1,371,207 |
| | 1.1 | 1.4 | N/A | N/A | 2.9 | 5.7 |
| Information | 111 | 69 | (D) | 18 | 508,681 | 643,367 |
| | <1 | <1 | N/A | <1 | 2.6 | 2.7 |
| Finance and insurance | 224 | 164 | 62 | 71 | 953,789 | 1,191,722 |
| | 1.7 | 1.4 | 1.5 | 1.7 | 4.9 | 5.0 |
| Real estate and rental and leasing | 279 | 261 | 135 | 109 | 1,033,832 | 1,250,434 |
| | 2.1 | 2.1 | 3.3 | 2.6 | 5.3 | 5.2 |
| Professional, scientific, and technical services | (D) | (D) | (D) | 135 | 1,703,399 | 2,093,532 |
| | N/A | N/A | N/A | 3.3 | 8.7 | 8.8 |

| Sector | Lassen County | | Modoc County | | California | |
|---|---|---|---|---|---|---|
| | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 |
| Management of companies and enterprises | (D) | (D) | 0 | (D) | 207,092 | 277,998 |
| | N/A | N/A | <1 | N/A | 1.1 | 1.2 |
| Administrative and support and waste management and remediation services | 264 | 312 | (D) | 167 | 1,248,607 | 1,526,406 |
| | 2.0 | 2.6 | N/A | 4.0 | 6.4 | 6.4 |
| Educational services | 52 | (D) | (D) | (D) | 439,530 | 543,623 |
| | <1 | N/A | N/A | N/A | 2.2 | 2.3 |
| Health care and social assistance | 1,144 | (D) | (D) | (D) | 1,868,906 | 2,822,918 |
| | 8.7 | N/A | N/A | N/A | 9.5 | 11.8 |
| Arts, entertainment, and recreation | 108 | 125 | (D) | (D) | 538,934 | 566,938 |
| | <1 | 1.0 | N/A | N/A | 2.7 | 2.4 |
| Accommodation and food services | 670 | 491 | (D) | (D) | 1,369,983 | 1,575,223 |
| | 5.1 | 4.0 | N/A | N/A | 7.0 | 6.6 |
| Other services | 569 | 533 | 363 | 276 | 1,166,397 | 1,346,871 |
| | 4.3 | 4.6 | 8.9 | 6.7 | 5.9 | 5.6 |
| Government and government enterprises | 6,834 | 6,046 | 1,260 | 1,141 | 2,678,172 | 2,724,695 |
| | 51.7 | 49.8 | 30.9 | 27.5 | 13.6 | 11.4 |

Sources: BEA 2010a, 2021a
Note: (D) represents data not shown to avoid disclosure of confidential information; estimates are included in high-level totals.

## Table A-3. California Analysis Area Labor Income by Sector, 2010 and 2021 (2021$)

| Sector | Lassen County | | Modoc County | | California | |
|---|---|---|---|---|---|---|
| | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 |
| Personal income (thousands of dollars) | 1,199,962 | 1,306,255 | 422,859 | 470,297 | 2,021,173,112 | 3,006,183,929 |
| Population (persons) | 34,901 | 33,159 | 9,695 | 8,661 | 37,322,360 | 39,237,836 |
| Per capita personal income (dollars) | 34,382 | 39,394 | 43,616 | 54,301 | 54,155 | 76,614 |
| Earnings by place of work (thousands of dollars) | 867,687 | 862,861 | 242,007 | 237,057 | 1,485,310,195 | 2,102,644,661 |
| Wages and salaries (thousands of dollars) | 548,235 | 559,651 | 114,672 | 127,163 | 1,018,944,023 | 1,533,988,242 |
| Supplement to wages and salaries | 227,382 | 237,842 | 44,040 | 49,275 | 244,650,288 | 314,285,006 |
| Proprietors' income | 92,070 | 65,368 | 83,296 | 60,619 | 221,715,883 | 254,371,413 |
| Farm earnings | 33,376 | 33,493 | 49,605 | 46,041 | 16,493,516 | 13,000,600 |
| Nonfarm earnings | 834,311 | 829,368 | 192,402 | 191,016 | 1,468,816,679 | 2,089,644,061 |
| Private nonfarm earnings | 246,745 | 239,192 | 98,009 | 98,195 | 1,193,995,472 | 1,773,635,412 |
| **By Industry (Earnings in Thousands of Dollars/Percentage of Nonfarm Earnings)** | | | | | | |
| Forestry, fishing, and related activities | (D) | 7,845 | 8,162 | 7,844 | 8,014,985 | 12,442,843 |
| | N/A | <1 | 4.2 | 4.1 | <1 | <1 |
| Mining (including quarrying and oil and gas extraction) | (D) | 148 | 113 | 47 | 5,785,463 | 2,782,958 |
| | N/A | <1 | <1 | <1 | <1 | <1 |
| Utilities | 4,434 | 289 | (D) | (D) | 10,091,492 | 16,861,048 |
| | <1 | <1 | N/A | N/A | <1 | <1 |
| Construction | 35,809 | (D) | (D) | 12,963 | 70,297,737 | 109,185,172 |
| | 4.3 | N/A | N/A | 6.8 | 4.8 | 5.2 |
| Manufacturing | 1,500 | (D) | (D) | 1,504 | 144,716,142 | 187,224,671 |
| | <1 | N/A | N/A | <1 | 9.9 | 9.0 |
| Wholesale trade | 5,723 | 7,155 | 5,476 | 7,056 | 65,932,062 | 77,475,792 |
| | <1 | <1 | 2.8 | 3.7 | 4.5 | 3.7 |
| Retail trade | 39,104 | 43,884 | 12,161 | 11,055 | 87,111,142 | 105,037,033 |
| | 4.7 | 5.3 | 6.3 | 5.8 | 5.9 | 5.0 |
| Transportation and warehousing | 6,634 | 7,446 | (D) | (D) | 42,050,052 | 80,454,289 |
| | <1 | <1 | N/A | N/A | 2.9 | 3.9 |
| Information | 6,831 | 3,969 | (D) | 1,642 | 66,885,925 | 170,115,835 |
| | <1 | <1 | N/A | <1 | 4.6 | 8.1 |
| Finance and insurance | 8,929 | 10,248 | 2,636 | 2,882 | 96,828,994 | 129,619,624 |
| | 1.1 | 1.2 | 1.4 | 1.5 | 6.6 | 6.2 |
| Real estate and rental and leasing | 5,500 | 6,221 | 6,437 | 5,468 | 46,287,943 | 78,843,605 |
| | <1 | <1 | 3.3 | 2.9 | 3.2 | 3.8 |

| Sector | Lassen County | | Modoc County | | California | |
|---|---|---|---|---|---|---|
| | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 |
| Professional, scientific, and technical services | (D) | (D) | (D) | 4,912 | 173,852,388 | 278,359,156 |
| | N/A | N/A | N/A | 2.6 | 11.8 | 13.3 |
| Management of companies and enterprises | (D) | (D) | 0 | 0 | 27,886,735 | 46,364,289 |
| | N/A | N/A | <1 | <1 | 1.9 | 2.2 |
| Administrative and support and waste management and remediation services | 8,181 | 10,529 | (D) | 3,992 | 60,152,055 | 87,147,299 |
| | <1 | 1.3 | N/A | 2.1 | 4.1 | 4.2 |
| Educational services | 1,687 | (D) | (D) | (D) | 22,861,346 | 30,940,204 |
| | <1 | N/A | N/A | N/A | 1.6 | 1.5 |
| Health care and social assistance | 66,811 | (D) | (D) | (D) | 139,684,524 | 198,966,464 |
| | 8.0 | N/A | N/A | N/A | 9.5 | 9.5 |
| Arts, entertainment, and recreation | 1,322 | 8,784 | (D) | (D) | 28,445,898 | 33,112,096 |
| | <1 | 1.1 | N/A | N/A | 1.9 | 1.6 |
| Accommodation and food services | 16,021 | 14,256 | (D) | (D) | 41,882,247 | 69,491,806 |
| | 1.9 | 1.7 | N/A | N/A | 2.9 | 3.3 |
| Other services (except government and government enterprises) | 23,093 | 20,103 | 10,846 | 8,718 | 55,228,342 | 59,211,228 |
| | 2.8 | 2.4 | 5.6 | 4.6 | 3.8 | 2.8 |
| Government and government enterprises | 587,567 | 590,176 | 94,393 | 92,821 | 274,821,207 | 316,008,649 |
| | 70.4 | 71.2 | 49.1 | 48.6 | 18.7 | 15.1 |

Sources: BEA 2010b, 2021b
Note: All percentages are rounded to the nearest tenth.
All 2010 dollar values were adjusted for inflation.
(D) represents data not shown to avoid disclosure of confidential information; estimates are included in high-level totals.
(N/A) means data are not available, or no information was given.

## Table A-4 (Part 1). Colorado Analysis Area Employment by Sector (2010 and 2021)

| Sector | Eagle County | | Garfield County | | Grand County | | Jackson County | | State of Colorado | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 |
| Total employment (number of jobs) | 40,796 | 49,061 | 36,761 | 39,938 | 10,275 | 11,497 | 1,012 | 1,050 | 3,143,637 | 3,945,819 |
| Wage and salary employment | 29,146 | 34,530 | 25,144 | 26,897 | 6,822 | 7,755 | 603 | 611 | 2,346,646 | 2,881,642 |
| Proprietors employment | 11,650 | 14,531 | 11,617 | 13,041 | 3,453 | 3,742 | 409 | 439 | 796,991 | 1,064,177 |
| Farm proprietors employment | 131 | 177 | 549 | 658 | 167 | 185 | 79 | 102 | 32,509 | 35,517 |
| Nonfarm proprietors employment | 11,519 | 14,354 | 11,068 | 12,383 | 3,286 | 3,557 | 330 | 337 | 764,482 | 1,028,660 |
| Farm employment | 195 | 243 | 747 | 854 | 249 | 275 | 134 | 158 | 45,101 | 47,988 |
| Nonfarm employment[2] | 40,601 | 48,818 | 36,014 | 39,084 | 10,026 | 11,222 | 878 | 892 | 3,098,536 | 3,897,831 |
| Private nonfarm employment | 37,241 | 45,306 | 30,584 | 33,747 | 8,656 | 9,812 | 685 | 723 | 2,643,912 | 3,388,729 |
| **By Industry (Number of Jobs/Percentage of Total Employment)** | | | | | | | | | | |
| Forestry, fishing, and related activities | (D) | 123 | 176 | 157 | 134 | 98 | 68 | 43 | 11,750 | 13,423 |
| | N/A | <1 | <1 | <1 | 1.3 | <1 | 6.7 | 4.1 | <1 | <1 |
| Mining (including quarrying and oil and gas extraction) | (D) | 207 | 2,755 | 937 | 138 | 68 | 22 | 40 | 48,728 | 37,994 |
| | N/A | <1 | 7.5 | 2.3 | 1.3 | <1 | 2.2 | 3.8 | 1.6 | 1.0 |
| Utilities | 69 | 74 | 217 | 233 | (D) | (D) | 1 | (D) | 8,738 | 9,401 |
| | <1 | <1 | <1 | <1 | N/A | N/A | <1 | N/A | <1 | <1 |
| Construction | 3,939 | 5,020 | 4,366 | 5,701 | 1,059 | 1,299 | (D) | (D) | 185,291 | 276,197 |
| | 9.7 | 10.2 | 11.9 | 14.3 | 10.3 | 11.3 | N/A | N/A | 5.9 | 7 |
| Manufacturing | 367 | 643 | 456 | 576 | 150 | 220 | (D) | (D) | 138,462 | 165,302 |
| | <1 | 1.3 | 1.2 | 1.4 | 1.5 | 1.9 | N/A | N/A | 4.4 | 4.2 |
| Wholesale trade | 549 | 558 | 867 | 658 | (D) | (D) | (D) | 10 | 101,457 | 120,434 |
| | 1.3 | 1.1 | 2.4 | 1.6 | N/A | N/A | N/A | 1.0 | 3.2 | 3.1 |
| Retail trade | 3,545 | 4,271 | 3,648 | 3,807 | 889 | 1,006 | 94 | 97 | 298,985 | 341,676 |
| | 8.7 | 8.7 | 9.9 | 9.5 | 8.7 | 8.8 | 9.3 | 9.2 | 9.5 | 8.7 |
| Transportation and warehousing | 628 | 1,185 | 873 | 908 | 183 | 178 | (D) | (D) | 78,550 | 181,227 |
| | 1.5 | 2.4 | 2.4 | 2.3 | 1.8 | 1.5 | N/A | N/A | 2.5 | 4.6 |
| Information | 447 | 337 | 260 | 269 | 62 | 46 | (D) | 6 | 83,591 | 89,824 |
| | 1.1 | <1 | <1 | <1 | <1 | <1 | N/A | <1 | 2.7 | 2.3 |

| Sector | Eagle County | | Garfield County | | Grand County | | Jackson County | | State of Colorado | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 |
| Finance and insurance | 1,728 | 2,203 | 1,247 | 1,519 | 286 | 346 | (D) | (D) | 191,501 | 251,294 |
| | 4.2 | 4.5 | 3.4 | 3.8 | 2.8 | 3.0 | N/A | N/A | 6.1 | 6.4 |
| Real estate and rental and leasing | 4,586 | 5,359 | 2,992 | 3,067 | 1,034 | 1,126 | 25 | (D) | 179,287 | 238,959 |
| | 11.2 | 10.9 | 8.1 | 7.7 | 10.1 | 9.8 | 2.5 | N/A | 5.7 | 6.1 |
| Professional, scientific, and technical services | 2,353 | 3,092 | 2,220 | 2,636 | 479 | 597 | (D) | 44 | 273,909 | 381,312 |
| | 5.8 | 6.3 | 6.0 | 6.6 | 4.7 | 5.2 | N/A | 4.2 | 8.7 | 9.7 |
| Management of companies and enterprises | 222 | 327 | 204 | 274 | 41 | 69 | 0 | 0 | 32,391 | 52,152 |
| | <1 | <1 | <1 | <1 | <1 | <1 | 0 | 0 | 1 | 1.3 |
| Administrative and support and waste management and remediation services | 2,205 | 3,637 | 1,704 | 2,075 | 398 | 501 | (D) | 28 | 185,584 | 211,660 |
| | 5.4 | 7.4 | 4.6 | 5.2 | 3.9 | 4.4 | N/A | 2.7 | 5.9 | 5.4 |
| Educational services | 362 | 839 | 505 | 780 | 69 | (D) | 1 | (D) | 59,323 | 77,829 |
| | <1 | 1.7 | 1.4 | 2.0 | <1 | N/A | <1 | N/A | 1.9 | 2 |
| Health care and social assistance | 2,277 | 3,559 | 2,611 | 3,380 | 298 | (D) | 43 | (D) | 280,604 | 359,593 |
| | 5.6 | 7.3 | 7.1 | 8.5 | 2.9 | N/A | 4.2 | N/A | 8.9 | 9.1 |
| Arts, entertainment, and recreation | 3,955 | 3,962 | 896 | 1,261 | 1,137 | (D) | 23 | 24 | 86,224 | 100,129 |
| | 9.7 | 8.1 | 2.4 | 3.2 | 11.1 | N/A | 2.3 | 2.3 | 2.7 | 2.5 |
| Accommodation and food services | 7,030 | 7,285 | 2,730 | 3,286 | 1,667 | (D) | 81 | 91 | 232,845 | 281,218 |
| | 17.2 | 14.8 | 7.4 | 8.2 | 16.2 | N/A | 8.0 | 8.7 | 7.4 | 7.1 |
| Other services | 2,495 | 2,625 | 1,857 | 2,223 | 491 | 596 | (D) | (D) | 166,692 | 199,105 |
| | 6.1 | 5.4 | 5.1 | 5.6 | 4.8 | 5.2 | N/A | N/A | 5.3 | 5 |
| Government and government enterprises | 3,360 | 3,512 | 5,430 | 5,337 | 1,370 | 1,410 | 193 | 169 | 454,624 | 509,102 |
| | 8.2 | 7.2 | 14.8 | 13.4 | 13.3 | 12.3 | 19.1 | 16.1 | 14.5 | 12.9 |

Sources: BEA 2010a, 2021a

(D) represents data not shown to avoid disclosure of confidential information; estimates are included in higher-level totals.

N/A means data not available or present.

## Table A-4 (Part 2). Colorado Analysis Area Employment by Sector (2010 and 2021)

| Sector | Mesa County | | Moffatt County | | Rio Blanco County | | Routt County | | State of Colorado | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 |
| Total employment (number of jobs) | 83,210 | 92,746 | 7,590 | 7,039 | 4,771 | 4,333 | 20,850 | 23,642 | 3,143,637 | 3,945,819 |
| Wage and salary employment | 61,085 | 67,103 | 5,440 | 4,892 | 3,401 | 3,009 | 13,779 | 15,603 | 2,346,646 | 2,881,642 |
| Proprietors employment | 22,125 | 25,643 | 2,150 | 2,147 | 1,370 | 1,324 | 7,071 | 8,039 | 796,991 | 1,064,177 |
| Farm proprietors employment | 1,904 | 2,245 | 434 | 475 | 267 | 292 | 634 | 761 | 32,509 | 35,517 |
| Nonfarm proprietors employment | 20,221 | 23,398 | 1,716 | 1,672 | 1,103 | 1,032 | 6,437 | 7,278 | 764,482 | 1,028,660 |
| Farm employment | 2,389 | 2,724 | 540 | 588 | 384 | 424 | 777 | 908 | 45,101 | 47,988 |
| Nonfarm employment[2] | 80,821 | 90,022 | 7,050 | 6,451 | 4,387 | 3,909 | 20,073 | 22,734 | 3,098,536 | 3,897,831 |
| Private nonfarm employment | 70,707 | 78,863 | 5,733 | 5,389 | 3,215 | 2,682 | 18,086 | 20,173 | 2,643,912 | 3,388,729 |
| **By Industry (Number of Jobs/Percentage of Total Employment)** | | | | | | | | | | |
| Forestry, fishing, and related activities | 375 | 487 | 137 | 150 | (D) | (D) | 229 | 176 | 11,750 | 13,423 |
| | <1 | <1 | 1.8 | 2.1 | N/A | N/A | 1.1 | <1 | <1 | <1 |
| Mining (including quarrying and oil and gas extraction) | 3,847 | 1,836 | 673 | 401 | 955 | 531 | 682 | 281 | 48,728 | 37,994 |
| | 4.6 | 2 | 8.9 | 5.7 | 20.0 | 12.3 | 3.3 | 1.2 | 1.6 | 1 |
| Utilities | 228 | 230 | (D) | (D) | (D) | 47 | (D) | 151 | 8,738 | 9,401 |
| | <1 | <1 | N/A | N/A | N/A | 1.1 | N/A | <1 | <1 | <1 |
| Construction | 5,777 | 7,487 | 389 | 474 | 341 | 236 | 1,987 | 2,154 | 185,291 | 276,197 |
| | 6.9 | 8.1 | 5.1 | 6.7 | 7.1 | 5.4 | 9.5 | 9.1 | 5.9 | 7 |
| Manufacturing | 2,912 | 3,605 | 102 | 100 | 87 | 79 | 185 | 262 | 138,462 | 165,302 |
| | 3.5 | 3.9 | 1.3 | 1.4 | 1.8 | 1.8 | 0.9 | 1.1 | 4.4 | 4.2 |
| Wholesale trade | 2,595 | 2,575 | 270 | 179 | (D) | 27 | (D) | 383 | 101,457 | 120,434 |
| | 3.1 | 2.8 | 3.6 | 2.5 | N/A | <1 | N/A | 1.6 | 3.2 | 3.1 |
| Retail trade | 9,751 | 10,667 | 921 | 992 | 292 | 298 | 1,902 | 1,990 | 298,985 | 341,676 |
| | 11.7 | 11.5 | 12.1 | 14.1 | 6.1 | 6.9 | 9.1 | 8.4 | 9.5 | 8.7 |
| Transportation and warehousing | 3,106 | 3,742 | (D) | (D) | 118 | 90 | 452 | 434 | 78,550 | 181,227 |
| | 3.7 | 4 | N/A | N/A | 2.5 | 2.1 | 2.2 | 1.8 | 2.5 | 4.6 |

| Sector | Mesa County | | Moffatt County | | Rio Blanco County | | Routt County | | State of Colorado | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 |
| Information | 1,099 | 754 | 73 | 34 | 26 | 14 | 222 | 162 | 83,591 | 89,824 |
| | 1.3 | <1 | 1 | <1 | <1 | <1 | 1.1 | <1 | 2.7 | 2.3 |
| Finance and insurance | 3,909 | 4,576 | 184 | 153 | 93 | 81 | 815 | 1,291 | 191,501 | 251,294 |
| | 4.7 | 4.9 | 2.4 | 2.2 | 1.9 | 1.9 | 3.9 | 5.5 | 6.1 | 6.4 |
| Real estate and rental and leasing | 4,841 | 5,948 | 240 | 303 | 155 | 192 | 2,296 | 2,718 | 179,287 | 238,959 |
| | 5.8 | 6.4 | 3.2 | 4.3 | 3.2 | 4.4 | 11 | 11.5 | 5.7 | 6.1 |
| Professional, scientific, and technical services | 4,273 | 4,497 | (D) | (D) | (D) | 107 | 1,353 | 1,548 | 273,909 | 381,312 |
| | 5.1 | 4.8 | N/A | N/A | N/A | 2.5 | 6.5 | 6.5 | 8.7 | 9.7 |
| Management of companies and enterprises | 220 | 273 | (D) | (D) | (D) | 0 | 86 | 161 | 32,391 | 52,152 |
| | <1 | <1 | N/A | N/A | N/A | 0 | <1 | <1 | 1 | 1.3 |
| Administrative and support and waste management and remediation services | 4,386 | 3,963 | 241 | 260 | 208 | 267 | 808 | 1,091 | 185,584 | 211,660 |
| | 5.3 | 4.3 | 3.2 | 3.7 | 4.4 | 6.2 | 3.9 | 4.6 | 5.9 | 5.4 |
| Educational services | 673 | 1,164 | (D) | 46 | 13 | (D) | 311 | 447 | 59,323 | 77,829 |
| | <1 | 1.3 | N/A | <1 | <1 | N/A | 1.5 | 1.9 | 1.9 | 2 |
| Health care and social assistance | 9,982 | 12,748 | (D) | 641 | 84 | (D) | 1,451 | 1,482 | 280,604 | 359,593 |
| | 12 | 13.7 | N/A | 9.1 | 1.8 | N/A | 7.0 | 6.3 | 8.9 | 9.1 |
| Arts, entertainment, and recreation | 1,832 | 1,837 | 130 | 100 | 65 | 74 | 1,491 | 1,681 | 86,224 | 100,129 |
| | 2.2 | 2 | 1.7 | 1.4 | 1.4 | 1.7 | 7.2 | 7.1 | 2.7 | 2.5 |
| Accommodation and food services | 6,246 | 7,405 | 519 | 529 | 309 | 254 | 2,113 | 2,567 | 232,845 | 281,218 |
| | 7.5 | 8 | 6.8 | 7.5 | 6.5 | 5.9 | 10.1 | 10.9 | 7.4 | 7.1 |
| Other services | 4,655 | 5,069 | 489 | 420 | 174 | 148 | 1,191 | 1,194 | 166,692 | 199,105 |
| | 5.6 | 5.5 | 6.4 | 6 | 3.6 | 3.4 | 5.7 | 5.1 | 5.3 | 5 |
| Government and government enterprises | 10,114 | 11,159 | 1,317 | 1,062 | 1,172 | 1,227 | 1,987 | 2,561 | 454,624 | 509,102 |
| | 12.2 | 12 | 17.4 | 15.1 | 24.6 | 28.3 | 9.5 | 10.8 | 14.5 | 12.9 |

Sources: BEA 2010a, 2021a

(D) represents data not shown to avoid disclosure of confidential information; estimates are included in higher-level totals.

N/A means data not available or present.

**Table A-5 (Part 1). Colorado Analysis Area Labor Income by Sector, 2010 and 2021 (2021$)**

| Sector | Eagle County | | Garfield County | | Grand County | | Jackson County | | State of Colorado | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 |
| Personal income (thousands of dollars) | 2,945,228 | 5,419,735 | 2,658,288 | 4,172,419 | 593,517 | 987,549 | 65,526 | 85,628 | 257,794,659 | 410,948,218 |
| Population (persons) | 52,114 | 55,727 | 56,102 | 62,161 | 14,794 | 15,860 | 1,388 | 1,363 | 5,047,005 | 5,812,069 |
| Per capita personal income (dollars) | 56,515 | 97,255 | 47,384 | 67,123 | 40,119 | 62,267 | 47,210 | 62,823 | 51,079 | 70,706 |
| Earnings by place of work (thousands of dollars) | 1,926,976 | 3,169,983 | 1,874,869 | 2,179,885 | 360,574 | 539,284 | 36,612 | 43,196 | 189,411,524 | 284,315,350 |
| Wages and salaries (thousands of dollars) | 1,486,759 | 2,014,583 | 1,375,813 | 1,527,917 | 266,336 | 374,887 | 22,175 | 26,272 | 142,342,931 | 205,270,875 |
| Supplement to wages and salaries | 280,366 | 344,166 | 298,343 | 309,441 | 60,654 | 73,477 | 6,449 | 6,451 | 30,830,275 | 38,796,409 |
| Proprietors' income | 159,850 | 811,234 | 200,712 | 342,527 | 33,584 | 90,920 | 7,988 | 10,473 | 16,238,318 | 40,248,066 |
| Farm earnings | 2,813 | 3,048 | -1,537 | 4,874 | 5,422 | 3,017 | 6,126 | 7,077 | 1,274,038 | 1,271,602 |
| Nonfarm earnings | 1,924,163 | 3,166,935 | 1,876,405 | 2,175,011 | 355,151 | 536,267 | 30,486 | 36,119 | 188,137,485 | 283,043,748 |
| Private nonfarm earnings | 1,687,285 | 2,906,149 | 1,532,926 | 1,800,253 | 268,137 | 434,057 | 20,393 | 27,183 | 152,495,628 | 241,395,201 |
| **By Industry (Total Income/Percentage of Total Nonfarm Income)** | | | | | | | | | | |
| Forestry, fishing, and related activities | (D) | 2,606 | 2,211 | 2,430 | 1,112 | 1,164 | 2,076 | 1,400 | 6,588 | 320,845 |
| | N/A | <1 | <1 | <1 | <1 | <1 | 6.8 | 3.9 | <1 | <1 |
| Mining (including quarrying and oil and gas extraction) | (D) | 2,878 | 266,670 | 86,968 | 3,032 | 2,212 | 143 | 2,908 | 321,055 | 12,297,287 |
| | N/A | <1 | 14.2 | 4 | <1 | <1 | <1 | <1 | 7.8 | 4.3 |
| Utilities | 7,113 | 10,265 | 30,368 | 36,358 | (D) | (D) | -23 | (D) | 28,003 | 1,942,237 |
| | <1 | <1 | 1.6 | 1.7 | N/A | N/A | <1 | N/A | <1 | <1 |
| Construction | 205,408 | 472,655 | 268,636 | 385,833 | 37,897 | 85,149 | (D) | (D) | 351,863 | 21,691,588 |
| | 11 | 14.9 | 14.3 | 17.7 | 10.7 | 15.9 | N/A | N/A | 8.6 | 7.7 |

| Sector | Eagle County | | Garfield County | | Grand County | | Jackson County | | State of Colorado | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 |
| Manufacturing | 14,661 | 35,574 | 23,575 | 27,972 | 4,646 | 10,077 | (D) | (D) | 168,223 | 15,945,891 |
| | <1 | 1.1 | 1.3 | 1.3 | 1.3 | 1.9 | N/A | N/A | 4.1 | 5.6 |
| Wholesale trade | 45,277 | 56,528 | 64,223 | 48,929 | (D) | (D) | (D) | 184 | 170,213 | 13,612,616 |
| | 2 | 1.8 | 3.4 | 2.2 | N/A | N/A | N/A | <1 | 4.1 | 4.8 |
| Retail trade | 160,167 | 239,008 | 153,600 | 172,041 | 28,902 | 46,458 | 2,165 | 3,376 | 317,344 | 14,943,538 |
| | 8 | 7.5 | 8.2 | 7.9 | 8.1 | 8.7 | 7.1 | <1 | 7.7 | 5.3 |
| Transportation and warehousing | 39,347 | 96,519 | 46,749 | 44,043 | 7,217 | 8,288 | (D) | (D) | 221,355 | 10,468,326 |
| | 2 | 3 | 2.5 | 2 | 2 | 1.6 | N/A | N/A | 5.4 | 3.7 |
| Information | 27,121 | 19,458 | 12,891 | 12,584 | 3,030 | 2,727 | (D) | 23 | 66,063 | 11,143,281 |
| | 1 | <1 | <1 | <1 | <1 | <1 | N/A | <1 | 1.6 | 3.9 |
| Finance and insurance | 54,158 | 77,514 | 51,897 | 63,448 | 9,508 | 8,081 | (D) | (D) | 175,245 | 16,982,485 |
| | 3 | 2.5 | 2.8 | 2.9 | 2.7 | 1.5 | N/A | N/A | 4.3 | 6 |
| Real estate and rental and leasing | 1,599 | 296,979 | 63,072 | 110,515 | 7,145 | 42,619 | 40 | (D) | 97,867 | 11,086,382 |
| | <1 | 9.4 | 3.4 | 5.1 | 2 | 7.9 | <1 | N/A | 2.4 | 3.9 |
| Professional, scientific, and technical services | 150,684 | 230,590 | 111,943 | 161,216 | 22,057 | 29,189 | (D) | 3,037 | 221,949 | 39,497,756 |
| | 8 | 7.3 | 6 | 7.4 | 6.2 | 5.4 | N/A | <1 | 5.4 | 14 |
| Management of companies and enterprises | 7,347 | 26,424 | 12,546 | 17,839 | 258 | 752 | 0 | N/A | 19,444 | 8,200,880 |
| | <1 | <1 | <1 | <1 | <1 | <1 | <1 | N/A | <1 | 2.9 |
| Administrative and support and waste management and remediation services | 83,078 | 157,227 | 63,965 | 88,954 | 9,938 | 17,241 | (D) | 928 | 178,881 | 11,226,138 |
| | 4 | 5 | 3.4 | 4.1 | 2.8 | 3.2 | N/A | <1 | 4.4 | 4 |
| Educational services | 17,693 | 35,061 | 16,411 | 29,117 | 1,242 | (D) | 71 | (D) | 14,243 | 3,375,199 |
| | <1 | 1.1 | <1 | 1.33 | <1 | N/A | <1 | N/A | <1 | 1.2 |
| Health care and social assistance | 236,417 | 476,498 | 179,437 | 252,572 | 15,058 | (D) | 1,319 | (D) | 641,870 | 24,815,683 |
| | 12 | 15.1 | 9.6 | 11.6 | 4.2 | N/A | 4.3 | N/A | 15.6 | 8.8 |
| Arts, entertainment, and recreation | 162,596 | 148,401 | 11,904 | 37,519 | 40,202 | (D) | 153 | (D) | 21,044 | 3,504,050 |
| | 8 | 4.7 | <1 | 1.7 | 11.3 | N/A | <1 | N/A | <1 | 1.2 |
| Accommodation and food services | 291,952 | 400,300 | 72,023 | 122,134 | 47,361 | (D) | 1,344 | 2,725 | 149,781 | 10,858,526 |
| | 15 | 12.6 | 3.8 | 5.6 | 13.3 | N/A | 4.4 | <1 | 3.6 | 3.8 |

| Sector | Eagle County | | Garfield County | | Grand County | | Jackson County | | State of Colorado | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 |
| Other services (except government and government enterprises) | 136,403 | 121,664 | 80,806 | 99,781 | 18,601 | 18,593 | (D) | (D) | 198,507 | 9,482,493 |
| | 7 | 3.8 | 4.3 | 4.6 | 5.2 | 3.5 | N/A | N/A | 4.8 | 3.4 |
| Government and government enterprises | 236,878 | 260,786 | 343,479 | 374,758 | 87,015 | 102,210 | 10,093 | 8,936 | 734,608 | 41,648,547 |
| | 12 | 8.2 | 18.3 | 17.2 | 24.5 | 19.1 | 33.1 | 1.7 | 17.9 | 16.3 |

Sources: BEA 2010b, 2021b
Note: All percentages are rounded to the nearest tenth.
All 2010 dollar values were adjusted for inflation.
(D) represents data not shown to avoid disclosure of confidential information; estimates are included in high-level totals.
(N/A) means data are not available, or no information was given.

**Table A-5 (Part 2). Colorado Analysis Area Labor Income by Sector, 2010 and 2021 (2021$)**

| Sector | Mesa County | | Moffat County | | Rio Blanco County | | Routt County | | State of Colorado | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 |
| Personal income (thousands of dollars) | 6,315,127 | 8,200,469 | 573,275 | 649,057 | 329,636 | 354,530 | 1,519,904 | 2,468,236 | 257,794,659 | 410,948,218 |
| Population (persons) | 146,272 | 157,335 | 13,798 | 13,185 | 6,627 | 6,476 | 23,418 | 25,091 | 5,047,005 | 5,812,069 |
| Per capita personal income (dollars) | 43,174 | 52,121 | 41,548 | 49,227 | 49,742 | 54,745 | 64,904 | 98,371 | 51,079 | 70,706 |
| Earnings by place of work (thousands of dollars) | 4,113,463 | 4,751,435 | 390,283 | 369,509 | 278,704 | 227,785 | 1,070,631 | 1,249,949 | 189,411,524 | 284,315,350 |
| Wages and salaries (thousands of dollars) | 2,980,793 | 3,438,077 | 281,904 | 258,407 | 206,637 | 175,240 | 695,652 | 869,861 | 142,342,931 | 205,270,875 |
| Supplement to wages and salaries | 677,419 | 740,031 | 72,688 | 62,984 | 47,718 | 40,873 | 146,429 | 164,182 | 30,830,275 | 38,796,409 |
| Proprietors' income | 455,251 | 573,327 | 35,691 | 48,118 | 24,350 | 11,672 | 228,551 | 215,906 | 16,238,318 | 40,248,066 |
| Farm earnings | 9,318 | 14,278 | 6,694 | 7,740 | 3,536 | 4,634 | -1,562 | (5,279) | 1,274,038 | 1,271,602 |
| Nonfarm earnings | 4,104,145 | 4,737,157 | 383,589 | 361,769 | 275,168 | 223,151 | 1,072,193 | 1,255,228 | 188,137,485 | 283,043,748 |
| Private nonfarm earnings | 3,369,537 | 3,967,749 | 301,325 | 294,323 | 204,858 | 149,249 | 952,081 | 1,061,442 | 152,495,628 | 241,395,201 |
| **By Industry (Total Income/Percentage of Total Nonfarm Income)** | | | | | | | | | | |
| Forestry, fishing, and related activities | 6,588 | 6,239 | 1,403 | 2,021 | (D) | (D) | 4,893 | 2,454 | 295,273 | 320,845 |
| | <1 | <1 | <1 | <1 | N/A | N/A | <1 | <1 | <1 | <1 |
| Mining (including quarrying and oil and gas extraction) | 321,055 | 154,105 | 67,790 | 49,391 | 98,294 | 64,299 | 68,215 | 24,084 | 8,066,897 | 12,297,287 |
| | 7.8 | 3.3 | 17.7 | 13.7 | 35.7 | 28.8 | 6.4 | 1.9 | 4.3 | 4.3 |
| Utilities | 28,003 | 29,215 | (D) | (D) | (D) | 6,751 | (D) | 22,320 | 1,404,824 | 1,942,237 |
| | <1 | <1 | N/A | N/A | N/A | 3 | N/A | 1.8 | <1 | <1 |
| Construction | 351,863 | 501,499 | 24,569 | 23,726 | 33,372 | 12,019 | 262,668 | 148,592 | 10,809,310 | 21,691,588 |
| | 8.6 | 10.6 | 6.4 | 6.6 | 12.1 | 5.4 | 24.5 | 11.8 | 5.7 | 7.7 |
| Manufacturing | 168,223 | 195,366 | 3,891 | 4,269 | 2,876 | 3,704 | 7,552 | 13,980 | 12,096,270 | 15,945,891 |
| | 4.1 | 4.1 | 1 | 1.2 | 1 | 1.7 | <1 | 1.1 | 6.4 | 5.6 |

| Sector | Mesa County | | Moffat County | | Rio Blanco County | | Routt County | | State of Colorado | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 |
| Wholesale trade | 170,213 | 188,071 | 17,416 | 10,949 | (D) | 1,120 | (D) | 30,119 | 9,735,613 | 13,612,616 |
| | 4.1 | 4 | 4.5 | 3 | N/A | <1 | N/A | 2.4 | 5.2 | 4.8 |
| Retail trade | 317,344 | 440,093 | 31,027 | 43,679 | 8,506 | 6,835 | 69,439 | 103,376 | 10,967,020 | 14,943,538 |
| | 7.7 | 9.3 | 8.1 | 12.1 | 3.1 | 3 | 6.5 | 8.2 | 5.8 | 5.3 |
| Transportation and warehousing | 221,355 | 201,294 | (D) | (D) | 11,964 | 5,333 | 19,938 | 18,279 | 5,334,942 | 10,468,326 |
| | 5.4 | 4.3 | N/A | N/A | 4.3 | 2.4 | 1.9 | 1.5 | 2.8 | 3.7 |
| Information | 66,063 | 46,252 | 4,610 | 1,562 | 1,165 | 705 | 12,157 | 10,872 | 9,263,953 | 11,143,281 |
| | 1.6 | <1 | 1.2 | <1 | <1 | <1 | 1.1 | <1 | 4.9 | 3.9 |
| Finance and insurance | 175,245 | 219,432 | 7,908 | 8,146 | 3,599 | 4,272 | 37,761 | 55,435 | 11,614,926 | 16,982,485 |
| | 4.3 | 4.6 | 2.1 | 2.3 | 1.3 | 1.9 | 3.5 | 4.4 | 6.2 | 6 |
| Real estate and rental and leasing | 97,867 | 192,685 | 3,020 | 9,575 | 1,181 | 2,287 | 34,332 | 129,246 | -879,182 | 11,086,382 |
| | 2.4 | 4.1 | <1 | 2.7 | <1 | 1 | 3.2 | 10.3 | <1 | 3.9 |
| Professional, scientific, and technical services | 221,949 | 236,348 | (D) | (D) | (D) | 2,925 | 76,421 | 106,542 | 24,124,299 | 39,497,756 |
| | 5.4 | 5 | N/A | N/A | N/A | 1.3 | 7.1 | 8.5 | 12.8 | 14 |
| Management of companies and enterprises | 19,444 | 16,761 | (D) | (D) | (D) | N/A | 6,624 | 11,145 | 5,339,038 | 8,200,880 |
| | <1 | <1 | N/A | N/A | N/A | 0 | <1 | <1 | 2.8 | 2.9 |
| Administrative and support and waste management and remediation services | 178,881 | 169,847 | 6,683 | 6,511 | 8,133 | 18,194 | 31,811 | 50,465 | 7,969,662 | 11,226,138 |
| | 4.4 | 3.6 | 1.7 | 1.8 | 3 | 8.2 | 3 | 4 | 4.2 | 4 |
| Educational services | 14,243 | 28,406 | (D) | 458 | 154 | (D) | 8,822 | 14,993 | 2,380,978 | 3,375,199 |
| | <1 | <1 | N/A | <1 | <1 | N/A | <1 | 1.2 | 1.3 | 1.2 |
| Health care and social assistance | 641,870 | 881,844 | (D) | 42,572 | 2,736 | (D) | 98,430 | 91,752 | 18,365,718 | 24,815,683 |
| | 15.6 | 18.6 | N/A | 11.8 | <1 | N/A | 9.2 | 7.3 | 9.8 | 8.8 |
| Arts, entertainment, and recreation | 21,044 | 28,335 | 1,375 | 2,405 | 413 | 1,955 | 47,784 | 69,447 | 2,229,508 | 3,504,050 |
| | <1 | <1 | <1 | <1 | <1 | <1 | 4.5 | 5.5 | 1.2 | 1.2 |
| Accommodation and food services | 149,781 | 230,495 | 11,215 | 13,955 | 11,810 | 7,531 | 64,752 | 114,449 | 6,260,189 | 10,858,526 |
| | 3.6 | 4.9 | 2.9 | 3.9 | 4.3 | 3.4 | 6 | 9.1 | 3.3 | 3.8 |
| Other services (except government and government enterprises) | 198,507 | 201,462 | 16,604 | 14,593 | 7,179 | 6,769 | 53,943 | 43,892 | 7,116,387 | 9,482,493 |
| | 4.8 | 4.3 | 4.3 | 4 | 2.6 | 3 | 5 | 3.5 | 3.8 | 3.4 |

| Sector | Mesa County | | Moffat County | | Rio Blanco County | | Routt County | | State of Colorado | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 |
| Government and government enterprises | 734,608 | 769,408 | 82,264 | 67,446 | 70,310 | 73,902 | 120,112 | 193,786 | 35,641,858 | 41,648,547 |
| | 17.9 | 16.2 | 21.4 | 18.6 | 25.6 | 33.1 | 11.2 | 15.4 | 18.9 | 16.3 |

Sources: BEA 2010b, 2021b
Note: All percentages are rounded to the nearest tenth.
All 2010 dollar values were adjusted for inflation.
(D) represents data not shown to avoid disclosure of confidential information; estimates are included in high-level totals.
(N/A) means data are not available, or no information was given.

## Table A-6 (Part 1). Idaho Analysis Area Employment by Sector (2010 and 2021)

| Sector | Adams County | | Bear Lake County | | Blaine County | | Bingham County | | Bonneville County | | Butte County | | Camas County | | State of Idaho | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 |
| Total employment (number of jobs) | 2,018 | 2,480 | 3,073 | 3,459 | 21,672 | 23,118 | 19,307 | 22,148 | 60,131 | 80,803 | 9,408 | 9,904 | 683 | 686 | 868,718 | 1,125,054 |
| Wage and salary employment | 1,117 | 1,514 | 1,835 | 2,002 | 15,407 | 15,982 | 12,448 | 14,051 | 45,133 | 60,749 | 8,867 | 9,345 | 408 | 393 | 642,637 | 831,903 |
| Proprietors employment | 901 | 966 | 1,238 | 1,457 | 6,265 | 7,136 | 6,859 | 8,097 | 14,998 | 20,054 | 541 | 559 | 275 | 293 | 226,081 | 293,151 |
| Farm proprietors employment | 229 | 206 | 451 | 482 | 1,205 | 1,198 | 148 | 140 | 827 | 811 | 194 | 200 | 99 | 115 | 22,805 | 22,544 |
| Nonfarm proprietors employment | 672 | 760 | 787 | 975 | 5,060 | 5,938 | 6,711 | 7,957 | 14,171 | 19,243 | 347 | 359 | 176 | 178 | 203,276 | 270,607 |
| Farm employment | 262 | 258 | 519 | 550 | 2,119 | 2,171 | 305 | 331 | 1,192 | 1,211 | 263 | 272 | 139 | 156 | 37,294 | 38,894 |
| Nonfarm employment | 1,756 | 2,222 | 2,554 | 2,909 | 19,553 | 20,947 | 19,002 | 21,817 | 58,939 | 79,592 | 9,145 | 9,632 | 544 | 530 | 831,424 | 1,086,160 |
| Private nonfarm employment | 1,420 | 1,886 | 1,862 | 2,190 | 15,426 | 16,751 | 17,418 | 20,425 | 52,665 | 72,455 | 8,834 | 9,405 | 420 | 410 | 702,848 | 951,287 |
| **By Industry (Number of Jobs/Percentage of Total Employment)** | | | | | | | | | | | | | | | | |
| Forestry, fishing, and related activities | 115 | 118 | (D) | (D) | (D) | 634 | 99 | 105 | (D) | (D) | (D) | (D) | (D) | (D) | 11,958 | 12,981 |
| | 5.7 | 4.8 | N/A | N/A | N/A | 2.7 | <1 | <1 | N/A | N/A | N/A | N/A | N/A | N/A | 1.4 | 1.2 |
| Mining (including quarrying and oil and gas extraction) | 19 | 16 | (D) | (D) | (D) | 43 | 189 | 131 | (D) | (D) | 19 | (D) | 0 | 1 | 4,428 | 4,579 |
| | <1 | <1 | N/A | N/A | N/A | <1 | 1.0 | <1 | N/A | N/A | <1 | N/A | 0 | <1 | <1 | <1 |
| Utilities | (D) | 12 | (D) | (D) | 64 | 75 | 31 | 29 | 56 | 98 | 1 | 1 | 0 | (D) | 2,954 | 3,347 |
| | N/A | <1 | N/A | N/A | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | 0 | N/A | <1 | <1 |
| Construction | 135 | 236 | 133 | 189 | 1,441 | 1,895 | 1,946 | 2,839 | 4,119 | 5,753 | 38 | 62 | (D) | 72 | 53,502 | 88,220 |
| | 6.7 | 9.5 | 4.3 | 5.5 | 6.6 | 8.2 | 10.1 | 12.8 | 6.9 | 7.1 | <1 | <1 | N/A | 10.5 | 6.2 | 7.8 |
| Manufacturing | 71 | 155 | 80 | 127 | 2,431 | 2,292 | 507 | 529 | 2,437 | 4,766 | 28 | 80 | (D) | (D) | 58,472 | 77,093 |
| | 3.5 | 6.3 | 2.6 | 3.7 | 11.2 | 9.9 | 2.6 | 2.4 | 4.1 | 5.9 | <1 | <1 | N/A | N/A | 6.7 | 6.9 |
| Wholesale trade | 26 | 20 | 80 | 60 | 1,393 | 941 | 267 | 294 | 3,590 | 3,390 | (D) | 23 | (D) | 49 | 28,606 | 36,081 |
| | 1.3 | <1 | 2.6 | 1.7 | 6.4 | 4.1 | 1.4 | 1.3 | 6 | 4.2 | N/A | <1 | N/A | 7.1 | 3.3 | 3.2 |

| Sector | Adams County | | Bear Lake County | | Blaine County | | Bingham County | | Bonneville County | | Butte County | | Camas County | | State of Idaho | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 |
| Retail trade | 281 | 211 | 447 | 392 | 1,956 | 2,020 | 1,820 | 1,966 | 8,368 | 10,524 | 143 | 154 | (D) | 22 | 98,083 | 119,168 |
| | 13.9 | 8.5 | 14.5 | 11.3 | 9.0 | 8.7 | 9.4 | 8.9 | 13.9 | 13.0 | 1.5 | 1.6 | N/A | 3.2 | 11.3 | 10.6 |
| Transportation and warehousing | (D) | 45 | (D) | (D) | 578 | 754 | 232 | 268 | 1,770 | 2,992 | (D) | 42 | 6 | (D) | 24,998 | 46,102 |
| | N/A | 1.8 | N/A | N/A | 2.7 | 3.3 | 1.2 | 1.2 | 2.9 | 3.7 | N/A | <1 | <1 | N/A | 2.9 | 4.1 |
| Information | 18 | (D) | 31 | 19 | 93 | (D) | 465 | 369 | 1,375 | 705 | (D) | 26 | 5 | (D) | 12,639 | 11,020 |
| | <1 | N/A | 1 | <1 | <1 | N/A | 2.4 | 1.7 | 2.3 | <1 | N/A | <1 | <1 | N/A | 1.5 | 1 |
| Finance and insurance | 51 | 53 | 65 | 83 | 709 | 916 | 964 | 1,178 | 2,816 | 3,699 | 54 | (D) | (D) | (D) | 37,341 | 50,029 |
| | 2.5 | 2.1 | 2.1 | 2.4 | 3.3 | 4.0 | 5.0 | 5.3 | 4.7 | 4.6 | <1 | N/A | N/A | N/A | 4.3 | 4.4 |
| Real estate and rental and leasing | 108 | 87 | 129 | 187 | 723 | 923 | 2,105 | 2,851 | 3,197 | 4,595 | 42 | (D) | 20 | 19 | 43,697 | 62,155 |
| | 5.4 | 3.5 | 4.2 | 5.4 | 3.3 | 4.0 | 10.9 | 12.9 | 5.3 | 5.7 | <1 | N/A | 2.9 | 2.8 | 5.0 | 5.5 |
| Professional, scientific, and technical services | 82 | 82 | (D) | (D) | (D) | (D) | 1,606 | 1,727 | 3,644 | 4,535 | 8,053 | (D) | 12 | 30 | 52,535 | 71,512 |
| | 4.1 | 3.3 | N/A | N/A | N/A | N/A | 8.3 | 7.8 | 6.1 | 5.6 | 85.6 | N/A | 1.8 | 4.4 | 6 | 6.4 |
| Management of companies and enterprises | 0 | 0 | 10 | 32 | (D) | (D) | (D) | 99 | 111 | 614 | (D) | (D) | (D) | (D) | 6,391 | 10,169 |
| | 0 | 0 | <1 | <1 | N/A | N/A | N/A | <1 | <1 | <1 | N/A | N/A | N/A | N/A | <1 | <1 |
| Administrative and support and waste management and remediation services | 70 | 68 | (D) | (D) | 590 | 719 | (D) | 1,376 | 3,148 | 4,867 | (D) | (D) | (D) | (D) | 49,332 | 64,161 |
| | 3.5 | 2.7 | N/A | N/A | 2.7 | 3.1 | N/A | 6.2 | 5.2 | 6 | N/A | N/A | N/A | N/A | 5.7 | 5.7 |
| Educational services | (D) | (D) | (D) | (D) | 192 | 254 | 278 | 450 | 607 | 1,298 | (D) | (D) | (D) | (D) | 14,555 | 23,101 |
| | N/A | N/A | N/A | N/A | <1 | 1.1 | 1.4 | 2 | 1 | 1.6 | N/A | N/A | N/A | N/A | 1.7 | 2.1 |
| Health care and social assistance | (D) | (D) | (D) | (D) | 1,856 | 2,050 | 1,005 | 1,265 | 8,516 | 12,638 | (D) | (D) | (D) | (D) | 89,550 | 117,370 |
| | N/A | N/A | N/A | N/A | 8.6 | 8.9 | 5.2 | 5.7 | 14.2 | 15.6 | N/A | N/A | N/A | N/A | 10.3 | 10.4 |
| Arts, entertainment, and recreation | 128 | 392 | 64 | 54 | 201 | 285 | 840 | 834 | 955 | 1,259 | 8 | 11 | (D) | (D) | 17,187 | 24,033 |
| | 6.3 | 15.8 | 2.1 | 1.6 | <1 | 1.2 | 4.4 | 3.8 | 1.6 | 1.6 | <1 | <1 | N/A | N/A | 2 | 2.1 |
| Accommodation and food services | 93 | 139 | 189 | 203 | 781 | 896 | 2,756 | 2,748 | 4,278 | 6,539 | 81 | 71 | (D) | (D) | 54,452 | 78,157 |
| | 4.6 | 5.6 | 6.2 | 5.9 | 3.6 | 3.9 | 14.3 | 12.4 | 7.1 | 8.1 | <1 | <1 | N/A | N/A | 6.3 | 6.9 |
| Other services | 87 | (D) | 133 | 167 | 1,110 | (D) | 1,160 | 1,367 | 3,166 | 3,785 | (D) | 71 | (D) | (D) | 42,168 | 52,009 |
| | 4.3 | N/A | 4.3 | 4.8 | 5.1 | N/A | 6 | 6.2 | 5.3 | 4.7 | N/A | <1 | N/A | N/A | 4.9 | 4.6 |

| Sector | Adams County | | Bear Lake County | | Blaine County | | Bingham County | | Bonneville County | | Butte County | | Camas County | | State of Idaho | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 |
| Government and government enterprises | 336 | 336 | 692 | 719 | 4,127 | 4,196 | 1,584 | 1,392 | 6,274 | 7,137 | 311 | 227 | 124 | 120 | 128,576 | 134,873 |
| | 16.7 | 13.5 | 22.5 | 20.8 | 19 | 18.2 | 8.2 | 6.3 | 10.4 | 8.8 | 3.3 | 2.3 | 18.2 | 17.5 | 14.8 | 12 |

Sources: BEA 2010a, 2021a
(D) represents data not shown to avoid disclosure of confidential information; estimates are included in higher-level totals.
N/A means data are not available or present.

## Table A-6 (Part 2). Idaho Analysis Area Employment by Sector (2010 and 2021)

| Sector | Caribou County | | Cassia County | | Clark County | | Custer County | | Elmore County | | Fremont County | | Gem County | | State of Idaho | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 |
| Total employment (number of jobs) | 4,522 | 5,005 | 13,552 | 16,636 | 528 | 502 | 2,835 | 2,859 | 13,197 | 14,069 | 5,353 | 6,555 | 6,220 | 7,809 | 868,718 | 1,125,054 |
| Wage and salary employment | 3,265 | 3,715 | 10,261 | 12,642 | 377 | 351 | 1,780 | 1,659 | 10,797 | 11,221 | 3,146 | 3,684 | 3,414 | 4,592 | 642,637 | 831,903 |
| Proprietors employment | 1,257 | 1,290 | 3,291 | 3,994 | 151 | 151 | 1,055 | 1,200 | 2,400 | 2,848 | 2,207 | 2,871 | 2,806 | 3,217 | 226,081 | 293,151 |
| Farm proprietors employment | 368 | 364 | 574 | 610 | 65 | 62 | 239 | 242 | 331 | 321 | 506 | 530 | 787 | 754 | 22,805 | 22,544 |
| Nonfarm proprietors employment | 889 | 926 | 2,717 | 3,384 | 86 | 89 | 816 | 958 | 2,069 | 2,527 | 1,701 | 2,341 | 2,019 | 2,463 | 203,276 | 270,607 |
| Farm employment | 531 | 544 | 1,767 | 1,944 | 124 | 119 | 319 | 340 | 805 | 824 | 759 | 824 | 910 | 898 | 37,294 | 38,894 |
| Nonfarm employment | 3,991 | 4,461 | 11,785 | 14,692 | 404 | 383 | 2,516 | 2,519 | 12,392 | 13,245 | 4,594 | 5,731 | 5,310 | 6,911 | 831,424 | 1,086,160 |
| Private nonfarm employment | 3,275 | 3,781 | 9,997 | 13,067 | 239 | 256 | 2,025 | 2,070 | 6,153 | 7,726 | 3,427 | 4,677 | 4,381 | 5,897 | 702,848 | 951,287 |
| **By Industry (Number of Jobs/Percentage of Total Employment)** | | | | | | | | | | | | | | | | |
| Forestry, fishing, and related activities | (D) | (D) | 444 | 553 | (D) | (D) | (D) | 64 | (D) | 188 | (D) | (D) | (D) | (D) | 11,958 | 12,981 |
| | N/A | N/A | 3.3 | 3.3 | N/A | N/A | N/A | 2.2 | N/A | 1.3 | N/A | N/A | N/A | N/A | 1.4 | 1.2 |
| Mining (including quarrying and oil and gas extraction) | 353 | 614 | 119 | 207 | 4 | (D) | (D) | 87 | (D) | 20 | (D) | (D) | (D) | (D) | 4,428 | 4,579 |
| | 7.8 | 12.3 | <1 | 1.2 | <1 | N/A | N/A | 3 | N/A | <1 | N/A | N/A | N/A | N/A | <1 | <1 |

| Sector | Caribou County | | Cassia County | | Clark County | | Custer County | | Elmore County | | Fremont County | | Gem County | | State of Idaho | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 |
| Utilities | 38 | 29 | 50 | 62 | 0 | 2 | 36 | 28 | 33 | 44 | (D) | (D) | 5 | (D) | 2,954 | 3,347 |
| | <1 | <1 | <1 | <1 | 0 | <1 | 1.3 | 1 | <1 | <1 | N/A | N/A | <1 | N/A | <1 | <1 |
| Construction | (D) | 381 | 618 | 967 | (D) | (D) | 179 | 221 | 457 | 559 | 435 | 715 | 482 | 824 | 53,502 | 88,220 |
| | N/A | 7.6 | 4.6 | 5.8 | N/A | N/A | 6.3 | 7.7 | 3.5 | 4 | 8.1 | 10.9 | 7.7 | 10.6 | 6.2 | 7.8 |
| Manufacturing | (D) | 801 | 1,288 | 1,558 | (D) | (D) | 57 | (D) | 444 | 810 | 104 | 210 | 242 | 416 | 58,472 | 77,093 |
| | N/A | 16.0 | 9.5 | 9.4 | N/A | N/A | 2 | N/A | 3.4 | 5.8 | 1.9 | 3.2 | 3.9 | 5.3 | 6.7 | 6.9 |
| Wholesale trade | 90 | 134 | 463 | 578 | (D) | 45 | 34 | 50 | 112 | 114 | (D) | (D) | 140 | 194 | 28,606 | 36,081 |
| | 2.0 | 2.7 | 3.4 | 3.5 | N/A | 9.0 | 1.2 | 1.7 | <1 | <1 | N/A | N/A | 2.3 | 2.5 | 3.3 | 3.2 |
| Retail trade | 397 | 400 | 1,735 | 2,091 | (D) | (D) | 275 | 239 | 1,143 | 1,216 | 459 | 618 | 598 | 824 | 98,083 | 119,168 |
| | 8.8 | 8 | 12.8 | 12.6 | N/A | N/A | 9.7 | 8.4 | 8.7 | 8.6 | 8.6 | 9.4 | 9.6 | 10.6 | 11.3 | 10.6 |
| Transportation and warehousing | 81 | 96 | 835 | 1,217 | (D) | (D) | 37 | 66 | 268 | 473 | 189 | 244 | 217 | (D) | 24,998 | 46,102 |
| | 1.8 | 1.9 | 6.2 | 7.3 | N/A | N/A | 1.3 | 2.3 | 2 | 3.4 | 3.5 | 3.7 | 3.5 | N/A | 2.9 | 4.1 |
| Information | 33 | (D) | 103 | 82 | (D) | (D) | 41 | 49 | 120 | 94 | (D) | (D) | 26 | 27 | 12,639 | 11,020 |
| | <1 | N/A | <1 | <1 | N/A | N/A | 1.4 | 1.7 | <1 | <1 | N/A | N/A | <1 | <1 | 1.5 | 1 |
| Finance and insurance | 87 | 108 | 388 | 490 | 12 | (D) | 51 | (D) | 275 | 338 | 168 | (D) | 203 | 247 | 37,341 | 50,029 |
| | 1.9 | 2.2 | 2.9 | 2.9 | 2.3 | N/A | 1.8 | N/A | 2.1 | 2.4 | 3.1 | N/A | 3.3 | 3.2 | 4.3 | 4.4 |
| Real estate and rental and leasing | 177 | 175 | 522 | 819 | 11 | 10 | 102 | (D) | 397 | 439 | 276 | 405 | 274 | 371 | 43,697 | 62,155 |
| | 3.9 | 3.5 | 3.9 | 4.9 | 2.1 | 2 | 3.6 | N/A | 3.0 | 3.1 | 5.2 | 6.2 | 4.4 | 4.8 | 5 | 5.5 |
| Professional, scientific, and technical services | 145 | (D) | 370 | 442 | (D) | (D) | 85 | 96 | 248 | 327 | 151 | (D) | 201 | 318 | 52,535 | 71,512 |
| | 3.2 | N/A | 2.7 | 2.7 | N/A | N/A | 3.0 | 3.4 | 1.9 | 2.3 | 2.8 | N/A | 3.2 | 4.1 | 6 | 6.4 |
| Management of companies and enterprises | (D) | (D) | (D) | 73 | 0 | 0 | (D) | (D) | 0 | (D) | 0 | (D) | (D) | (D) | 6,391 | 10,169 |
| | N/A | N/A | N/A | <1 | 0 | 0 | N/A | N/A | 0 | N/A | 0 | N/A | N/A | N/A | <1 | <1 |
| Administrative and support and waste management and remediation services | (D) | 149 | (D) | 400 | (D) | (D) | (D) | (D) | 345 | (D) | 116 | 286 | (D) | (D) | 49,332 | 64,161 |
| | N/A | 3 | N/A | 2.4 | N/A | N/A | N/A | N/A | 2.6 | N/A | 2.2 | 4.4 | N/A | N/A | 5.7 | 5.7 |
| Educational services | (D) | (D) | (D) | 139 | (D) | (D) | 10 | 12 | 174 | 135 | (D) | (D) | (D) | 72 | 14,555 | 23,101 |
| | N/A | N/A | N/A | <1 | N/A | N/A | <1 | <1 | 1.3 | 1 | N/A | N/A | N/A | <1 | 1.7 | 2.1 |
| Health care and social assistance | (D) | (D) | (D) | 1,552 | (D) | (D) | 93 | (D) | 573 | 1,007 | (D) | (D) | (D) | 888 | 89,550 | 117,370 |
| | N/A | N/A | N/A | 9.3 | N/A | N/A | 3.3 | N/A | 4.3 | 7.2 | N/A | N/A | N/A | 11.4 | 10.3 | 10.4 |
| Arts, entertainment, and recreation | 57 | 47 | 159 | 192 | 2 | 5 | 86 | 161 | 88 | 132 | 67 | 95 | 76 | 117 | 17,187 | 24,033 |
| | 1.3 | <1 | 1.2 | 1.2 | <1 | 1 | 3 | 5.6 | <1 | <1 | 1.3 | 1.4 | 1.2 | 1.5 | 2 | 2.1 |

| Sector | Caribou County | | Cassia County | | Clark County | | Custer County | | Elmore County | | Fremont County | | Gem County | | State of Idaho | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 |
| Accommodation and food services | 170 | 131 | 481 | 1,028 | (D) | (D) | 291 | 363 | 789 | 964 | 320 | 514 | 253 | 412 | 54,452 | 78,157 |
| | 3.8 | 2.6 | 3.5 | 6.2 | N/A | N/A | 10.3 | 12.7 | 6 | 6.9 | 6.0 | 7.8 | 4.1 | 5.3 | 6.3 | 6.9 |
| Other services | 193 | (D) | 607 | 617 | 14 | 12 | 102 | 112 | 531 | 570 | 353 | 399 | 392 | 425 | 42,168 | 52,009 |
| | 4.3 | N/A | 4.5 | 3.7 | 2.7 | 2.4 | 3.6 | 3.9 | 4 | 4.1 | 6.6 | 6.1 | 6.3 | 5.4 | 4.9 | 4.6 |
| Government and government enterprises | 716 | 680 | 1,788 | 1,625 | 165 | 127 | 491 | 449 | 6,239 | 5,519 | 1,167 | 1,054 | 929 | 1,014 | 128,576 | 134,873 |
| | 15.8 | 13.6 | 13.2 | 9.8 | 31.3 | 25.3 | 17.3 | 15.7 | 47.3 | 39.2 | 21.8 | 16.1 | 14.9 | 13 | 14.8 | 12 |

Source: BEA 2010a, 2021a
(D) represents data not shown to avoid disclosure of confidential information; estimates are included in higher-level totals.
N/A means data are not available or present.

## Table A-6 (Part 3). Idaho Analysis Area Employment by Sector (2010 and 2021)

| Sector | Gooding County | | Jefferson County | | Jerome County | | Lemhi County | | Lincoln County | | Madison County | | State of Idaho | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 |
| Total employment (number of jobs) | 8,060 | 8,968 | 10,513 | 13,444 | 11,133 | 12,880 | 4,316 | 4,627 | 2,323 | 2,602 | 18,186 | 26,790 | 868,718 | 1,125,054 |
| Wage and salary employment | 6,014 | 6,718 | 6,323 | 8,177 | 8,557 | 10,158 | 2,715 | 2,837 | 1,596 | 1,789 | 13,423 | 20,080 | 642,637 | 831,903 |
| Proprietors employment | 2,046 | 2,250 | 4,190 | 5,267 | 2,576 | 2,722 | 1,601 | 1,790 | 727 | 813 | 4,763 | 6,710 | 226,081 | 293,151 |
| Farm proprietors employment | 564 | 535 | 742 | 725 | 523 | 516 | 326 | 329 | 257 | 289 | 381 | 404 | 22,805 | 22,544 |
| Nonfarm proprietors employment | 1,482 | 1,715 | 3,448 | 4,542 | 2,053 | 2,206 | 1,275 | 1,461 | 470 | 524 | 4,382 | 6,306 | 203,276 | 270,607 |
| Farm employment | 1,950 | 2,023 | 1,185 | 1,130 | 1,692 | 1,711 | 414 | 426 | 555 | 626 | 663 | 713 | 37,294 | 38,894 |
| Nonfarm employment | 6,110 | 6,945 | 9,328 | 12,314 | 9,441 | 11,169 | 3,902 | 4,201 | 1,768 | 1,976 | 17,523 | 26,077 | 831,424 | 1,086,160 |
| Private nonfarm employment | 4,934 | 5,941 | 7,850 | 10,751 | 8,311 | 9,974 | 3,041 | 3,357 | 1,245 | 1,486 | 15,383 | 23,529 | 702,848 | 951,287 |
| **By Industry (Number of Jobs/Percentage of Total Employment)** | | | | | | | | | | | | | | |
| Forestry, fishing, and related activities | (D) | (D) | 631 | 522 | 449 | 486 | (D) | (D) | (D) | 176 | (D) | 189 | 11,958 | 12,981 |
| | N/A | N/A | 6 | 3.9 | 4 | 3.8 | N/A | N/A | N/A | 6.8 | N/A | <1 | 1.4 | 1.2 |
| | (D) | (D) | 31 | 28 | 23 | 24 | (D) | (D) | 0 | 0 | (D) | 40 | 4,428 | 4,579 |

| Sector | Gooding County | | Jefferson County | | Jerome County | | Lemhi County | | Lincoln County | | Madison County | | State of Idaho | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 |
| Mining (including quarrying and oil and gas extraction) | N/A | N/A | <1 | <1 | <1 | <1 | N/A | N/A | 0 | 0 | N/A | <1 | <1 | <1 |
| Utilities | 40 | 54 | 25 | 33 | (D) | (D) | (D) | 15 | (D) | (D) | (D) | (D) | 2,954 | 3,347 |
| | <1 | <1 | <1 | <1 | N/A | N/A | N/A | <1 | N/A | N/A | N/A | N/A | <1 | <1 |
| Construction | 330 | 539 | 950 | 1,645 | 579 | 793 | 366 | 460 | (D) | 245 | 883 | 1,348 | 53,502 | 88,220 |
| | 4.1 | 6 | 9 | 12.2 | 5.2 | 6.2 | 8.5 | 9.9 | N/A | 9.4 | 4.9 | 5 | 6.2 | 7.8 |
| Manufacturing | 802 | 999 | 1,020 | 1,262 | 1,437 | 1,933 | 134 | 160 | (D) | 177 | 810 | 1,284 | 58,472 | 77,093 |
| | 10.0 | 11.1 | 9.7 | 9.4 | 12.9 | 15 | 3.1 | 3.5 | N/A | 6.8 | 4.5 | 4.8 | 6.7 | 6.9 |
| Wholesale trade | 199 | 170 | 356 | 512 | (D) | (D) | 58 | 66 | (D) | (D) | 1,345 | (D) | 28,606 | 36,081 |
| | 2.5 | 1.9 | 3.4 | 3.8 | N/A | N/A | 1.3 | 1.4 | N/A | N/A | 7.4 | N/A | 3.3 | 3.2 |
| Retail trade | 583 | 604 | 939 | 1,291 | 1,132 | 1,259 | 437 | 474 | 139 | (D) | 2,073 | 2,983 | 98,083 | 119,168 |
| | 7.2 | 6.7 | 8.9 | 9.6 | 10.2 | 9.8 | 10.1 | 10.2 | 6 | N/A | 11.4 | 11.1 | 11.3 | 10.6 |
| Transportation and warehousing | 343 | 262 | 414 | 498 | 1,144 | 1,042 | (D) | 92 | 57 | 103 | (D) | (D) | 24,998 | 46,102 |
| | 4.3 | 2.9 | 3.9 | 3.7 | 10.3 | 8.1 | N/A | 2 | 2.5 | 4 | N/A | N/A | 2.9 | 4.1 |
| Information | 18 | (D) | 53 | 66 | 104 | (D) | 48 | 38 | (D) | (D) | 125 | 270 | 12,639 | 11,020 |
| | <1 | N/A | <1 | <1 | <1 | N/A | 1.1 | <1 | N/A | N/A | <1 | 1 | 1.5 | 1 |
| Finance and insurance | 164 | 211 | 348 | 416 | 229 | 189 | 134 | 88 | (D) | 39 | 612 | 780 | 37,341 | 50,029 |
| | 2.0 | 2.4 | 3.3 | 3.1 | 2.1 | 1.5 | 3.1 | 1.9 | N/A | 1.5 | 3.4 | 2.9 | 4.3 | 4.4 |
| Real estate and rental and leasing | 257 | (D) | 601 | 864 | 395 | (D) | 178 | 204 | (D) | (D) | 1,016 | 1,584 | 43,697 | 62,155 |
| | 3.2 | N/A | 5.7 | 6.4 | 3.5 | N/A | 4.1 | 4.4 | N/A | N/A | 5.6 | 5.9 | 0 | 5.5 |
| Professional, scientific, and technical services | 280 | 197 | (D) | (D) | 238 | 283 | 231 | 228 | (D) | 37 | 1,253 | 1,962 | 52,535 | 71,512 |
| | 3.5 | 2.2 | N/A | N/A | 2.1 | 2.2 | 5.4 | 4.9 | N/A | 1.4 | 6.9 | 7.3 | 6 | 6.4 |
| Management of companies and enterprises | 12 | 17 | (D) | (D) | 16 | 88 | 16 | (D) | 0 | 0 | (D) | 71 | 6,391 | 10,169 |
| | <1 | <1 | N/A | N/A | <1 | <1 | <1 | N/A | 0 | 0 | N/A | <1 | <1 | <1 |
| Administrative and support and waste management and remediation services | 116 | 143 | 281 | 438 | 285 | 522 | 147 | (D) | (D) | 101 | (D) | 1,845 | 49,332 | 64,161 |
| | 1.4 | 1.6 | 2.7 | 3.3 | 2.6 | 4.1 | 3.4 | N/A | N/A | 3.9 | N/A | 6.9 | 5.7 | 5.7 |
| Educational services | 10 | (D) | (D) | 144 | 96 | 122 | 17 | (D) | (D) | 11 | (D) | 4,282 | 14,555 | 23,101 |
| | <1 | N/A | N/A | 1.1 | <1 | <1 | <1 | N/A | N/A | <1 | N/A | 16.0 | 1.7 | 2.1 |
| | (D) | (D) | (D) | 969 | 596 | 617 | 338 | (D) | (D) | 145 | (D) | 1,786 | 89,550 | 117,370 |

| Sector | Gooding County | | Jefferson County | | Jerome County | | Lemhi County | | Lincoln County | | Madison County | | State of Idaho | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 |
| Health care and social assistance | N/A | N/A | N/A | 7.2 | 5.4 | 4.8 | 7.8 | N/A | N/A | 5.6 | N/A | 6.7 | 10.3 | 10.4 |
| Arts, entertainment, and recreation | 115 | 133 | 290 | 300 | 174 | (D) | 115 | 163 | (D) | (D) | 330 | 419 | 17,187 | 24,033 |
| | 1.4 | 1.5 | 2.8 | 2.2 | 1.6 | N/A | 2.7 | 3.5 | N/A | N/A | 1.8 | 1.6 | 2 | 2.1 |
| Accommodation and food services | 294 | 414 | 315 | 417 | 398 | (D) | 304 | 380 | (D) | (D) | 1,005 | 1,767 | 54,452 | 78,157 |
| | 3.6 | 4.6 | | 3.1 | 3.6 | N/A | 7 | 8.2 | N/A | N/A | 5.5 | 6.6 | 6.3 | 6.9 |
| Other services | 410 | 396 | 623 | 770 | 518 | 583 | 322 | 288 | (D) | 94 | 702 | 973 | 42,168 | 52,009 |
| | 5.1 | 4.4 | 5.9 | 5.7 | 4.7 | 4.5 | 7.5 | 6.2 | N/A | 3.6 | 3.9 | 3.6 | 4.9 | 4.6 |
| Government and government enterprises | 1,176 | 1,004 | 1,478 | 1,563 | 1,130 | 1,195 | 861 | 844 | 523 | 490 | 2,140 | 2,548 | 128,576 | 134,873 |
| | 14.6 | 11.2 | 14.1 | 11.6 | 10.2 | 9.3 | 19.9 | 18.2 | 22.5 | 18.8 | 11.8 | 9.5 | 14.8 | 12 |

Source: BEA 2010a, 2021a

(D) represents data not shown to avoid disclosure of confidential information; estimates are included in higher-level totals.

N/A means data are not available or present.

## Table A-6 (Part 4). Idaho Analysis Area Employment by Sector (2010 and 2021)

| Sector | Minidoka County | | Oneida County | | Owyhee County | | Payette County | | Power County | | Twin Falls County | | Washington County | | State of Idaho | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 |
| Total employment (number of jobs) | 8,925 | 11,608 | 2,062 | 2,654 | 4,212 | 5,164 | 9,380 | 10,955 | 4,365 | 4,893 | 44,368 | 55,421 | 4,538 | 4,689 | 868,718 | 1,125,054 |
| Wage and salary employment | 6,771 | 8,679 | 1,129 | 1,566 | 2,696 | 3,256 | 6,281 | 7,378 | 3,444 | 3,799 | 33,864 | 42,216 | 2,933 | 3,136 | 642,637 | 831,903 |
| Proprietors employment | 2,154 | 2,929 | 933 | 1,088 | 1,516 | 1,908 | 3,099 | 3,577 | 921 | 1,094 | 10,504 | 13,205 | 1,605 | 1,553 | 226,081 | 293,151 |
| Farm proprietors employment | 547 | 570 | 431 | 448 | 522 | 487 | 627 | 621 | 285 | 288 | 1,148 | 1,154 | 532 | 506 | 22,805 | 22,544 |
| Nonfarm proprietors employment | 1,607 | 2,359 | 502 | 640 | 994 | 1,421 | 2,472 | 2,956 | 636 | 806 | 9,356 | 12,051 | 1,073 | 1,047 | 203,276 | 270,607 |
| Farm employment | 1,376 | 1,490 | 507 | 528 | 1,133 | 1,236 | 985 | 1,046 | 780 | 884 | 2,238 | 2,474 | 689 | 692 | 37,294 | 38,894 |
| Nonfarm employment | 7,549 | 10,118 | 1,555 | 2,126 | 3,079 | 3,928 | 8,395 | 9,909 | 3,585 | 4,009 | 42,130 | 52,947 | 3,849 | 3,997 | 831,424 | 1,086,160 |
| Private nonfarm employment | 6,003 | 8,538 | 1,082 | 1,440 | 2,304 | 3,201 | 7,210 | 8,810 | 2,876 | 3,284 | 37,034 | 47,648 | 3,080 | 3,205 | 702,848 | 951,287 |
| **By Industry (Number of Jobs/Percentage of Total Employment)** | | | | | | | | | | | | | | | | |
| Forestry, fishing, and related activities | (D) | (D) | (D) | (D) | (D) | (D) | (D) | 283 | 214 | 255 | 824 | (D) | 216 | (D) | 11,958 | 12,981 |
| | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 2.6 | 4.9 | 5.2 | 1.9 | N/A | 4.8 | N/A | 1.4 | 1.2 |
| Mining (including quarrying and oil and gas extraction) | (D) | (D) | (D) | (D) | (D) | (D) | (D) | 28 | 19 | 16 | 117 | (D) | 19 | (D) | 4,428 | 4,579 |
| | N/A | N/A | N/A | N/A | N/A | N/A | N/A | <1 | <1 | <1 | <1 | N/A | <1 | N/A | <1 | <1 |
| Utilities | 59 | 45 | 1 | 7 | (D) | (D) | 101 | 116 | (D) | 11 | 224 | 223 | (D) | (D) | 2,954 | 3,347 |
| | <1 | <1 | <1 | <1 | N/A | N/A | 1.1 | 1.1 | N/A | <1 | <1 | <1 | N/A | N/A | <1 | <1 |
| Construction | 515 | 721 | 68 | (D) | 233 | 384 | 610 | 845 | 100 | 146 | 2,267 | 3,233 | 223 | 268 | 53,502 | 88,220 |
| | 5.8 | 6.2 | 3.3 | N/A | 5.5 | 7.4 | 6.5 | 7.7 | 2.3 | 3 | 5.1 | 5.8 | 4.9 | 5.7 | 6.2 | 7.8 |
| Manufacturing | 953 | 1,375 | 44 | 64 | 196 | 199 | 1,174 | 1,362 | 1,084 | 1,071 | 3,254 | 5,131 | 486 | 668 | 58,472 | 77,093 |
| | 10.7 | 11.8 | 2.1 | 2.4 | 4.7 | 3.9 | 12.5 | 12.4 | 24.8 | 21.9 | 7.3 | 9.3 | 10.7 | 14.2 | 6.7 | 6.9 |
| Wholesale trade | 572 | 711 | 26 | 48 | 113 | 157 | 289 | 234 | (D) | 262 | 1,441 | 1,898 | 170 | 79 | 28,606 | 36,081 |
| | 6.4 | 6.1 | 1.3 | 1.8 | 2.7 | 3 | 3.1 | 2.1 | N/A | 5.4 | 3.2 | 3.4 | 3.7 | 1.7 | 3.3 | 3.2 |
| Retail trade | 673 | 932 | 188 | 266 | 328 | 429 | 730 | 898 | 272 | 232 | 5,724 | 6,397 | 408 | 440 | 98,083 | 119,168 |
| | 7.5 | 8 | 9.1 | 10 | 7.8 | 8.3 | 7.8 | 8.2 | 6.2 | 4.7 | 12.9 | 11.5 | 9 | 9.4 | 11.3 | 10.6 |
| Transportation and warehousing | 342 | 478 | 99 | 61 | (D) | (D) | 329 | 422 | 292 | 334 | 1,768 | 2,601 | (D) | (D) | 24,998 | 46,102 |
| | 3.8 | 4.1 | 4.8 | 2.3 | N/A | N/A | 3.5 | 3.9 | 6.7 | 6.8 | | 4.7 | N/A | N/A | 2.9 | 4.1 |
| Information | 145 | 250 | 14 | (D) | 35 | (D) | (D) | (D) | (D) | (D) | 593 | 336 | 104 | 115 | 12,639 | 11,020 |
| | 1.6 | 2.2 | <1 | N/A | <1 | N/A | N/A | N/A | N/A | N/A | 1.3 | <1 | 2.3 | 2.5 | 1.5 | <1 |
| Finance and insurance | 178 | 244 | (D) | 99 | (D) | 67 | 359 | 405 | 66 | 78 | 1,712 | 1,900 | 100 | 104 | 37,341 | 50,029 |
| | 2.0 | 2.1 | N/A | 3.7 | N/A | 1.3 | 3.8 | 3.7 | 1.5 | 1.6 | 3.9 | 3.4 | 2.2 | 2.2 | 4.3 | 4.4 |

| Sector | Minidoka County | | Oneida County | | Owyhee County | | Payette County | | Power County | | Twin Falls County | | Washington County | | State of Idaho | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 |
| Real estate and rental and leasing | 286 | 507 | (D) | 93 | (D) | 221 | 365 | (D) | 121 | (D) | 2,159 | 2,745 | 177 | 150 | 43,697 | 62,155 |
| | 3.2 | 4.4 | N/A | 3.5 | N/A | 4.3 | 3.9 | N/A | 2.8 | N/A | 4.9 | 5 | 3.9 | 3.2 | 5 | 5.5 |
| Professional, scientific, and technical services | 232 | 276 | (D) | 50 | (D) | 161 | (D) | (D) | 58 | 79 | 2,005 | 2,321 | 120 | 140 | 52,535 | 71,512 |
| | 2.6 | 2.4 | N/A | 1.9 | N/A | 3.1 | N/A | N/A | 1.3 | 1.6 | 4.5 | 4.2 | 2.6 | 3.0 | 6 | 6.4 |
| Management of companies and enterprises | 0 | (D) | 0 | 0 | (D) | 0 | (D) | (D) | (D) | 52 | 176 | 471 | (D) | (D) | 6,391 | 10,169 |
| | 0 | N/A | 0 | 0 | N/A | 0 | N/A | N/A | N/A | 1.1 | <1 | <1 | N/A | N/A | <1 | <1 |
| Administrative and support and waste management and remediation services | 104 | (D) | (D) | 56 | 142 | 188 | 485 | (D) | (D) | 62 | 2,983 | 3,922 | (D) | (D) | 49,332 | 64,161 |
| | 1.2 | N/A | N/A | 2.1 | 3.4 | 3.6 | 5.2 | N/A | N/A | 1.3 | 6.7 | 7.1 | N/A | N/A | 5.7 | 5.7 |
| Educational services | (D) | (D) | 6 | 12 | (D) | (D) | (D) | 116 | (D) | (D) | 394 | 603 | (D) | (D) | 14,555 | 23,101 |
| | N/A | N/A | <1 | <1 | N/A | N/A | N/A | 1.1 | N/A | N/A | <1 | 1.1 | N/A | N/A | 1.7 | 2.1 |
| Health care and social assistance | (D) | (D) | 94 | 86 | (D) | (D) | (D) | 1,078 | 77 | (D) | 5,729 | 7,001 | (D) | (D) | 89,550 | 117,370 |
| | N/A | N/A | 4.6 | 3.2 | N/A | N/A | N/A | 9.8 | 1.8 | N/A | 12.9 | 12.6 | N/A | N/A | 10.3 | 10.4 |
| Arts, entertainment, and recreation | 65 | (D) | (D) | 27 | 47 | 67 | 95 | 137 | (D) | (D) | 534 | 810 | 58 | 65 | 17,187 | 24,033 |
| | <1 | N/A | N/A | 1 | 1.1 | 1.3 | 1 | 1.3 | N/A | N/A | 1.2 | 1.5 | 1.3 | 1.4 | 2 | 2.1 |
| Accommodation and food services | 526 | (D) | (D) | 108 | 185 | 292 | 305 | 440 | (D) | (D) | 2,797 | 4,485 | 181 | 292 | 54,452 | 78,157 |
| | 5.9 | N/A | N/A | 4.1 | 4.4 | 5.7 | 3.3 | 4 | N/A | N/A | 6.3 | 8.1 | 4 | 6.2 | 6.3 | 6.9 |
| Other services | 465 | 626 | 99 | (D) | 176 | (D) | 641 | 748 | 166 | 184 | 2,333 | 2,662 | 196 | 188 | 42,168 | 52,009 |
| | 5.2 | 5.4 | 4.8 | N/A | 4.2 | N/A | 6.8 | 6.8 | 3.8 | 3.8 | 5.3 | 4.8 | 4.3 | 4 | 4.9 | 4.6 |
| Government and government enterprises | 1,546 | 1,580 | 473 | 686 | 775 | 727 | 1,185 | 1,099 | 709 | 725 | 5,096 | 5,299 | 769 | 792 | 128,576 | 134,873 |
| | 17.3 | 13.6 | 22.9 | 25.8 | 18.4 | 14.1 | 12.6 | 10 | 16.2 | 14.8 | 11.5 | 9.6 | 16.9 | 16.9 | 14.8 | 12 |

Sources: BEA 2010a, 2021a

(D) represents data not shown to avoid disclosure of confidential information; estimates are included in higher-level totals.

N/A means data are not available or present.

## Table A-7 (Part 1). Idaho Analysis Area Labor Income by Sector, 2010 and 2021 (2021$)

| Sector | Adams County | | Bear Lake County | | Bingham County | | Blaine County | | Bonneville County | | Butte County | | Camas County | | State of Idaho | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 |
| Personal income (thousands of dollars) | 138,527 | 204,708 | 213,320 | 297,043 | 1,608,652 | 2,090,600 | 1,651,071 | 3,336,537 | 4,523,190 | 7,474,953 | 105,036 | 129,632 | 37,128 | 70,900 | 63,153,869 | 99,549,587 |
| Population (persons) | 3,962 | 4,625 | 5,977 | 6,545 | 45,785 | 8,876 | 21,316 | 24,766 | 104,735 | 127,930 | 2,912 | 2,654 | 1,114 | 1,139 | 1,571,266 | 1,900,923 |
| Per capita personal income (dollars) | 34,964 | 44,261 | 35,690 | 45,385 | 35,135 | 42,774 | 77,456 | 134,722 | 43,187 | 58,430 | 36,070 | 48,844 | 33,328 | 62,248 | 40,193 | 52,369 |
| Earnings by place of work (thousands of dollars) | 65,517 | 102,551 | 94,413 | 122,558 | 966,429 | 1,072,547 | 822,330 | 1,323,247 | 2,951,476 | 5,083,982 | 1,012,396 | 1,113,247 | 25,434 | 48,109 | 42,639,210 | 63,210,380 |
| Wages and salaries (thousands of dollars) | 40,722 | 70,418 | 63,124 | 73,047 | 609,601 | 696,914 | 571,042 | 775,451 | 1,890,022 | 2,815,285 | 870,148 | 960,043 | 16,036 | 21,771 | 28,732,738 | 42,991,642 |
| Supplement to wages and salaries | 12,425 | 17,018 | 20,656 | 22,473 | 171,721 | 182,135 | 131,517 | 153,204 | 479,238 | 648,109 | 136,140 | 143,861 | 4,536 | 5,102 | 7,488,742 | 9,844,072 |
| Proprietors' income | 12,371 | 15,115 | 10,633 | 27,038 | 185,107 | 193,498 | 119,771 | 394,592 | 582,216 | 1,620,588 | 6,107 | 9,343 | 4,862 | 21,236 | 6,417,730 | 10,374,666 |
| Farm earnings | 2,304 | 3,126 | 3,988 | 8,501 | 101,374 | 48,489 | 7,326 | 5,402 | 43,060 | 34,279 | 6,169 | 8,136 | 3,596 | 7,874 | 1,793,528 | 1,698,757 |
| Nonfarm earnings | 63,213 | 99,425 | 90,425 | 114,057 | 865,055 | 1,024,058 | 815,004 | 1,317,845 | 2,908,416 | 5,049,703 | 1,006,227 | 1,105,111 | 21,838 | 40,235 | 40,845,682 | 61,511,623 |
| Private nonfarm earnings | 42,921 | 77,527 | 52,014 | 72,907 | 648,197 | 795,181 | 706,017 | 1,216,870 | 2,505,504 | 4,583,219 | 980,506 | 1,091,070 | 14,617 | 33,368 | 32,707,721 | 52,501,122 |
| **By Industry (Earnings in Thousands of Dollars/Percentage of Nonfarm Earnings)** | | | | | | | | | | | | | | | | |
| Forestry, fishing, and related activities | 4,408 | 4,630 | (D) | (D) | (D) | 33,925 | 2,234 | 1,382 | (D) | (D) | (D) | (D) | (D) | (D) | 481,435 | 598,877 |
| | 7 | 4.7 | N/A | N/A | N/A | 3.3 | <1 | <1 | N/A | N/A | N/A | N/A | N/A | N/A | 1.2 | 1 |
| Mining (including quarrying and oil and gas extraction) | 100 | 50 | (D) | (D) | (D) | 844 | 4,561 | 2,797 | (D) | (D) | 14 | (D) | 0 | 92 | 665,322 | 297,006 |
| | <1 | <1 | N/A | N/A | N/A | <1 | <1 | <1 | N/A | N/A | <1 | N/A | <1 | <1 | 1.6 | <1 |
| Utilities | (D) | 1,132 | (D) | (D) | 8,344 | 8,730 | 3,604 | 3,383 | 4,332 | 10,343 | -39 | (145) | 0 | (D) | 425,119 | 465,416 |
| | N/A | 1.1 | N/A | N/A | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | N/A | 1 | <1 |
| Construction | 4,930 | 9,217 | 2,442 | 5,481 | 65,730 | 94,779 | 87,710 | 200,720 | 199,005 | 320,583 | 1,454 | 3,829 | (D) | 5,145 | 2,532,365 | 5,440,744 |
| | 7.8 | 9.3 | 2.7 | 4.8 | 7.6 | 9.3 | 10.8 | 15.2 | 6.8 | 6.3 | <1 | <1 | N/A | 12.8 | 6.2 | 8.8 |
| Manufacturing | 1,395 | 7,326 | 2,370 | 5,250 | 147,864 | 150,967 | 35,565 | 27,801 | 125,226 | 439,492 | 1,815 | 3,079 | (D) | (D) | 4,337,779 | 6,448,370 |
| | 2.2 | 7.4 | 2.6 | 4.6 | 17.1 | 14.7 | 4.4 | 1.5 | 4.3 | 8.7 | <1 | <1 | N/A | N/A | 10.6 | 10.5 |
| Wholesale trade | 1,267 | 1,149 | 4,101 | 3,560 | 78,310 | 83,260 | 12,916 | 30,545 | 280,240 | 255,173 | (D) | 1,463 | (D) | 6,582 | 1,924,500 | 3,132,234 |
| | 2 | 1.2 | 4.5 | 3.1 | 9.1 | 8.1 | 1.6 | 2.3 | 9.6 | 5.1 | N/A | <1 | N/A | 16.4 | 4.7 | 5.1 |

| Sector | Adams County | | Bear Lake County | | Bingham County | | Blaine County | | Bonneville County | | Butte County | | Camas County | | State of Idaho | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 |
| Retail trade | 10,164 | 6,399 | 9,409 | 10,463 | 42,110 | 60,986 | 77,584 | 102,099 | 484,695 | 1,356,542 | 2,572 | 2,726 | (D) | 1,238 | 3,761,964 | 5,995,906 |
| | 16.1 | 6.4 | 10.4 | 9.2 | 4.9 | 6 | 9.5 | 7.7 | 16.7 | 26.9 | <1 | <1 | N/A | 3.1 | 9.2 | 9.7 |
| Transportation and warehousing | (D) | 1,401 | (D) | (D) | 22,721 | 36,862 | 17,508 | 18,076 | 75,982 | 126,459 | (D) | 2,015 | 78 | (D) | 1,334,862 | 2,116,934 |
| | N/A | 1.4 | N/A | N/A | 2.6 | 3.6 | 2.1 | 1.4 | 2.6 | 2.5 | N/A | <1 | <1 | N/A | 3.3 | 3.4 |
| Information | 873 | (D) | 1,062 | 983 | 1,895 | (D) | 24,450 | 28,801 | 70,988 | 40,780 | (D) | 1,747 | 230 | (D) | 742,415 | 831,822 |
| | 1.4 | N/A | 1.2 | <1 | <1 | N/A | 3 | 2.2 | 2.4 | <1 | N/A | <1 | 1.1 | N/A | 1.8 | 1.4 |
| Finance and insurance | 1,676 | 1,718 | 2,159 | 3,269 | 25,257 | 36,615 | 35,264 | 79,085 | 85,570 | 193,968 | 1,455 | (D) | (D) | (D) | 1,629,779 | 3,035,612 |
| | 2.7 | 1.7 | 2.4 | 2.9 | 2.9 | 3.6 | 4.3 | 6 | 2.9 | 3.8 | <1 | N/A | N/A | N/A | 4 | 4.9 |
| Real estate and rental and leasing | 784 | 2,111 | 351 | 3,687 | 42,846 | 59,471 | 22,185 | 203,642 | 56,831 | 43,644 | 224 | (D) | 269 | 1,299 | 711,271 | 1,929,456 |
| | 1.2 | 2.1 | <1 | 3.2 | 5 | 5.8 | 2.7 | 15.5 | 2 | <1 | <1 | N/A | 1.2 | 3.2 | 1.7 | 3.1 |
| Professional, scientific, and technical services | 3,657 | 5,454 | (D) | (D) | (D) | (D) | 111,102 | 145,076 | 228,834 | 289,913 | 959,268 | (D) | 804 | 2,981 | 3,338,212 | 5,109,316 |
| | 5.8 | 5.5 | N/A | N/A | N/A | N/A | 13.6 | 11 | 7.9 | 5.7 | 95.3 | N/A | 3.7 | 7.4 | 8.2 | 8.3 |
| Management of companies and enterprises | 0 | - | 55 | 147 | (D) | (D) | (D) | 7,206 | 16,985 | 15,917 | (D) | (D) | (D) | (D) | 717,968 | 1,000,906 |
| | <1 | 0 | <1 | <1 | N/A | N/A | N/A | <1 | <1 | <1 | N/A | N/A | N/A | N/A | 1.8 | 1.6 |
| Administrative and support and waste management and remediation services | 1,102 | 1,952 | (D) | (D) | 19,207 | 18,244 | (D) | 61,505 | 182,005 | 310,486 | (D) | (D) | (D) | (D) | 1,758,762 | 3,064,315 |
| | 1.7 | 2 | N/A | N/A | 2.2 | 1,8 | N/A | 4.7 | 6.3 | 6.1 | N/A | N/A | N/A | N/A | 4.3 | 5 |
| Educational services | (D) | (D) | (D) | (D) | 2,772 | 3,267 | 8,093 | 13,078 | 10,123 | 33,295 | (D) | (D) | (D) | (D) | 453,931 | 723,475 |
| | N/A | N/A | N/A | N/A | <1 | <1 | 1 | 1 | <1 | <1 | N/A | N/A | N/A | N/A | 1.1 | 1.2 |
| Health care and social assistance | (D) | (D) | (D) | (D) | 94,814 | 116,072 | 66,727 | 85,064 | 474,914 | 796,317 | (D) | (D) | (D) | (D) | 5,032,073 | 7,508,709 |
| | N/A | N/A | N/A | N/A | 11 | 11.3 | 8.2 | 6.5 | 16.3 | 15.8 | N/A | N/A | N/A | N/A | 12.3 | 12.2 |
| Arts, entertainment, and recreation | 3,879 | 14,965 | 486 | 476 | 1,120 | 4,220 | 22,366 | 30,677 | 10,970 | 15,941 | 85 | 463 | (D) | (D) | 289,847 | 534,948 |
| | 6.1 | 15.1 | <1 | <1 | <1 | <1 | 2.7 | 2.3 | <1 | <1 | <1 | <1 | N/A | N/A | <1 | <1 |
| Accommodation and food services | 1,212 | 2,385 | 3,493 | 5,016 | 11,276 | 21,897 | 84,047 | 111,873 | 83,805 | 184,133 | 1,200 | 2,201 | (D) | (D) | 1,141,603 | 2,312,250 |
| | 1.9 | 2.4 | 3.9 | 4.4 | 1.3 | 2.1 | 10.3 | 8.5 | 2.9 | 3.6 | <1 | <1 | N/A | N/A | 2.8 | 3.8 |
| Other services (except government and government enterprises) | 2,211 | (D) | 3,520 | 6,057 | 30,560 | (D) | 46,004 | 64,060 | 101,482 | 127,460 | (D) | 1,616 | (D) | (D) | 1,428,511 | 1,954,826 |
| | 3.5 | N/A | 3.9 | 5.3 | 3.5 | N/A | 5.6 | 4.9 | 3.5 | 2.5 | N/A | <1 | N/A | N/A | 3.5 | 3.2 |
| Government and government enterprises | 20,293 | 21,898 | 38,410 | 41,150 | 216,859 | 228,877 | 108,988 | 1009,975 | 402,912 | 466,484 | 25,721 | 14,041 | 7,220 | 6,867 | 8,137,962 | 9,010,501 |
| | 32.1 | 22 | 42.5 | 36.1 | 25.1 | 22.4 | 13.4 | 7.7 | 13.9 | 9.2 | 2.6 | 1.3 | 33.1 | 17.1 | 19.9 | 14.6 |

Sources: BEA 2010b, 2021b

Note: (D) represents data not shown to avoid disclosure of confidential information; estimates are included in higher-level totals.

(N/A) means data are not available, or no information was given.

All 2010 dollar values were adjusted for inflation.

## Table A-7 (Part 2). Idaho Analysis Area Labor Income by Sector, 2010 and 2021 (2021$)

| Sector | Caribou County | | Cassia County | | Clark County | | Custer County | | Elmore County | | Fremont County | | Gem County | | State of Idaho | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 |
| Personal income (thousands of dollars) | 266,739 | 339,479 | 936,830 | 1,202,324 | 31,398 | 37,995 | 188,264 | 215,287 | 955,435 | 1,207,394 | 426,258 | 577,704 | 570,058 | 899,374 | 63,153,869 | 99,549,587 |
| Population (persons) | 6,968 | 7,111 | 23,091 | 25,164 | 979 | 792 | 4,357 | 4,428 | 27,155 | 28,827 | 13,236 | 13,592 | 16,698 | 19,792 | 1,571,266 | 1,900,923 |
| Per capita personal income (dollars) | 38,281 | 47,740 | 40,571 | 47,780 | 32,071 | 47,973 | 43,210 | 48,619 | 35,184 | 41,884 | 32,204 | 42,503 | 34,139 | 45,441 | 40,193 | 52,369 |
| Earnings by place of work (thousands of dollars) | 252,460 | 304,950 | 731,629 | 906,976 | 27,336 | 26,149 | 116,302 | 102,975 | 768,863 | 840,420 | 202,484 | 252,951 | 184,884 | 281,437 | 42,639,210 | 63,210,380 |
| Wages and salaries (thousands of dollars) | 180,877 | 224,839 | 389,993 | 554,570 | 16,821 | 16,628 | 78,720 | 63,936 | 518,443 | 563,244 | 118,804 | 152,321 | 120,818 | 187,768 | 28,732,738 | 42,991,642 |
| Supplement to wages and salaries | 52,523 | 58,732 | 107,627 | 136,161 | 4,945 | 4,655 | 22,121 | 18,904 | 194,330 | 207,511 | 37,035 | 42,296 | 35,904 | 50,082 | 7,488,742 | 9,844,072 |
| Proprietors' income | 19,060 | 21,379 | 234,009 | 216,245 | 5,570 | 4,866 | 15,461 | 20,135 | 56,091 | 69,665 | 46,645 | 58,334 | 28,162 | 43,587 | 6,417,730 | 10,374,666 |
| Farm earnings | 15,157 | 16,223 | 197,865 | 172,555 | 7,801 | 1,981 | 7,091 | 7,855 | 46,907 | 46,934 | 24,960 | 20,718 | 4,037 | (7,846) | 1,793,528 | 1,698,757 |
| Nonfarm earnings | 237,303 | 288,727 | 533,764 | 734,421 | 19,535 | 24,168 | 109,211 | 95,120 | 721,956 | 793,486 | 177,524 | 232,233 | 180,847 | 289,283 | 40,845,682 | 61,511,623 |
| Private nonfarm earnings | 198,859 | 250,886 | 438,566 | 646,875 | 10,342 | 16,911 | 80,051 | 68,129 | 207,536 | 309,739 | 110,632 | 170,102 | 131,112 | 228,710 | 32,707,721 | 52,501,122 |
| **By Industry (Earnings in Thousands of Dollars/Percentage of Nonfarm Earnings)** | | | | | | | | | | | | | | | | |
| Forestry, fishing, and related activities | (D) | (D) | 26,653 | 25,256 | (D) | (D) | (D) | 2,041 | (D) | 8,041 | (D) | (D) | (D) | (D) | 481,435 | 598,877 |
| | N/A | N/A | 5 | 3.4 | N/A | | N/A | N/A | N/A | 1 | N/A | N/A | N/A | N/A | 1.2 | 1 |
| Mining (including quarrying and oil and gas extraction) | 31,658 | 60,308 | 4,628 | 10,664 | 5 | (D) | (D) | 7,044 | (D) | 47 | (D) | (D) | (D) | (D) | 665,322 | 297,006 |
| | 13.3 | 20.9 | <1 | 1.5 | <1 | N/A | N/A | 7.4 | N/A | <1 | N/A | N/A | N/A | N/A | 1.6 | <1 |
| Utilities | 4,008 | 3,316 | 5,149 | 7,436 | 0 | - | 3,103 | 3,578 | 5,491 | 5,390 | (D) | (D) | 96 | (D) | 425,119 | 465,416 |
| | 1.7 | 1.1 | <1 | 1 | <1 | N/A | 2.8 | 3.8 | <1 | <1 | N/A | N/A | <1 | N/A | 1 | <1 |
| Construction | (D) | 25,596 | 30,890 | 55,958 | (D) | (D) | 5,783 | 11,172 | 22,199 | 28,637 | 29,945 | 34,648 | 19,103 | 41,112 | 2,532,365 | 5,440,744 |
| | N/A | 8.9 | 5.8 | 7.6 | N/A | N/A | 5.3 | 11.7 | 3.1 | 3.6 | 16.9 | 14.9 | 10.6 | 14.2 | 6.2 | 8.8 |
| Manufacturing | (D) | 89,971 | 75,997 | 101,624 | (D) | (D) | 159 | (D) | 20,156 | 41,273 | 2,943 | 11,183 | 10,390 | 22,244 | 4,337,779 | 6,448,370 |
| | N/A | 31.2 | 14.2 | 13.8 | N/A | N/A | <1 | N/A | 2.8 | 5.2 | 1.7 | 4.8 | 5.7 | 7.7 | 10.6 | 10.5 |
| Wholesale trade | 5,675 | 9,733 | 28,353 | 40,482 | (D) | 3,989 | 1,243 | 2,413 | 5,197 | 7,509 | (D) | (D) | 8,664 | 11,497 | 1,924,500 | 3,132,234 |
| | 2.4 | 3.4 | 5.3 | 5.5 | N/A | 16.5 | 1.1 | 2.5 | <1 | <1 | N/A | N/A | 4.8 | 4 | 4.7 | 5.1 |

| Sector | Caribou County | | Cassia County | | Clark County | | Custer County | | Elmore County | | Fremont County | | Gem County | | State of Idaho | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 |
| Retail trade | 9,084 | 10,492 | 47,558 | 77,476 | (D) | (D) | 6,962 | 5,053 | 30,704 | 47,650 | 9,438 | 15,457 | 15,816 | 23,066 | 3,761,964 | 5,995,906 |
| | 3.8 | 3.6 | 8.9 | 10.5 | N/A | N/A | 6.4 | 5.3 | 4.3 | 6 | 5.3 | 6.7 | 8.7 | 9 | 9.2 | 9.7 |
| Transportation and warehousing | 4,228 | 4,765 | 44,725 | 81,962 | (D) | (D) | 654 | 1,600 | 10,099 | 29,220 | 9,899 | 21,705 | 13,326 | (D) | 1,334,862 | 2,116,934 |
| | 1.8 | 1.7 | 8.4 | 11.2 | N/A | N/A | <1 | 1.7 | 1.4 | 3.7 | 5.6 | 9.3 | 7.4 | N/A | 3.3 | 3.4 |
| Information | 1,315 | (D) | 6,851 | 7,720 | (D) | (D) | 2,401 | 3,147 | 6,654 | 4,695 | (D) | (D) | 518 | 2,033 | 742,415 | 831,822 |
| | <1 | N/A | 1.3 | 1.1 | N/A | N/A | 2.2 | 3.3 | <1 | <1 | N/A | N/A | <1 | <1 | 1.8 | 1.4 |
| Finance and insurance | 3,491 | 3,430 | 14,625 | 22,580 | 2,055 | (D) | 1,178 | (D) | 11,449 | 13,954 | 4,454 | (D) | 4,652 | 8,075 | 1,629,779 | 3,035,612 |
| | 1.5 | 1.2 | 2.7 | 3.1 | 10.5 | N/A | 1.1 | N/A | 1.6 | 1.8 | 2.5 | N/A | 2.6 | 2.8 | 4 | 4.9 |
| Real estate and rental and leasing | 2,221 | 4,972 | 29,623 | 45,137 | 19 | 138 | 1,369 | (D) | 3,816 | 4,347 | 6,318 | 2,447 | 915 | 10,854 | 711,271 | 1,929,456 |
| | <1 | 1.7 | 5.5 | 6.1 | <1 | <1 | 1.3 | N/A | <1 | <1 | 3.6 | 1.1 | <1 | 3.8 | 1.7 | 3.1 |
| Professional, scientific, and technical services | 5,015 | (D) | 16,604 | 22,540 | (D) | (D) | 2,611 | 2,799 | 10,127 | 12,180 | 3,018 | (D) | 5,767 | 12,786 | 3,338,212 | 5,109,316 |
| | 2.1 | N/A | 3.1 | 3.1 | N/A | N/A | 2.4 | 2.9 | 1.4 | 1.5 | 1.7 | N/A | 3.2 | 4.4 | 8.2 | 8.3 |
| Management of companies and enterprises | (D) | (D) | (D) | 1,886 | 0 | N/A | (D) | (D) | 0 | (D) | 0 | (D) | (D) | (D) | 717,968 | 1,000,906 |
| | N/A | N/A | N/A | <1 | <1 | N/A | N/A | N/A | <1 | N/A | <1 | N/A | N/A | N/A | 1.8 | 1.6 |
| Administrative and support and waste management and remediation services | (D) | 5,636 | (D) | 12,395 | (D) | (D) | (D) | (D) | 10,298 | (D) | 2,643 | 7,186 | (D) | (D) | 1,758,762 | 3,064,315 |
| | N/A | 2 | N/A | 1.7 | N/A | N/A | N/A | N/A | 1.4 | N/A | 1.5 | 3.1 | N/A | N/A | 4.3 | 5 |
| Educational services | (D) | (D) | (D) | 1,877 | (D) | (D) | 8 | 6 | 5,158 | 4,116 | (D) | (D) | (D) | 1,930 | 453,931 | 723,475 |
| | N/A | N/A | N/A | <1 | N/A | N/A | <1 | <1 | <1 | <1 | N/A | N/A | N/A | <1 | 1.1 | 1.2 |
| Health care and social assistance | (D) | (D) | (D) | 84,739 | (D) | (D) | 3,057 | (D) | 23,250 | 52,502 | (D) | (D) | (D) | 36,443 | 5,032,073 | 7,508,709 |
| | N/A | N/A | N/A | 11.5 | N/A | N/A | 2.8 | N/A | 3.2 | 6.6 | N/A | N/A | N/A | 12.6 | 12.3 | 12.2 |
| Arts, entertainment, and recreation | 657 | 289 | 2,279 | 2,309 | 16 | 57 | 1,835 | 4,595 | 605 | 634 | 738 | 800 | 527 | 1,516 | 289,847 | 534,948 |
| | <1 | <1 | <1 | <1 | <1 | <1 | 1.7 | 4.8 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| Accommodation and food services | 2,572 | 3,877 | 7,124 | 24,999 | (D) | (D) | 5,666 | 10,816 | 16,131 | 21,081 | 5,902 | 17,612 | 4,606 | 13,705 | 1,141,603 | 2,312,250 |
| | 1.1 | 1.3 | 1.3 | 3.4 | N/A | N/A | 5.2 | 11.4 | 2.2 | 2.7 | 3.3 | 7.6 | 2.5 | 4.7 | 2.8 | 3.8 |
| Other services (except government and government enterprises) | 5,262 | (D) | 17,672 | 19,835 | 297 | 868 | 1,969 | 2,018 | 18,756 | 20,842 | 5,377 | 9,585 | 8,987 | 12,974 | 1,428,511 | 1,954,826 |
| | 2.2 | N/A | 3.3 | 2.7 | 1.5 | 3.6 | 1.8 | 2.1 | 2.6 | 2.6 | 3 | 4.1 | 5 | 4.5 | 3.5 | 3.2 |
| Government and government enterprises | 38,444 | 37,841 | 95,198 | 87,546 | 9,193 | 7,257 | 29,160 | 26,991 | 514,421 | 483,747 | 66,892 | 62,131 | 49,734 | 60,573 | 8,137,962 | 9,010,501 |
| | 16.2 | 13.1 | 17.8 | 11.9 | 47.1 | 30 | 26.7 | 28.4 | 71.3 | 61 | 37.7 | 26.8 | 27.5 | 20.9 | 19.9 | 14.6 |

Sources: BEA 2010b, 2021b
Note: (D) represents data not shown to avoid disclosure of confidential information; estimates are included in higher-level totals.
(N/A) means data are not available, or no information was given.
All 2010 dollar values were adjusted for inflation.

## Table A-7 (Part 3). Idaho Analysis Area Labor Income by Sector, 2010 and 2021 (2021$)

| Sector | Gooding County | | Jefferson County | | Jerome County | | Lemhi County | | Lincoln County | | Madison County | | State of Idaho | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 |
| Personal income (thousands of dollars) | 708,678 | 1,006,994 | 897,506 | 1,362,361 | 811,385 | 1,044,591 | 296,410 | 415,666 | 194,466 | 225,638 | 875,262 | 1,381,959 | 50,432,553 | 99,549,587 |
| Population (persons) | 19,373 | 15,772 | 32,850 | 32,202 | 28,088 | 24,662 | 9,954 | 8,162 | 6,515 | 5,282 | 47,382 | 53,881 | 1,571,266 | 1,900,923 |
| Per capita personal income (dollars) | 45,807 | 63,847 | 34,213 | 42,307 | 36,174 | 42,356 | 37,289 | 50,927 | 37,376 | 42,718 | 23,131 | 25,648 | 32,097 | 52,369 |
| Earnings by place of work (thousands of dollars) | 501,980 | 674,977 | 400,028 | 551,899 | 602,865 | 765,948 | 139,692 | 190,666 | 126,261 | 153,616 | 676,256 | 1,075,967 | 34,050,237 | 63,210,380 |
| Wages and salaries (thousands of dollars) | 235,409 | 293,699 | 213,356 | 327,207 | 341,113 | 465,298 | 95,501 | 123,023 | 60,044 | 75,853 | 469,277 | 715,502 | 22,944,997 | 42,991,642 |
| Supplement to wages and salaries | 62,472 | 74,530 | 63,837 | 84,386 | 89,517 | 112,022 | 29,679 | 34,166 | 18,487 | 22,120 | 128,212 | 187,754 | 5,980,257 | 9,844,072 |
| Proprietors' income | 204,098 | 306,748 | 122,835 | 140,306 | 172,236 | 188,628 | 14,511 | 33,477 | 47,731 | 55,643 | 78,766 | 172,711 | 5,124,983 | 10,374,666 |
| Farm earnings | 250,674 | 343,330 | 62,811 | 22,314 | 169,286 | 160,784 | 3,323 | 12,075 | 52,509 | 59,828 | 15,623 | 18,418 | 1,432,251 | 1,698,757 |
| Nonfarm earnings | 200,684 | 331,647 | 269,290 | 529,585 | 346,242 | 605,164 | 108,899 | 178,591 | 58,896 | 93,788 | 527,559 | 1,057,549 | 32,617,986 | 61,511,623 |
| Private nonfarm earnings | 153,593 | 280,028 | 215,049 | 456,605 | 300,036 | 537,827 | 63,371 | 116,272 | 34,865 | 64,930 | 435,917 | 907,932 | 26,119,284 | 52,501,122 |
| **By Industry (Earnings in Thousands of Dollars/Percentage of Nonfarm Earnings)** | | | | | | | | | | | | | | |
| Forestry, fishing, and related activities | (D) | (D) | 20,137 | 23,002 | 27,959 | 27,752 | (D) | (D) | (D) | 7,279 | (D) | 8,789 | 384,458 | 598,877 |
| | N/A | N/A | 7.5 | 4.3 | 8.1 | 4.6 | N/A | N/A | N/A | 7.8 | N/A | <1 | 1.2 | 1 |
| Mining (including quarrying and oil and gas extraction) | (D) | (D) | 129 | 1,462 | 0 | 181 | (D) | (D) | 0 | N/A | (D) | 902 | 531,304 | 297,006 |
| | N/A | N/A | <1 | <1 | <1 | <1 | N/A | N/A | <1 | N/A | N/A | <1 | 1.6 | <1 |
| Utilities | 4,737 | 4,936 | 2,821 | 3,727 | (D) | (D) | (D) | 1,261 | (D) | (D) | (D) | (D) | 339,486 | 465,416 |
| | 2.4 | 1.5 | 1.0 | <1 | N/A | N/A | N/A | <1 | N/A | N/A | N/A | N/A | 1.0 | <1 |
| Construction | 14,640 | 22,545 | 31,274 | 78,903 | 32,908 | 39,890 | 14,435 | 19,816 | (D) | 10,786 | 33,521 | 61,528 | 2,022,261 | 5,440,744 |
| | 7.3 | 6.8 | 11.6 | 14.9 | 9.5 | 6.6 | 13.3 | 11.1 | N/A | 11.5 | 6.4 | 5.8 | 6.2 | 8.8 |
| Manufacturing | 52,348 | 65,700 | 66,949 | 82,946 | 76,925 | 126,934 | 4,395 | 4,901 | (D) | 12,946 | 39,427 | 59,730 | 3,464,004 | 6,448,370 |
| | 26.1 | 19.8 | 24.9 | 15.7 | 22.2 | 21 | 4.0 | 2.7 | N/A | 13.8 | 7.5 | 5.6 | 10.6 | 10.5 |
| Wholesale trade | 13,389 | 11,296 | 15,378 | 27,293 | (D) | (D) | 2,423 | 1,594 | (D) | (D) | 53,458 | (D) | 1,536,841 | 3,132,234 |
| | 6.7 | 3.4 | 5.7 | 5.2 | N/A | N/A | 2.2 | <1 | N/A | N/A | 10.1 | N/A | 4.7 | 5.1 |
| Retail trade | 13,544 | 15,737 | 19,399 | 48,736 | 37,172 | 60,433 | 11,578 | 12,772 | 2,682 | (D) | 51,005 | 95,483 | 3,004,178 | 5,995,906 |
| | 6.7 | 4.7 | 7.2 | 9.2 | 10.7 | 10 | 10.6 | 7.2 | 4.6 | N/A | 9.7 | 9 | 9.2 | 9.7 |

| Sector | Gooding County | | Jefferson County | | Jerome County | | Lemhi County | | Lincoln County | | Madison County | | State of Idaho | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 |
| Transportation and warehousing | 15,090 | 13,203 | 22,240 | 31,569 | 69,758 | 65,841 | (D) | 6,528 | 3,014 | 7,378 | (D) | (D) | 1,065,976 | 2,116,934 |
| | 7.5 | 4 | 8.3 | 6 | 20.1 | 10.9 | N/A | 3.7 | 5.1 | 7.9 | N/A | N/A | 3.3 | 3.4 |
| Information | 1,118 | (D) | 928 | 3,061 | 5,196 | (D) | 1,408 | 1,023 | (D) | (D) | 3,863 | 11,021 | 592,868 | 831,822 |
| | <1 | N/A | <1 | <1 | 1.5 | N/A | 1.3 | <1 | N/A | N/A | <1 | 1 | 1.8 | 1.4 |
| Finance and insurance | 4,760 | 6,377 | 6,103 | 15,404 | 6,720 | 7,211 | 2,810 | 2,392 | (D) | 380 | 18,186 | 27,149 | 1,301,487 | 3,035,612 |
| | 2.4 | 1.9 | 2.3 | 2.9 | 1.9 | 1.2 | 2.6 | 1.3 | N/A | <1 | 3.4 | 2.6 | 4.0 | 4.9 |
| Real estate and rental and leasing | 3,008 | (D) | 23,910 | 25,076 | 4,091 | (D) | 880 | 5,625 | (D) | (D) | 14,527 | 21,599 | 567,997 | 1,929,456 |
| | 1.5 | N/A | 8.9 | 4.7 | 1.2 | N/A | <1 | 3.1 | N/A | N/A | 2.8 | 2 | 1.7 | 3.1 |
| Professional, scientific, and technical services | 10,822 | 9,867 | (D) | (D) | 10,961 | 12,288 | 7,500 | 17,021 | (D) | 2,916 | 40,773 | 77,149 | 2,665,784 | 5,109,316 |
| | 5.4 | 3 | N/A | N/A | 3.2 | 2 | 6.9 | 9.5 | N/A | 3.1 | 7.7 | 7.3 | 8.2 | 8.3 |
| Management of companies and enterprises | 1,957 | 2,061 | (D) | (D) | 1,405 | 3,613 | 1,875 | (D) | 0 | N/A | (D) | 668 | 573,345 | 1,000,906 |
| | <1 | <1 | N/A | N/A | <1 | <1 | 1.7 | N/! | <1 | N/A | N/A | <1 | 1.8 | 1.6 |
| Administrative and support and waste management and remediation services | 1,364 | 2,947 | 5,884 | 19,806 | 7,917 | 22,358 | 3,689 | (D) | (D) | 3,698 | (D) | 54,163 | 1,404,488 | 3,064,315 |
| | <1 | <1 | 2.2 | 3.7 | 2.3 | 3.7 | 3.4 | N/A | N/A | 3.9 | N/A | 5.1 | 4.3 | 5 |
| Educational services | 412 | (D) | (D) | 1,501 | 2,933 | 5,888 | 362 | (D) | (D) | 55 | (D) | 192,556 | 362,494 | 723,475 |
| | <1 | N/A | N/A | <1 | <1 | 1 | <1 | N/A | N/A | <1 | N/A | 18.2 | 1.1 | 1.2 |
| Health care and social assistance | (D) | (D) | (D) | 29,202 | 28,092 | 34,446 | 9,406 | (D) | (D) | 6,218 | (D) | 78,089 | 4,018,444 | 7,508,709 |
| | N/A | N/A | N/A | 5.5 | 8.1 | 5.7 | 8.6 | N/A | N/A | 6.6 | N/A | 7.4 | 12.3 | 12.2 |
| Arts, entertainment, and recreation | 2,135 | 1,944 | 2,811 | 3,175 | 6,862 | (D) | 1,732 | 3,847 | (D) | (D) | 2,791 | 5,126 | 231,462 | 534,948 |
| | 1.1 | <1 | 1.0 | <1 | 2.0 | N/A | 1.6 | 2.2 | N/A | N/A | <1 | <1 | <1 | <1 |
| Accommodation and food services | 3,843 | 10,232 | 3,970 | 20,084 | 6,550 | (D) | 4,640 | 6,871 | (D) | (D) | 16,692 | 55,857 | 911,646 | 2,312,250 |
| | 1.9 | 3.1 | 1.5 | 3.8 | 1.9 | N/A | 4.3 | 3 | N/A | N/A | 3.2 | 5.3 | 2.8 | 3.8 |
| Other services (except government and government enterprises) | 16,220 | 16,894 | 15,699 | 21,886 | 18,292 | 18,208 | 8,518 | 8,226 | (D) | 1,917 | 16,081 | 30,368 | 1,140,761 | 1,954,826 |
| | 8.1 | 5.1 | 5.8 | 4.1 | 5.3 | 3 | 7.8 | 4.6 | N/A | 2 | 3.0 | 2.9 | 3.5 | 3.2 |
| Government and government enterprises | 58,969 | 51,619 | 67,923 | 72,980 | 57,861 | 67,337 | 57,012 | 62,319 | 30,093 | 28,858 | 114,758 | 149,617 | 6,498,702 | 9,010,501 |
| | 29.4 | 15.6 | 25.2 | 13.8 | 16.7 | 11.1 | 52.4 | 34.9 | 51.1 | 30.8 | 21.8 | 14.1 | 19.9 | 14.6 |

Sources: BEA 2010b, 2021b

Note: (D) represents data not shown to avoid disclosure of confidential information; estimates are included in higher-level totals.
(N/A) means data are not available, or no information was given.
All 2010 dollar values were adjusted for inflation.

## Table A-7 (Part 4). Idaho Analysis Area Labor Income by Sector, 2010 and 2021 (2021$)

| Sector | Minidoka County | | Oneida County | | Owyhee County | | Payette County | | Power County | | Twin Falls County | | Washington County | | State of Idaho | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 |
| Personal income (thousands of dollars) | 718,637 | 993,973 | 148,992 | 206,973 | 367,907 | 539,240 | 861,513 | 1,206,728 | 288,501 | 342,097 | 2,905,383 | 4,208,749 | 375,904 | 448,112 | 63,153,869 | 99,549,587 |
| Population (persons) | 20,094 | 21,955 | 4,291 | 4,611 | 11,470 | 12,336 | 22,659 | 26,350 | 7,879 | 7,950 | 77,587 | 92,243 | 10,181 | 10,898 | 1,571,266 | 1,900,923 |
| Per capita personal income (dollars) | 35,764 | 45,273 | 34,722 | 44,887 | 32,075 | 43,713 | 38,021 | 45,796 | 36,617 | 43,031 | 37,447 | 45,627 | 36,922 | 41,119 | 40,193 | 52,369 |
| Earnings by place of work (thousands of dollars) | 457,366 | 592,488 | 61,014 | 84,947 | 189,763 | 251,881 | 438,140 | 518,844 | 244,548 | 270,618 | 1,966,442 | 2,788,797 | 167,489 | 173,763 | 42,639,210 | 63,210,380 |
| Wages and salaries (thousands of dollars) | 267,670 | 389,200 | 34,494 | 51,391 | 98,247 | 131,294 | 248,847 | 327,055 | 149,215 | 188,485 | 1,279,861 | 1,826,437 | 99,545 | 122,186 | 28,732,738 | 42,991,642 |
| Supplement to wages and salaries | 74,726 | 100,306 | 11,657 | 16,844 | 28,164 | 34,571 | 69,542 | 81,979 | 44,011 | 49,881 | 344,439 | 440,910 | 30,895 | 34,367 | 7,488,742 | 9,844,072 |
| Proprietors' income | 114,970 | 102,982 | 14,863 | 16,712 | 63,351 | 86,016 | 119,751 | 109,810 | 51,322 | 32,252 | 342,142 | 521,450 | 37,049 | 17,210 | 6,417,730 | 10,374,666 |
| Farm earnings | 70,728 | 68,075 | 8,951 | 10,327 | 69,759 | 79,907 | 46,115 | 45,789 | 56,332 | 37,219 | 143,556 | 165,869 | 22,451 | 6,261 | 1,793,528 | 1,698,757 |
| Nonfarm earnings | 386,638 | 524,413 | 52,063 | 74,620 | 120,004 | 171,974 | 392,025 | 473,055 | 188,216 | 233,399 | 1,822,886 | 2,622,928 | 145,037 | 167,502 | 40,845,682 | 61,511,623 |
| Private nonfarm earnings | 309,401 | 428,502 | 31,165 | 44,469 | 81,258 | 136,006 | 332,904 | 417,343 | 152,099 | 197,203 | 1,541,402 | 2,318,674 | 103,735 | 124,211 | 32,707,721 | 52,501,122 |
| **By Industry (Earnings in Thousands of Dollars/Percentage of Nonfarm Earnings)** | | | | | | | | | | | | | | | | |
| Forestry, fishing, and related activities | (D) | (D) | (D) | (D) | (D) | (D) | (D) | 13,869 | 8,193 | 12,605 | 42,867 | (D) | 6,540 | (D) | 481,435 | 598,877 |
| | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 2.9 | 4.4 | 5.4 | 2.4 | N/A | 4.5 | N/A | 1.2 | 1 |
| Mining (including quarrying and oil and gas extraction) | (D) | (D) | (D) | (D) | (D) | (D) | (D) | 618 | 0 | 112 | 1,286 | (D) | 34 | (D) | 665,322 | 297,006 |
| | N/A | N/A | N/A | N/A | N/A | N/A | N/A | <1 | <1 | <1 | <1 | N/A | <1 | N/A | 1.6 | <1 |
| Utilities | 6,525 | 6,097 | 1 | 7 | (D) | (D) | 12,120 | 17,939 | (D) | 1,489 | 25,870 | 29,110 | (D) | (D) | 425,119 | 465,416 |
| | 1.7 | 1.2 | <1 | N/A | N/A | N/A | 3.1 | 3.8 | N/A | <1 | 1.4 | 1.1 | N/A | N/A | 1 | <1 |
| Construction | 23,209 | 41,108 | 1,130 | (D) | 8,925 | 20,469 | 31,222 | 40,503 | 4,046 | 6,336 | 104,738 | 164,035 | 8,724 | 10,455 | 2,532,365 | 5,440,744 |
| | 6 | 7.8 | 2.2 | N/A | 7.4 | 11.9 | 8 | 8.6 | 2.1 | 2.7 | 5.7 | 6.3 | 6 | 6.2 | 6.2 | 8.8 |
| Manufacturing | 73,052 | 97,832 | 1,008 | 1,369 | 9,349 | 11,072 | 62,327 | 75,981 | 76,404 | 88,591 | 183,849 | 344,765 | 20,155 | 36,878 | 4,337,779 | 6,448,370 |
| | 18.9 | 18.7 | 1.9 | 1.8 | 7.8 | 6.4 | 15.9 | 16.1 | 40.6 | 38 | 10.1 | 13.1 | 13.9 | 22 | 10.6 | 10.5 |
| Wholesale trade | 35,297 | 52,782 | 1,744 | 3,581 | 8,346 | 11,535 | 13,350 | 15,350 | (D) | 19,633 | 85,431 | 131,274 | 7,935 | 4,332 | 1,924,500 | 3,132,234 |
| | 9.1 | 10.1 | 3.4 | 4.8 | 7 | 6.7 | 3.4 | 3.2 | N/A | 8.4 | 4.7 | 5 | 5.5 | 2.6 | 4.7 | 5.1 |

| Sector | Minidoka County | | Oneida County | | Owyhee County | | Payette County | | Power County | | Twin Falls County | | Washington County | | State of Idaho | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 |
| Retail trade | 23,128 | 35,012 | 3,773 | 5,653 | 9,864 | 10,730 | 13,965 | 26,280 | 5,519 | 7,564 | 181,846 | 237,976 | 11,100 | 12,654 | 3,761,964 | 5,995,906 |
| | 6 | 6.7 | 7.2 | 7.6 | 8.2 | 6.2 | 3.6 | 5.6 | 2.9 | 3.2 | 10 | 9.1 | 7.7 | 7.6 | 9.2 | 9.7 |
| Transportation and warehousing | 37,179 | 26,435 | 5,254 | 2,045 | (D) | (D) | 18,787 | 22,151 | 14,541 | 19,469 | 91,019 | 115,361 | (D) | (D) | 1,334,862 | 2,116,934 |
| | 9.6 | 5 | 10.1 | 2.7 | N/A | N/A | 4.8 | 4.7 | 7.7 | 8.3 | 5 | 4.4 | N/A | N/A | 3.3 | 3.4 |
| Information | 7,393 | 15,865 | 697 | (D) | 3,430 | (D) | (D) | (D) | (D) | (D) | 33,768 | 19,454 | 6,304 | 8,082 | 742,415 | 831,822 |
| | 1.9 | 3 | 1.3 | N/A | 2.9 | N/A | N/A | N/A | N/A | N/A | 1.9 | <1 | 4.3 | 4.8 | 1.8 | 1.4 |
| Finance and insurance | 5,706 | 6,040 | (D) | 5,131 | (D) | 1,588 | 19,346 | 19,199 | 2,335 | 3,803 | 86,034 | 86,138 | 3,392 | 3,219 | 1,629,779 | 3,035,612 |
| | 1.5 | 1.2 | N/A | 6.9 | N/A | <1 | 4.9 | 4.1 | 1.2 | 1.6 | 4.7 | 3.3 | 2.3 | 1.9 | 4 | 4.9 |
| Real estate and rental and leasing | 11,751 | 26,043 | (D) | 2,337 | (D) | 10,439 | 14,689 | (D) | 8,299 | (D) | 47,156 | 92,489 | 4,013 | 3,500 | 711,271 | 1,929,456 |
| | 3 | 5 | N/A | 3.1 | N/A | 6.1 | 3.7 | N/A | 4.4 | N/A | 2.6 | 3.5 | 2.8 | 2.1 | 1.7 | 3.1 |
| Professional, scientific, and technical services | 7,559 | 10,620 | (D) | 1,549 | (D) | 10,430 | (D) | (D) | 2,138 | 3,038 | 92,186 | 131,483 | 4,964 | 6,360 | 3,338,212 | 5,109,316 |
| | 2 | 2 | N/A | 2.1 | N/A | 6.1 | N/A | N/A | 1.1 | 1.3 | 5.1 | 5 | 3.4 | 3.8 | 8.2 | 8.3 |
| Management of companies and enterprises | 0 | (D) | 0 | N/A | (D) | N/A | (D) | (D) | (D) | 2,045 | 11,285 | 36,692 | (D) | (D) | 717,968 | 1,000,906 |
| | <1 | N/A | <1 | N/A | N/A | N/A | N/A | N/A | N/A | <1 | <1 | 1.4 | N/A | N/A | 1.8 | 1.6 |
| Administrative and support and waste management and remediation services | 877 | (D) | (D) | 1,302 | 5,308 | 7,778 | 12,435 | (D) | (D) | 866 | 70,265 | 125,821 | (D) | (D) | 1,758,762 | 3,064,315 |
| | <1 | N/A | N/A | 1,7 | 4.4 | 4.5 | 3.2 | N/A | N/A | <1 | 3.9 | 4.8 | N/A | N/A | 4.3 | 5 |
| Educational services | (D) | (D) | 182 | 125 | (D) | (D) | (D) | 3,090 | (D) | (D) | 9,174 | 12,830 | (D) | (D) | 453,931 | 723,475 |
| | N/A | N/A | <1 | <1 | N/A | N/A | N/A | <1 | N/A | N/A | <1 | <1 | N/A | N/A | 1.1 | 1.2 |
| Health care and social assistance | (D) | (D) | 2,335 | 3,801 | (D) | (D) | (D) | 69,441 | 2,985 | (D) | 330,401 | 521,594 | (D) | (D) | 5,032,073 | 7,508,709 |
| | N/A | N/A | 4.5 | 5.1 | N/A | N/A | N/A | 14.7 | 1.6 | N/A | 18.1 | 19.9 | N/A | N/A | 12.3 | 12.2 |
| Arts, entertainment, and recreation | 1,097 | (D) | (D) | 447 | 378 | 708 | 979 | 2,587 | (D) | (D) | 5,529 | 9,523 | 944 | 1,280 | 289,847 | 534,948 |
| | <1 | N/A | N/A | <1 | <1 | <1 | <1 | <1 | N/A | N/A | <1 | <1 | <1 | <1 | <1 | <1 |
| Accommodation and food services | 9,119 | (D) | (D) | 1,788 | 2,309 | 5,604 | 3,973 | 9,446 | (D) | (D) | 56,844 | 129,171 | 2,297 | 5,063 | 1,141,603 | 2,312,250 |
| | 2.4 | N/A | N/A | 2.4 | 1.9 | 3.3 | 1 | 2 | N/A | N/A | 3.1 | 4.9 | 1.6 | 3.3 | 2.8 | 3.8 |
| Other services (except government and government enterprises) | 13,950 | 21,737 | 1,732 | (D) | 6,003 | (D) | 20,241 | 26,320 | 6,085 | 6,278 | 81,854 | 92,006 | 5,522 | 5,559 | 1,428,511 | 1,954,826 |
| | 3.6 | 4.1 | 3.3 | N/A | 5 | N/A | 5.2 | 5.6 | 3.2 | 2.7 | 4.5 | 3.5 | 3.8 | 3.3 | 3.5 | 3.2 |

| Sector | Minidoka County | | Oneida County | | Owyhee County | | Payette County | | Power County | | Twin Falls County | | Washington County | | State of Idaho | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 |
| Government and government enterprises | 77,237 | 95,911 | 20,899 | 30,151 | 38,746 | 35,968 | 59,121 | 55,712 | 36,117 | 36,196 | 281,483 | 304,254 | 41,303 | 43,291 | 8,137,962 | 9,010,501 |
| | 20 | 18.3 | 40.1 | 40.4 | 32.3 | 20.9 | 15.1 | 11.8 | 19.2 | 15.5 | 15.4 | 11.6 | 28.5 | 25.8 | 19.9 | 14.6 |

Sources: BEA 2010b, 2021b
Note: (D) represents data not shown to avoid disclosure of confidential information; estimates are included in higher-level totals.
(N/A) means data are not available, or no information was given.
All 2010 dollar values were adjusted for inflation.

## Table A-8 (Part 1). Montana Analysis Area Employment by Sector (2010 and 2021)

| Sector | Beaverhead County | | Big Horn County | | Blaine County | | Carbon County | | Carter County | | Chouteau County | | Custer County | | State of Montana | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 |
| Total employment (number of jobs) | 5,723 | 6,304 | 6,014 | 5,159 | 2,680 | 2,482 | 5,214 | 5,958 | 795 | 892 | 2,769 | 2,701 | 7,566 | 7,637 | 616,344 | 709,342 |
| Wage and salary employment | 3,837 | 4,179 | 4,684 | 4,013 | 1,655 | 1,521 | 2,698 | 3,039 | 375 | 394 | 1,521 | 1,484 | 5,742 | 5,585 | 447,230 | 507,125 |
| Proprietors employment | 1,886 | 2,125 | 1,330 | 1,146 | 1,025 | 961 | 2,516 | 2,919 | 420 | 498 | 1,248 | 1,217 | 1,824 | 2,052 | 169,114 | 202,217 |
| Farm proprietors employment | 317 | 306 | 506 | 410 | 486 | 435 | 641 | 650 | 257 | 256 | 554 | 526 | 352 | 337 | 24,067 | 23,037 |
| Nonfarm proprietors employment | 1,569 | 1,819 | 824 | 736 | 539 | 526 | 1,875 | 2,269 | 163 | 242 | 694 | 691 | 1,472 | 1,715 | 145,047 | 179,180 |
| Farm employment | 529 | 562 | 635 | 565 | 590 | 551 | 723 | 764 | 328 | 361 | 748 | 760 | 447 | 451 | 28,828 | 28,955 |
| Nonfarm employment | 5,194 | 5,742 | 5,379 | 4,594 | 2,090 | 1,931 | 4,491 | 5,194 | 467 | 531 | 2,021 | 1,941 | 7,119 | 7,186 | 587,516 | 680,387 |
| Private nonfarm employment | 4,171 | 4,678 | 3,017 | 2,837 | 1,328 | 1,261 | 3,841 | 4,578 | 338 | 404 | 1,502 | 1,467 | 5,899 | 6,063 | 490,410 | 584,573 |
| **By Industry (Number of Jobs/Percentage of Total Employment)** | | | | | | | | | | | | | | | | |
| Forestry, fishing, and related activities | (D) | 179 | (D) | (D) | (D) | (D) | (D) | 246 | (D) | (D) | 142 | (D) | (D) | (D) | 7,122 | 8,193 |
| | N/A | 2.8 | N/A | N/A | N/A | N/A | N/A | 4.1 | N/A | N/A | 5.1 | N/A | N/A | N/A | 1.2 | 1.2 |
| Mining (including quarrying and oil and gas extraction) | (D) | 155 | 609 | 417 | (D) | 32 | 125 | 99 | (D) | 1 | 25 | (D) | (D) | (D) | 11,092 | 9,581 |
| | N/A | 2.5 | 10.1 | 8.1 | N/A | 1.3 | 2.4 | 1.7 | N/A | <1 | <1 | N/A | N/A | N/A | 1.8 | 1.4 |
| Utilities | (D) | (D) | (D) | (D) | (D) | (D) | 29 | 25 | (D) | (D) | 9 | 10 | (D) | (D) | 3,163 | 2,993 |
| | N/A | N/A | N/A | N/A | N/A | N/A | <1 | <1 | N/A | N/A | <1 | <1 | N/A | N/A | <1 | <1 |
| Construction | 353 | 461 | 102 | (D) | 112 | (D) | 459 | 570 | (D) | (D) | 116 | 84 | 478 | 396 | 40,842 | 55,366 |
| | 6.2 | 7.3 | 1.7 | N/A | 4.2 | N/A | 8.8 | 9.6 | N/A | N/A | 4.2 | 3.1 | 6.3 | 5.2 | 6.6 | 7.8 |
| Manufacturing | 99 | 135 | 61 | (D) | 45 | (D) | 94 | 143 | 11 | 9 | 48 | 65 | 95 | 122 | 19,857 | 25,703 |
| | 1.7 | 2.1 | 1 | N/A | 1.7 | N/A | 1.8 | 2.4 | 1.4 | 1 | 1.7 | 2.4 | 1.3 | 1.6 | 3.2 | 3.6 |
| Wholesale trade | 177 | 201 | (D) | (D) | 87 | 58 | 89 | 111 | (D) | (D) | 72 | 75 | 206 | 244 | 17,517 | 19,577 |
| | 3.1 | 3.2 | N/A | N/A | 3.2 | 2.3 | 1.7 | 1.9 | N/A | N/A | 2.6 | 2.8 | 2.7 | 3.2 | 2.8 | 2.8 |
| Retail trade | 587 | 648 | 401 | 407 | 222 | 255 | 399 | 463 | 44 | 41 | 207 | 211 | 977 | 1,052 | 70,321 | 77,062 |
| | 10.3 | 10.3 | 6.7 | 7.9 | 8.3 | 10.3 | 7.7 | 7.8 | 5.5 | 4.6 | 7.5 | 7.8 | 12.9 | 13.8 | 11.4 | 10.9 |
| Transportation and warehousing | (D) | (D) | 121 | 146 | (D) | (D) | 99 | 127 | (D) | (D) | 55 | 54 | (D) | (D) | 17,434 | 24,342 |
| | N/A | N/A | 2 | 2.8 | N/A | N/A | 1.9 | 2.1 | N/A | N/A | 2 | 2 | N/A | N/A | 2.8 | 3.4 |
| Information | 53 | 43 | 23 | 20 | (D) | (D) | 50 | 36 | (D) | (D) | (D) | 14 | 117 | 79 | 9,096 | 7,633 |
| | <1 | <1 | <1 | <1 | N/A | N/A | 1 | <1 | N/A | N/A | N/A | <1 | 1.5 | 1 | 1.5 | 1.1 |
| Finance and insurance | 185 | 175 | 113 | 101 | (D) | (D) | 126 | 148 | (D) | 27 | 131 | 112 | 381 | 456 | 25,097 | 29,912 |
| | 3.2 | 2.8 | 1.9 | 2 | N/A | N/A | 2.4 | 2.5 | N/A | 3 | 4.7 | 4.1 | 5 | 6 | 4.1 | 4.2 |

| Sector | Beaverhead County | | Big Horn County | | Blaine County | | Carbon County | | Carter County | | Chouteau County | | Custer County | | State of Montana | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 |
| Real estate and rental and leasing | 401 | 391 | 72 | 95 | (D) | (D) | 389 | 424 | 11 | (D) | 101 | 124 | 241 | 355 | 30,470 | 43,224 |
| | 7.0 | 6.2 | 1.2 | 1.8 | N/A | N/A | 7.5 | 7.1 | 1.4 | N/A | 3.6 | 4.6 | 3.2 | 4.6 | 4.9 | 6.1 |
| Professional, scientific, and technical services | 203 | 228 | 146 | 125 | (D) | 64 | 273 | (D) | (D) | (D) | 72 | (D) | 290 | (D) | 33,696 | 42,756 |
| | 3.5 | 3.6 | 2.4 | 2.4 | N/A | 2.6 | 5.2 | N/A | N/A | N/A | 2.6 | N/A | 3.8 | N/A | 5.5 | 6 |
| Management of companies and enterprises | 0 | 0 | (D) | (D) | 1 | 0 | (D) | (D) | 0 | 0 | 0 | 0 | 43 | (D) | 1,995 | 2,966 |
| | 0 | 0 | N/A | N/A | <1 | 0 | N/A | N/A | 0 | 0 | 0 | 0 | 0.6 | N/A | <1 | <1 |
| Administrative and support and waste management and remediation services | 140 | 137 | (D) | (D) | 49 | 31 | (D) | 211 | (D) | 10 | 23 | (D) | 148 | 299 | 26,578 | 28,489 |
| | 2.4 | 2.2 | N/A | N/A | 1.8 | 1.2 | N/A | 3.5 | N/A | 1.1 | <1 | N/A | 2 | 3.9 | 4.3 | 4 |
| Educational services | (D) | 45 | (D) | (D) | (D) | (D) | 46 | 49 | 5 | 5 | (D) | (D) | 60 | (D) | 7,873 | 9,529 |
| | N/A | <1 | N/A | N/A | N/A | N/A | <1 | <1 | <1 | <1 | N/A | N/A | <1 | N/A | 1.3 | 1.3 |
| Health care and social assistance | (D) | 645 | (D) | (D) | (D) | (D) | 318 | 339 | (D) | (D) | (D) | (D) | 1,059 | (D) | 68,410 | 79,590 |
| | N/A | 10.2 | N/A | N/A | N/A | N/A | 6.1 | 5.7 | N/A | N/A | N/A | N/A | 14 | N/A | 11.1 | 11.2 |
| Arts, entertainment, and recreation | 188 | 191 | 129 | 141 | 24 | 32 | 271 | 295 | 10 | 16 | 39 | 37 | 164 | 215 | 18,628 | 21,488 |
| | 3.3 | 3 | 2.1 | 2.7 | <1 | 1.3 | 5.2 | 5 | 1.3 | 1.8 | 1.4 | 1.4 | 2.2 | 2.8 | 3 | 3 |
| Accommodation and food services | 543 | 586 | 303 | 328 | 76 | 64 | 532 | 645 | 33 | 24 | 143 | 125 | 712 | 721 | 49,396 | 60,521 |
| | 9.5 | 9.3 | 5 | 6.4 | 2.8 | 2.6 | 10.2 | 10.8 | 4.2 | 2.7 | 5.2 | 4.6 | 9.4 | 9.4 | 8 | 8.5 |
| Other services | 261 | 362 | 194 | 168 | 141 | 140 | 265 | 371 | (D) | (D) | (D) | 114 | 375 | 418 | 31,823 | 35,648 |
| | 4.6 | 5.7 | 3.2 | 3.3 | 5.3 | 5.6 | 5.1 | 6.2 | N/A | N/A | N/A | 4.2 | 5 | 5.5 | 5.2 | 5 |
| Government and government enterprises | 1,023 | 1,064 | 2,362 | 1,757 | 762 | 670 | 650 | 616 | 129 | 127 | 519 | 474 | 1,220 | 1,123 | 97,106 | 95,814 |
| | 17.9 | 16.9 | 39.3 | 34.1 | 28.4 | 27.0 | 12.5 | 10.3 | 16.2 | 14.2 | 18.7 | 17.5 | 16.1 | 14.7 | 15.8 | 13.5 |

Sources: BEA 2010a, 2021a

(D) represents data not shown to avoid disclosure of confidential information; estimates are included in high-level totals.

(N/A) means data are not available, or no information was given.

## Table A-8 (Part 2). Montana Analysis Area Employment by Sector (2010 and 2021)

| Sector | Dawson County | | Fallon County | | Fergus County | | Garfield County | | Madison County | | McCone County | | Musselshell County | | State of Montana | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 |
| Total employment (number of jobs) | 5,320 | 5,069 | 2,359 | 2,156 | 7,354 | 7,541 | 773 | 869 | 5,640 | 7,005 | 1,275 | 1,263 | 2,218 | 2,251 | 616,344 | 709,342 |
| Wage and salary employment | 3,978 | 3,804 | 1,616 | 1,391 | 4,783 | 4,863 | 364 | 402 | 3,563 | 4,528 | 662 | 638 | 1,343 | 1,359 | 447,230 | 507,125 |
| Proprietors employment | 1,342 | 1,265 | 743 | 765 | 2,571 | 2,678 | 409 | 467 | 2,077 | 2,477 | 613 | 625 | 875 | 892 | 169,114 | 202,217 |
| Farm proprietors employment | 380 | 368 | 248 | 244 | 732 | 717 | 221 | 236 | 476 | 473 | 379 | 364 | 317 | 297 | 24,067 | 23,037 |
| Nonfarm proprietors employment | 962 | 897 | 495 | 521 | 1,839 | 1,961 | 188 | 231 | 1,601 | 2,004 | 234 | 261 | 558 | 595 | 145,047 | 179,180 |
| Farm employment | 446 | 451 | 302 | 315 | 859 | 873 | 275 | 299 | 634 | 678 | 436 | 437 | 356 | 342 | 28,828 | 28,955 |
| Nonfarm employment | 4,874 | 4,618 | 2,057 | 1,841 | 6,495 | 6,668 | 498 | 570 | 5,006 | 6,327 | 839 | 826 | 1,862 | 1,909 | 587,516 | 680,387 |
| Private nonfarm employment | 4,008 | 3,814 | 1,775 | 1,556 | 5,408 | 5,689 | 351 | 398 | 4,436 | 5,778 | 651 | 671 | 1,552 | 1,632 | 490,410 | 584,573 |
| **By Industry (Number of Jobs/Percentage of Total Employment)** | | | | | | | | | | | | | | | | |
| Forestry, fishing, and related activities | (D) | (D) | (D) | (D) | (D) | (D) | (D) | (D) | 163 | 179 | (D) | (D) | 50 | (D) | 7,122 | 8,193 |
| | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 2.9 | 2.6 | N/A | N/A | 2.3 | N/A | 1.2 | 1.2 |
| Mining (including quarrying and oil and gas extraction) | (D) | 127 | 381 | 245 | (D) | (D) | 14 | 0 | 102 | 210 | 18 | (D) | 293 | (D) | 11,092 | 9,581 |
| | N/A | 2.5 | 16.2 | 11.4 | N/A | N/A | 1.8 | 0 | 1.8 | 3.0 | 1.4 | N/A | 13.2 | N/A | 1.8 | 1.4 |
| Utilities | (D) | (D) | (D) | (D) | (D) | (D) | 0 | 1 | 15 | (D) | (D) | (D) | (D) | (D) | 3,163 | 2,993 |
| | N/A | N/A | N/A | N/A | N/A | N/A | 0 | <1 | <1 | N/A | N/A | N/A | N/A | N/A | <1 | <1 |
| Construction | 172 | 155 | 218 | 157 | 654 | 758 | (D) | 33 | 615 | 592 | 65 | 46 | 168 | 169 | 40,842 | 55,366 |
| | 3.2 | 3.1 | 9.2 | 7.3 | 8.9 | 10.1 | N/A | 3.8 | 10.9 | 8.5 | 5.1 | 3.6 | 7.6 | 7.5 | 6.6 | 7.8 |
| Manufacturing | 65 | 65 | 33 | 30 | 346 | 453 | (D) | 15 | 134 | 190 | (D) | 18 | 51 | 41 | 19,857 | 25,703 |
| | 1.2 | 1.3 | 1.4 | 1.4 | 4.7 | 6.0 | N/A | 1.7 | 2.4 | 2.7 | N/A | 1.4 | 2.3 | 1.8 | 3.2 | 3.6 |
| Wholesale trade | 233 | (D) | (D) | (D) | 330 | 320 | (D) | (D) | 44 | (D) | 81 | 97 | 38 | 56 | 17,517 | 19,577 |
| | 4.4 | N/A | N/A | N/A | 4.5 | 4.2 | N/A | N/A | <1 | N/A | 6.4 | 7.7 | 1.7 | 2.5 | 2.8 | 2.8 |
| Retail trade | 577 | 640 | 199 | 250 | 693 | 744 | 65 | (D) | 402 | 475 | 77 | 72 | 176 | 195 | 70,321 | 77,062 |
| | 10.8 | 12.6 | 8.4 | 11.6 | 9.4 | 9.9 | 8.4 | N/A | 7.1 | 6.8 | 6 | 5.7 | 7.9 | 8.7 | 11.4 | 10.9 |
| Transportation and warehousing | (D) | 555 | 183 | 122 | (D) | (D) | (D) | (D) | 139 | 95 | (D) | (D) | (D) | (D) | 17,434 | 24,342 |
| | N/A | 10.9 | 7.8 | 5.7 | N/A | N/A | N/A | N/A | 2.5 | 1.4 | N/A | N/A | N/A | N/A | 2.8 | 3.4 |

| Sector | Dawson County | | Fallon County | | Fergus County | | Garfield County | | Madison County | | McCone County | | Musselshell County | | State of Montana | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 |
| Information | 100 | 77 | 25 | 18 | 93 | 82 | (D) | (D) | 21 | 39 | (D) | (D) | 20 | 19 | 9,096 | 7,633 |
| | 1.9 | 1.5 | 1.1 | <1 | 1.3 | 1.1 | N/A | N/A | <1 | <1 | N/A | N/A | <1 | <1 | 1.5 | 1.1 |
| Finance and insurance | 175 | 148 | (D) | 73 | 300 | 343 | (D) | (D) | 157 | 170 | (D) | (D) | (D) | (D) | 25,097 | 29,912 |
| | 3.3 | 2.9 | N/A | 3.4 | 4.1 | 4.5 | N/A | N/A | 2.8 | 2.4 | N/A | N/A | N/A | N/A | 4.1 | 4.2 |
| Real estate and rental and leasing | 117 | 150 | (D) | 101 | 316 | 372 | 14 | 27 | 284 | 429 | (D) | (D) | (D) | (D) | 30,470 | 43,224 |
| | 2.2 | 3.0 | N/A | 4.7 | 4.3 | 4.9 | 1.8 | 3.1 | 5 | 6.1 | N/A | N/A | N/A | N/A | 4.9 | 6.1 |
| Professional, scientific, and technical services | 127 | 136 | 48 | 55 | (D) | (D) | 9 | (D) | (D) | 292 | (D) | (D) | 55 | 66 | 33,696 | 42,756 |
| | 2.4 | 2.7 | 2 | 2.6 | N/A | N/A | 1.2 | N/A | N/A | 4.2 | N/A | N/A | 2.5 | 2.9 | 5.5 | 6 |
| Management of companies and enterprises | (D) | (D) | 0 | 0 | (D) | (D) | 0 | 0 | (D) | 0 | 0 | 0 | 7 | 0 | 1,995 | 2,966 |
| | N/A | N/A | 0 | 0 | N/A | N/A | 0 | 0 | N/A | 0 | 0 | 0 | <1 | 0 | <1 | <1 |
| Administrative and support and waste management and remediation services | (D) | (D) | 34 | 31 | 179 | (D) | 10 | (D) | 183 | 154 | 12 | (D) | 48 | 35 | 26,578 | 28,489 |
| | N/A | N/A | 1.4 | 1.4 | 2.4 | N/A | 1.3 | N/A | 3.2 | 2.2 | 0.9 | N/A | 2.2 | 1.6 | 4.3 | 4.0 |
| Educational services | 9 | (D) | 9 | 8 | (D) | 18 | 6 | 1 | 30 | (D) | 6 | 5 | 8 | 7 | 7,873 | 9,529 |
| | <1 | N/A | <1 | <1 | N/A | <1 | <1 | <1 | <1 | N/A | <1 | <1 | <1 | 0.3 | 1.3 | 1.3 |
| Health care and social assistance | 738 | (D) | 159 | 121 | (D) | 805 | (D) | 18 | 210 | (D) | (D) | (D) | 161 | 180 | 68,410 | 79,590 |
| | 13.9 | N/A | 6.7 | 5.6 | N/A | 10.7 | N/A | 2.1 | 3.7 | N/A | N/A | N/A | 7.3 | 8.0 | 11.1 | 11.2 |
| Arts, entertainment, and recreation | 127 | 80 | (D) | (D) | 122 | 145 | (D) | (D) | 505 | 878 | 10 | 6 | (D) | 40 | 18,628 | 21,488 |
| | 2.4 | 1.6 | N/A | N/A | 1.7 | 1.9 | N/A | N/A | 9.0 | 12.5 | <1 | <1 | N/A | 1.8 | 3 | 3 |
| Accommodation and food services | 408 | 384 | (D) | (D) | 606 | 547 | (D) | (D) | 993 | 1,436 | 30 | 32 | (D) | 74 | 49,396 | 60,521 |
| | 7.7 | 7.6 | N/A | N/A | 8.2 | 7.3 | N/A | N/A | 17.6 | 20.5 | 2.4 | 2.5 | N/A | 3.3 | 8 | 8.5 |
| Other services | 289 | 272 | 136 | 109 | 348 | 319 | (D) | (D) | 246 | 246 | 49 | 43 | 201 | 157 | 31,823 | 35,648 |
| | 5.4 | 5.4 | 5.8 | 5.1 | 4.7 | 4.2 | N/A | N/A | 4.4 | 3.5 | 3.8 | 3.4 | 9.1 | 7.0 | 5.2 | 5.0 |
| Government and government enterprises | 866 | 804 | 282 | 285 | 1,087 | 979 | 147 | 172 | 570 | 549 | 188 | 155 | 310 | 277 | 97,106 | 95,814 |
| | 16.3 | 15.9 | 12 | 13.2 | 14.8 | 13.0 | 19 | 19.8 | 10.1 | 7.8 | 14.7 | 12.3 | 14 | 12.3 | 15.8 | 13.5 |

Sources: BEA 2010a, 2021a

(D) represents data not shown to avoid disclosure of confidential information; estimates are included in high-level totals.

(N/A) means data are not available, or no information was given.

## Table A-8 (Part 3). Montana Analysis Area Employment by Sector (2010 and 2021)

| Sector | Petroleum County | | Phillips County | | Powder River County | | Prairie County | | Roosevelt County | | Rosebud County | | Stillwater County | | State of Montana | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 |
| Total employment (number of jobs) | 292 | 325 | 2,662 | 2,507 | 1,090 | 1,152 | 643 | 642 | 5,318 | 5,010 | 5,806 | 4,879 | 4,958 | 5,893 | 616,344 | 709,342 |
| Wage and salary employment | 167 | 151 | 1,572 | 1,426 | 554 | 587 | 348 | 327 | 3,840 | 3,665 | 4,546 | 3,740 | 3,123 | 3,863 | 447,230 | 507,125 |
| Proprietors employment | 125 | 174 | 1,090 | 1,081 | 536 | 565 | 295 | 315 | 1,478 | 1,345 | 1,260 | 1,139 | 1,835 | 2,030 | 169,114 | 202,217 |
| Farm proprietors employment | 84 | 86 | 436 | 412 | 254 | 250 | 140 | 151 | 566 | 511 | 392 | 371 | 533 | 503 | 24,067 | 23,037 |
| Nonfarm proprietors employment | 41 | 88 | 654 | 669 | 282 | 315 | 155 | 164 | 912 | 834 | 868 | 768 | 1,302 | 1,527 | 145,047 | 179,180 |
| Farm employment | 116 | 129 | 536 | 534 | 319 | 330 | 175 | 189 | 637 | 594 | 500 | 512 | 604 | 583 | 28,828 | 28,955 |
| Nonfarm employment | 176 | 196 | 2,126 | 1,973 | 771 | 822 | 468 | 453 | 4,681 | 4,416 | 5,306 | 4,367 | 4,354 | 5,310 | 587,516 | 680,387 |
| Private nonfarm employment | 112 | 138 | 1,679 | 1,604 | 558 | 607 | 277 | 264 | 2,833 | 2,662 | 3,454 | 2,719 | 3,843 | 4,787 | 490,410 | 584,573 |
| **By Industry (Number of Jobs/Percentage of Total Employment)** | | | | | | | | | | | | | | | | |
| Forestry, fishing, and related activities | (D) | (D) | (D) | (D) | (D) | (D) | (D) | (D) | (D) | (D) | (D) | (D) | 81 | (D) | 7,122 | 8,193 |
| | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 1.6 | N/A | 1.2 | 1.2 |
| Mining (including quarrying and oil and gas extraction) | (D) | (D) | (D) | (D) | (D) | (D) | 14 | 8 | 65 | 80 | 529 | (D) | (D) | (D) | 11,092 | 9,581 |
| | N/A | N/A | N/A | N/A | N/A | N/A | 2.2 | 1.2 | 1.2 | 1.6 | 9.1 | N/A | N/A | N/A | 1.8 | 1.4 |
| Utilities | 0 | 1 | 20 | 21 | 2 | 4 | (D) | 1 | 31 | 33 | (D) | 301 | 23 | 15 | 3,163 | 2,993 |
| | 0 | <1 | <1 | <1 | <1 | <1 | N/A | <1 | <1 | <1 | N/A | 6.2 | <1 | <1 | <1 | <1 |
| Construction | 4 | (D) | 164 | 159 | (D) | (D) | (D) | 14 | 234 | 191 | 273 | 370 | (D) | 399 | 40,842 | 55,366 |
| | 1.4 | N/A | 6.2 | 6.3 | N/A | N/A | N/A | 2.2 | 4.4 | 3.8 | 4.7 | 7.6 | N/A | 6.8 | 6.6 | 7.8 |
| Manufacturing | 0 | 2 | 42 | 57 | (D) | (D) | (D) | 11 | 79 | 56 | 47 | 30 | 286 | 281 | 19,857 | 25,703 |
| | 0 | <1 | 1.6 | 2.3 | N/A | N/A | N/A | 1.7 | 1.5 | 1.1 | <1 | <1 | 5.8 | 4.8 | 3.2 | 3.6 |
| Wholesale trade | 0 | 3 | 57 | (D) | (D) | (D) | (D) | (D) | 83 | 76 | (D) | 15 | 64 | 81 | 17,517 | 19,577 |
| | 0 | <1 | 2.1 | N/A | N/A | N/A | N/A | N/A | 1.6 | 1.5 | N/A | <1 | 1.3 | 1.4 | 2.8 | 2.8 |
| Retail trade | (D) | (D) | 258 | 287 | 108 | 132 | 29 | 37 | 497 | 491 | 431 | 303 | 405 | 510 | 70,321 | 77,062 |
| | N/A | N/A | 9.7 | 11.4 | 9.9 | 11.5 | 4.5 | 5.8 | 9.3 | 9.8 | 7.4 | 6.2 | 8.2 | 8.7 | 11.4 | 10.9 |
| Transportation and warehousing | (D) | (D) | 137 | (D) | (D) | (D) | 17 | (D) | 131 | 131 | 135 | 93 | 70 | 81 | 17,434 | 24,342 |
| | N/A | N/A | 5.1 | N/A | N/A | N/A | 2.6 | N/A | 2.5 | 2.6 | 2.3 | 1.9 | 1.4 | 1.4 | 2.8 | 3.4 |
| Information | (D) | (D) | 25 | (D) | (D) | (D) | 8 | 3 | 56 | 41 | 68 | 64 | 24 | 21 | 9,096 | 7,633 |

| Sector | Petroleum County | | Phillips County | | Powder River County | | Prairie County | | Roosevelt County | | Rosebud County | | Stillwater County | | State of Montana | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 |
| | N/A | N/A | <1 | N/A | N/A | N/A | 1.2 | <1 | 1.1 | <1 | 1.2 | 1.3 | <1 | <1 | 1.5 | 1.1 |
| Finance and insurance | 0 | 0 | 85 | 83 | (D) | (D) | (D) | (D) | 157 | 141 | 88 | 93 | 113 | 108 | 25,097 | 29,912 |
| | 0 | 0 | 3.2 | 3.3 | N/A | N/A | N/A | N/A | 3 | 2.8 | 1.5 | 1.9 | 2.3 | 1.8 | 4.1 | 4.2 |
| Real estate and rental and leasing | 5 | 10 | 87 | 98 | (D) | 53 | (D) | (D) | 72 | 121 | 89 | 72 | 191 | 325 | 30,470 | 43,224 |
| | 1.7 | 3.1 | 3.3 | 3.9 | N/A | 4.6 | N/A | N/A | 1.4 | 2.4 | 1.5 | 1.5 | 3.9 | 5.5 | 4.9 | 6.1 |
| Professional, scientific, and technical services | 3 | 5 | (D) | 61 | (D) | (D) | 20 | 18 | 103 | (D) | 94 | (D) | 196 | 218 | 33,696 | 42,756 |
| | 1 | 1.5 | N/A | 2.4 | N/A | N/A | 3.1 | 2.8 | 1.9 | N/A | 1.6 | N/A | 4.0 | 3.7 | 5.5 | 6 |
| Management of companies and enterprises | 0 | 0 | 1 | 0 | 0 | (D) | 0 | 0 | 0 | (D) | 0 | (D) | (D) | (D) | 1,995 | 2,966 |
| | 0 | 0 | <1 | 0 | 0 | N/A | 0 | 0 | 0 | N/A | 0 | N/A | N/A | N/A | <1 | <1 |
| Administrative and support and waste management and remediation services | (D) | 5 | (D) | (D) | (D) | 10 | 8 | 8 | 113 | 82 | 115 | (D) | (D) | (D) | 26,578 | 28,489 |
| | N/A | 1.5 | N/A | N/A | N/A | 0.9 | 1.2 | 1.2 | 2.1 | 1.6 | 2.0 | N/A | N/A | N/A | 4.3 | 4 |
| Educational services | 1 | 0 | (D) | 8 | 6 | 5 | 5 | 1 | 17 | (D) | (D) | 12 | 22 | (D) | 7,873 | 9,529 |
| | <1 | 0 | N/A | <1 | <1 | <1 | <1 | <1 | <1 | N/A | N/A | <1 | <1 | N/A | 1.3 | 1.3 |
| Health care and social assistance | (D) | 10 | (D) | 211 | (D) | 12 | 5 | (D) | 542 | (D) | (D) | (D) | 292 | (D) | 68,410 | 79,590 |
| | N/A | 3.1 | N/A | 8.4 | N/A | 1 | <1 | N/A | 10.2 | N/A | N/A | N/A | 5.9 | N/A | 11.1 | 11.2 |
| Arts, entertainment, and recreation | (D) | (D) | (D) | 23 | 23 | 18 | 7 | (D) | (D) | 69 | 149 | 89 | 121 | 95 | 18,628 | 21,488 |
| | N/A | N/A | N/A | <1 | 2.1 | 1.6 | 1.1 | N/A | N/A | 1.4 | 2.6 | 1.8 | 2.4 | 1.6 | 3 | 3 |
| Accommodation and food services | (D) | 8 | (D) | 193 | 70 | 59 | 29 | (D) | 311 | 309 | 309 | 208 | 246 | 275 | 49,396 | 60,521 |
| | N/A | 2.5 | N/A | 7.7 | 6.4 | 5.1 | 4.5 | N/A | 5.8 | 6.2 | 5.3 | 4.3 | 5.0 | 4.7 | 8 | 8.5 |
| Other services | (D) | (D) | 150 | 143 | 42 | 41 | 30 | 24 | 220 | 215 | 165 | 157 | 188 | 212 | 31,823 | 35,648 |
| | N/A | N/A | 5.6 | 5.7 | 3.9 | 3.6 | 4.7 | 3.7 | 4.1 | 4.3 | 2.8 | 3.2 | 3.8 | 3.6 | 5.2 | 5.0 |
| Government and government enterprises | 64 | 58 | 447 | 369 | 213 | 215 | 191 | 189 | 1,848 | 1,754 | 1,852 | 1,648 | 511 | 523 | 97,106 | 95,814 |
| | 21.9 | 17.8 | 16.8 | 14.7 | 19.5 | 18.7 | 29.7 | 29.4 | 34.7 | 35.0 | 31.9 | 33.8 | 10.3 | 8.9 | 15.8 | 13.5 |

Sources: BEA 2010a, 2021a

(D) represents data not shown to avoid disclosure of confidential information; estimates are included in high-level totals.

(N/A) means data are not available, or no information was given.

## Table A-8 (Part 4). Montana Analysis Area Employment by Sector (2010 and 2021)

| Sector | Sweet Grass County | | Treasure County | | Valley County | | Wibaux County | | Yellowstone County | | State of Montana | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 |
| Total employment (number of jobs) | 8,925 | 11,608 | 2,062 | 2,654 | 4,212 | 5,164 | 9,380 | 10,955 | 4,365 | 4,893 | 44,368 | 55,421 |
| Wage and salary employment | 6,771 | 8,679 | 1,129 | 1,566 | 2,696 | 3,256 | 6,281 | 7,378 | 3,444 | 3,799 | 33,864 | 42,216 |
| Proprietors employment | 2,154 | 2,929 | 933 | 1,088 | 1,516 | 1,908 | 3,099 | 3,577 | 921 | 1,094 | 10,504 | 13,205 |
| Farm proprietors employment | 547 | 570 | 431 | 448 | 522 | 487 | 627 | 621 | 285 | 288 | 1,148 | 1,154 |
| Nonfarm proprietors employment | 1,607 | 2,359 | 502 | 640 | 994 | 1,421 | 2,472 | 2,956 | 636 | 806 | 9,356 | 12,051 |
| Farm employment | 1,376 | 1,490 | 507 | 528 | 1,133 | 1,236 | 985 | 1,046 | 780 | 884 | 2,238 | 2,474 |
| Nonfarm employment | 7,549 | 10,118 | 1,555 | 2,126 | 3,079 | 3,928 | 8,395 | 9,909 | 3,585 | 4,009 | 42,130 | 52,947 |
| Private nonfarm employment | 6,003 | 8,538 | 1,082 | 1,440 | 2,304 | 3,201 | 7,210 | 8,810 | 2,876 | 3,284 | 37,034 | 47,648 |
| **By Industry (Number of Jobs/Percentage of Total Employment)** | | | | | | | | | | | | |
| Forestry, fishing, and related activities | (D) | (D) | 11 | (D) | (D) | (D) | (D) | (D) | 329 | 515 | 7,122 | 8,193 |
| | N/A | N/A | 2.8 | N/A | N/A | N/A | N/A | N/A | <1 | <1 | 1.2 | 1.2 |
| Mining (including quarrying and oil and gas extraction) | (D) | (D) | 0 | 0 | (D) | (D) | (D) | (D) | 1,500 | 1,145 | 11,092 | 9,581 |
| | N/A | N/A | 0 | 0 | N/A | N/A | N/A | N/A | 1.5 | 1 | 1.8 | 1.4 |
| Utilities | (D) | (D) | (D) | (D) | 37 | 34 | (D) | (D) | 331 | 278 | 3,163 | 2,993 |
| | N/A | N/A | N/A | N/A | <1 | <1 | N/A | N/A | <1 | <1 | <1 | <1 |
| Construction | 201 | 269 | (D) | (D) | 231 | 238 | (D) | 9 | 6,408 | 8,467 | 40,842 | 55,366 |
| | 8.1 | 9.3 | N/A | N/A | 5.1 | 5.1 | N/A | 1.5 | 6.4 | 7.4 | 6.6 | 7.8 |
| Manufacturing | 83 | 123 | (D) | 4 | 54 | 35 | 11 | (D) | 3,325 | 4,024 | 19,857 | 25,703 |
| | 3.3 | 4.3 | N/A | 1 | 1.2 | <1 | 1.6 | N/A | 3.3 | 3.5 | 3.2 | 3.6 |
| Wholesale trade | 37 | 27 | 30 | 26 | 158 | 136 | (D) | (D) | 5,698 | 5,867 | 17,517 | 19,577 |
| | 1.5 | <1 | 7.7 | 6.6 | 3.5 | 2.9 | N/A | N/A | 5.7 | 5.2 | 2.8 | 2.8 |
| Retail trade | 194 | 206 | (D) | (D) | 488 | 377 | 29 | (D) | 12,896 | 12,944 | 70,321 | 77,062 |
| | 7.8 | 7.1 | N/A | N/A | 10.8 | 8.1 | 4.1 | N/A | 12.8 | 11.4 | 11.4 | 10.9 |
| Transportation and warehousing | (D) | (D) | (D) | (D) | 148 | 189 | 34 | (D) | 3,907 | 6,092 | 17,434 | 24,342 |
| | N/A | N/A | N/A | N/A | 3.3 | 4.1 | 4.9 | N/A | 3.9 | 5.4 | 2.8 | 3.4 |
| Information | (D) | 11 | (D) | 3 | 80 | 75 | (D) | (D) | 1,581 | 1,204 | 9,096 | 7,633 |
| | N/A | <1 | N/A | <1 | 1.8 | 1.6 | N/A | N/A | 1.6 | 1.1 | 1.5 | 1.1 |
| Finance and insurance | 69 | 81 | (D) | (D) | (D) | 146 | 24 | 25 | 4,564 | 5,762 | 25,097 | 29,912 |
| | 2.8 | 2.8 | N/A | N/A | N/A | 3.1 | 3.4 | 4.2 | 4.5 | 5.1 | 4.1 | 4.2 |
| Real estate and rental and leasing | 131 | 205 | 9 | 12 | (D) | 173 | 14 | 15 | 4,780 | 6,642 | 30,470 | 43,224 |
| | 5.3 | 7.1 | 2.3 | 3.0 | N/A | 3.7 | 2 | 2.5 | 4.8 | 5.8 | 4.9 | 6.1 |
| Professional, scientific, and technical services | 91 | 111 | (D) | (D) | 154 | 130 | (D) | (D) | 6,105 | 6,699 | 33,696 | 42,756 |
| | 3.7 | 3.8 | N/A | N/A | 3.4 | 2.8 | N/A | N/A | 6.1 | 5.9 | 5.5 | 6 |

| Sector | Sweet Grass County | | Treasure County | | Valley County | | Wibaux County | | Yellowstone County | | State of Montana | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 |
| Management of companies and enterprises | (D) | 8 | 0 | 0 | (D) | 0 | 0 | 0 | 427 | 741 | 1,995 | 2,966 |
| | N/A | <1 | 0 | 0 | N/A | 0 | 0 | 0 | <1 | <1 | <1 | <1 |
| Administrative and support and waste management and remediation services | (D) | 55 | (D) | 5 | (D) | 163 | (D) | 8 | 6,213 | 5,843 | 26,578 | 28,489 |
| | N/A | 1.9 | N/A | 1.3 | N/A | 3.5 | N/A | 1.3 | 6.2 | 5.1 | 4.3 | 4 |
| Educational services | (D) | (D) | 1 | 1 | (D) | (D) | 1 | 1 | 1,276 | 1,546 | 7,873 | 9,529 |
| | N/A | N/A | <1 | <1 | N/A | N/A | <1 | <1 | 1.3 | 1.4 | 1.3 | 1.3 |
| Health care and social assistance | (D) | (D) | (D) | (D) | (D) | (D) | (D) | 6 | 13,731 | 15,557 | 68,410 | 79,590 |
| | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 1 | 13.7 | 13.7 | 11.1 | 11.2 |
| Arts, entertainment, and recreation | 76 | 71 | (D) | 3 | 59 | 41 | (D) | 5 | 2,761 | 3,113 | 18,628 | 21,488 |
| | 3.1 | 2.5 | N/A | <1 | 1.3 | <1 | N/A | <1 | 2.7 | 2.7 | 3 | 3 |
| Accommodation and food services | 157 | 212 | (D) | (D) | 313 | 401 | (D) | 41 | 8,245 | 9,825 | 49,396 | 60,521 |
| | 6.3 | 7.3 | N/A | N/A | 6.9 | 8.6 | N/A | 6.9 | 8.2 | 8.6 | 8 | 8.5 |
| Other services | 144 | 153 | 17 | 14 | 192 | 181 | 21 | 17 | 5,276 | 6,053 | 31,823 | 35,648 |
| | 5.8 | 5.3 | 4.4 | 3.5 | 4.2 | 3.9 | 3 | 2.9 | 5.2 | 5.3 | 5.2 | 5 |
| Government and government enterprises | 389 | 220 | 79 | 66 | 779 | 787 | 114 | 141 | 9,798 | 10,033 | 97,106 | 95,814 |
| | 15.7 | 7.6 | 20.3 | 16.7 | 17.2 | 16.9 | 16.3 | 23.7 | 9.7 | 8.8 | 15.8 | 13.5 |

Sources: BEA 2010a, 2021a

(D) represents data not shown to avoid disclosure of confidential information; estimates are included in high-level totals.

(N/A) means data are not available, or no information was given.

## Table A-9 (Part 1). Montana Analysis Area Labor Income by Sector, 2010 and 2021 (2021$)

| Sector | Beaverhead County | | Big Horn County | | Blaine County | | Carbon County | | Carter County | | Chouteau County | | Custer County | | State of Montana | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 |
| Personal income (thousands of dollars) | 371,543 | 518,390 | 398,993 | 473,150 | 215,852 | 237,985 | 446,260 | 647,725 | 42,318 | 56,198 | 219,021 | 232,423 | 517,237 | 602,175 | 45,156,400 | 62,886,699 |
| Population (persons) | 9,254 | 9,524 | 12,912 | 12,957 | 6,513 | 6,980 | 10,054 | 10,847 | 1,163 | 1,428 | 5,815 | 5,916 | 11,705 | 11,916 | 990,863 | 1,104,271 |
| Per capita personal income (dollars) | 40,149 | 54,430 | 30,900 | 36,517 | 33,142 | 34,095 | 44,386 | 59,715 | 36,388 | 39,354 | 37,665 | 39,287 | 44,189 | 50,535 | 45,573 | 56,949 |
| Earnings by place of work (thousands of dollars) | 210,457 | 275,065 | 293,840 | 276,320 | 124,259 | 106,879 | 153,812 | 204,761 | 18,334 | 27,408 | 106,441 | 91,287 | 359,129 | 370,658 | 29,752,893 | 38,034,685 |
| Wages and salaries (thousands of dollars) | 141,315 | 180,581 | 208,452 | 197,217 | 62,456 | 62,296 | 91,820 | 123,212 | 11,077 | 15,069 | 50,902 | 55,372 | 244,206 | 241,366 | 19,419,036 | 26,086,727 |
| Supplement to wages and salaries | 41,482 | 49,440 | 59,467 | 60,244 | 20,920 | 20,865 | 26,718 | 31,486 | 3,704 | 4,734 | 15,080 | 15,759 | 64,586 | 61,488 | 5,234,925 | 6,251,082 |
| Proprietors' income | 27,661 | 45,044 | 25,921 | 18,859 | 40,883 | 23,718 | 35,274 | 50,063 | 3,553 | 7,605 | 40,459 | 20,156 | 50,336 | 67,804 | 5,098,932 | 5,696,876 |
| Farm earnings | 13,186 | 21,189 | 14,557 | 12,206 | 33,923 | 20,969 | 207 | 8,840 | 4,379 | 7,169 | 32,782 | 20,083 | 4,668 | (220) | 707,154 | 437,583 |
| Nonfarm earnings | 197,271 | 253,876 | 279,283 | 264,114 | 90,336 | 85,910 | 153,605 | 195,921 | 13,955 | 20,239 | 73,658 | 68,204 | 354,460 | 370,878 | 29,045,739 | 37,597,102 |
| Private nonfarm earnings | 136,070 | 184,140 | 148,120 | 139,669 | 40,965 | 39,406 | 116,926 | 157,333 | 8,661 | 14,298 | 49,616 | 45,872 | 272,614 | 294,084 | 22,587,303 | 30,772,471 |
| **By Industry (Earnings in Thousands of Dollars/Percentage of Nonfarm Earnings)** | | | | | | | | | | | | | | | | |
| Forestry, fishing, and related activities | (D) | 4,231 | (D) | (D) | (D) | (D) | (D) | 14,952 | (D) | (D) | 4,938 | (D) | (D) | (D) | 201,152 | 282,376 |
| | N/A | 1.7 | N/A | N/A | N/A | N/A | N/A | 7.6 | N/A | N/A | 6.7 | N/A | N/A | N/A | <1 | <1 |
| Mining (including quarrying and oil and gas extraction) | (D) | 16,225 | 61,009 | 40,025 | (D) | 971 | 5,979 | 3,359 | (D) | 60 | 11 | (D) | (D) | (D) | 1,213,872 | 933,503 |
| | N/A | 6.4 | 21.8 | 15.2 | N/A | 1.1 | 3.9 | 1.7 | N/A | <1 | <1 | N/A | N/A | N/A | 4.2 | 2.5 |
| Utilities | (D) | (D) | (D) | (D) | (D) | (D) | 3,544 | 3,279 | (D) | (D) | 396 | 281 | (D) | (D) | 397,152 | 390,355 |
| | N/A | N/A | N/A | N/A | N/A | N/A | 2.3 | 1.7 | N/A | N/A | <1 | <1 | N/A | N/A | 1.4 | 1 |
| Construction | 15,007 | (D) | 5,213 | (D) | 4,623 | (D) | 21,296 | 25,592 | (D) | (D) | 5,638 | 2,495 | 50,129 | 26,434 | 2,322,189 | 3,494,985 |
| | 7.6 | N/A | 1.9 | N/A | 5.1 | N/A | 13.9 | 13.1 | N/A | N/A | 7.7 | 3.7 | 14.1 | 7.1 | 8 | 9.3 |
| Manufacturing | 2,523 | 4,099 | 3,101 | (D) | 659 | (D) | 2,720 | 3,403 | 95 | 15 | 1,130 | 2,277 | 3,107 | 4,867 | 1,193,679 | 1,688,847 |
| | 1.3 | 1.6 | 1.1 | N/A | <1 | N/A | 1.8 | 1.7 | <1 | <1 | 1.5 | 3.3 | <1 | 1.3 | 4.1 | 4.5 |
| Wholesale trade | 6,117 | 10,708 | (D) | (D) | 3,534 | 2,710 | 3,481 | 4,852 | (D) | (D) | 4,425 | 5,055 | 9,356 | 13,640 | 1,124,741 | 1,556,606 |
| | 3.1 | 4.2 | N/A | N/A | 3.9 | 3.2 | 2.3 | 2.5 | N/A | N/A | 6 | 7.4 | 2.6 | 3.7 | 3.9 | 4.1 |

| Sector | Beaverhead County | | Big Horn County | | Blaine County | | Carbon County | | Carter County | | Chouteau County | | Custer County | | State of Montana | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 |
| Retail trade | 17,629 | 31,468 | 9,258 | 14,515 | 8,921 | 10,749 | 8,822 | 10,355 | 1,081 | 2,023 | 6,140 | 7,568 | 33,121 | 52,361 | 2,823,559 | 3,333,510 |
| | 8.9 | 12.4 | 3.3 | 5.5 | 9.9 | 12.5 | 5.7 | 5.3 | 7.7 | 10 | 8.3 | 11.1 | 9.3 | 14.1 | 9.7 | 8.9 |
| Transportation and warehousing | (D) | (D) | 5,595 | 7,173 | (D) | (D) | 6,063 | 6,854 | (D) | (D) | 2,284 | 1,738 | (D) | (D) | 1,141,695 | 1,421,264 |
| | N/A | N/A | 2 | 2.7 | N/A | N/A | 3.9 | 3.5 | N/A | N/A | 3.1 | 2.5 | N/A | N/A | 3.9 | 3.8 |
| Information | 2,397 | 1,713 | 1,547 | 810 | (D) | (D) | 2,027 | 1,078 | (D) | (D) | (D) | 224 | 4,466 | 4,257 | 566,122 | 591,752 |
| | 1.2 | <1 | <1 | <1 | N/A | N/A | 1.3 | <1 | N/A | N/A | N/A | <1 | 1.3 | 1.1 | 1.9 | 1.6 |
| Finance and insurance | 8,727 | 9,365 | 4,970 | 3,628 | (D) | (D) | 4,142 | 5,143 | (D) | 40 | 4,380 | 3,296 | 20,794 | 26,829 | 1,338,206 | 1,790,781 |
| | 4.4 | 3.7 | 1.8 | 1.4 | N/A | N/A | 2.7 | 2.6 | N/A | <1 | 5.9 | 4.8 | 5.9 | 7.2 | 4.6 | 4.8 |
| Real estate and rental and leasing | 8,855 | 8,682 | 1,394 | 2,026 | (D) | (D) | 2,520 | 10,566 | 95 | (D) | 1,246 | 2,093 | 2,005 | 8,798 | 545,074 | 1,353,015 |
| | 4.5 | 3.4 | <1 | <1 | N/A | N/A | 1.6 | 5.4 | <1 | N/A | 1.7 | 3.1 | <1 | 2.4 | 1.9 | 3.6 |
| Professional, scientific, and technical services | 6,186 | 8,269 | 5,805 | 4,799 | (D) | 2,640 | 10,059 | (D) | (D) | (D) | 2,193 | (D) | 11,274 | (D) | 1,834,809 | 2,879,811 |
| | 3.1 | 3.3 | 2.1 | 1.8 | N/A | 3.1 | 6.5 | N/A | N/A | N/A | 3 | N/A | 3.2 | N/A | 6.3 | 7.7 |
| Management of companies and enterprises | 0 | - | (D) | (D) | 11 | N/A | (D) | (D) | 0 | N/A | 0 | 0 | 3,620 | (D) | 153,953 | 272,776 |
| | <1 | 0 | N/A | N/A | <1 | N/A | N/A | N/A | <1 | N/A | <1 | 0 | 1 | N/A | <1 | <1 |
| Administrative and support and waste management and remediation services | 3,677 | 2,659 | (D) | (D) | 1,218 | 554 | (D) | 6,573 | (D) | 143 | 431 | (D) | 3,290 | 14,893 | 902,514 | 1,208,555 |
| | 1.9 | 1. | N/A | N/A | 1.3 | <1 | N/A | 3.4 | N/A | <1 | <1 | N/A | <1 | 4 | 3.1 | 3.2 |
| Educational services | (D) | 924 | (D) | (D) | (D) | (D) | 640 | 804 | 54 | 76 | (D) | (D) | 1,297 | (D) | 193,934 | 283,652 |
| | N/A | <1 | N/A | N/A | N/A | N/A | <1 | <1 | <1 | <1 | N/A | N/A | <1 | N/A | <1 | <1 |
| Health care and social assistance | (D) | 34,758 | (D) | (D) | (D) | (D) | 14,589 | 17,198 | (D) | (D) | (D) | (D) | 52,331 | (D) | 4,026,765 | 5,409,554 |
| | N/A | 13.7 | N/A | N/A | N/A | N/A | 9.5 | 8.8 | N/A | N/A | N/A | N/A | 14.8 | N/A | 13.9 | 14.4 |
| Arts, entertainment, and recreation | 2,042 | 4,299 | 2,835 | 3,387 | 249 | 296 | 5,224 | 5,107 | 169 | 266 | 922 | 944 | 3,012 | 3,476 | 373,117 | 559,347 |
| | 1 | 1.7 | 1 | 1.3 | <1 | <1 | 3.4 | 2.6 | 1.2 | 1.3 | 1.3 | 1.4 | <1 | <1 | 1.3 | 1.5 |
| Accommodation and food services | 8,795 | 12,444 | 7,607 | 8,940 | 925 | 793 | 11,296 | 17,456 | 561 | 474 | 1,797 | 2,185 | 15,577 | 20,338 | 1,088,374 | 1,932,422 |
| | 4.5 | 4.9 | 2.7 | 3.4 | 1 | <1 | 7.4 | 8.9 | 4 | 2.3 | 2.4 | 3.2 | 4.4 | 5.5 | 3.7 | 5.1 |
| Other services (except government and government enterprises) | 6,752 | 8,586 | 7,744 | 5,956 | 3,951 | 3,779 | 7,505 | 10,050 | (D) | (D) | (D) | 3,144 | 13,725 | 19,679 | 1,146,396 | 1,389,360 |
| | 3.4 | 3.4 | 2.8 | 2.3 | 4.4 | 4.4 | 4.9 | 5.1 | N/A | N/A | N/A | 4.6 | 3.9 | 5.3 | 3.9 | 3.7 |

| Sector | Beaverhead County | | Big Horn County | | Blaine County | | Carbon County | | Carter County | | Chouteau County | | Custer County | | State of Montana | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 |
| Government and government enterprises | 61,201 | 69,736 | 131,163 | 124,445 | 49,371 | 46,504 | 36,679 | 38,588 | 5,294 | 5,941 | 24,042 | 22,332 | 81,847 | 76,794 | 6,458,437 | 6,824,631 |
| | 31 | 27.5 | 47 | 47.1 | 54.7 | 54.1 | 23.9 | 19.7 | 37.9 | 29.4 | 32.6 | 32.8 | 23.1 | 20.7 | 22.2 | 18.2 |

Sources: BEA 2010b, 2021b
Note: All percentages are rounded to the nearest tenth.
All 2010 dollar values were adjusted for inflation.
(D) represents data not shown to avoid disclosure of confidential information; estimates are included in high-level totals.
(N/A) means data are not available, or no information was given.

## Table A-9 (Part 2). Montana Analysis Area Labor Income by Sector, 2010 and 2021 (2021$)

| Sector | Dawson County | | Fallon County | | Fergus County | | Garfield County | | Madison County | | McCone County | | Musselshell County | | State of Montana | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 |
| Personal income (thousands of dollars) | 386,334 | 422,572 | 160,762 | 148,330 | 492,033 | 542,339 | 44,998 | 45,174 | 335,784 | 664,035 | 76,599 | 80,485 | 188,369 | 242,613 | 45,156,400 | 62,886,699 |
| Population (persons) | 8,961 | 8,904 | 2,894 | 3,017 | 11,594 | 11,617 | 1,190 | 1,209 | 7,690 | 8,917 | 1,747 | 1,718 | 4,557 | 4,896 | 990,863 | 1,104,271 |
| Per capita personal income (dollars) | 43,112 | 47,459 | 55,550 | 49,165 | 42,439 | 46,685 | 37,814 | 37,365 | 43,665 | 74,468 | 43,846 | 46,848 | 41,337 | 49,553 | 45,573 | 56,949 |
| Earnings by place of work (thousands of dollars) | 251,041 | 244,642 | 145,942 | 104,808 | 296,260 | 304,991 | 26,717 | 19,423 | 201,340 | 370,509 | 53,296 | 44,566 | 96,871 | 95,222 | 29,752,893 | 38,034,685 |
| Wages and salaries (thousands of dollars) | 170,703 | 172,469 | 94,229 | 72,194 | 179,393 | 214,669 | 9,913 | 14,324 | 138,498 | 271,448 | 24,917 | 28,682 | 60,947 | 64,155 | 19,419,036 | 26,086,727 |
| Supplement to wages and salaries | 48,022 | 45,942 | 21,769 | 17,667 | 51,258 | 56,089 | 3,452 | 4,675 | 35,645 | 51,974 | 7,491 | 7,873 | 15,309 | 64,155 | 5,234,925 | 6,251,082 |
| Proprietors' income | 32,315 | 26,231 | 29,944 | 14,947 | 65,609 | 34,233 | 13,351 | 424 | 27,196 | 47,087 | 20,887 | 8,011 | 20,616 | 15,018 | 5,098,932 | 5,696,876 |
| Farm earnings | 10,493 | 8,821 | 3,568 | 4,847 | 21,387 | (15,864) | 13,165 | (220) | 10,003 | 8,370 | 19,588 | 7,087 | 4,185 | 2,072 | 707,154 | 437,583 |
| Nonfarm earnings | 240,549 | 235,821 | 142,374 | 99,961 | 274,873 | 320,855 | 13,552 | 19,643 | 191,337 | 362,139 | 33,708 | 37,479 | 92,686 | 93,150 | 29,045,739 | 37,597,102 |
| Private nonfarm earnings | 193,791 | 191,606 | 126,499 | 82,507 | 212,244 | 260,918 | 6,993 | 10,992 | 160,736 | 329,734 | 26,680 | 29,906 | 78,433 | 78,986 | 22,587,303 | 30,772,471 |

| Sector | Dawson County | | Fallon County | | Fergus County | | Garfield County | | Madison County | | McCone County | | Musselshell County | | State of Montana | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 |
| **By Industry (Earnings in Thousands of Dollars/Percentage of Nonfarm Earnings)** | | | | | | | | | | | | | | | | |
| Forestry, fishing, and related activities | (D) | (D) | (D) | (D) | (D) | (D) | (D) | (D) | 3,803 | 4,305 | (D) | (D) | 1,906 | (D) | 201,152 | 282,376 |
| | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 2 | 1.2 | N/A | N/A | 2.1 | N/A | <1 | <1 |
| Mining (including quarrying and oil and gas extraction) | (D) | 9,737 | 43,816 | 25,905 | (D) | (D) | 1 | N/A | 5,049 | 15,324 | 3 | (D) | 33,009 | (D) | 1,213,872 | 933,503 |
| | N/A | 4.1 | 30.8 | 25.9 | N/A | N/A | <1 | N/A | 2.6 | 4.2 | <1 | N/A | 35.6 | N/A | 4.2 | 2.5 |
| Utilities | (D) | (D) | (D) | (D) | (D) | (D) | 14 | 47 | 1,314 | (D) | (D) | (D) | (D) | (D) | 397,152 | 390,355 |
| | N/A | N/A | N/A | N/A | N/A | N/A | <1 | <1 | <1 | N/A | N/A | N/A | N/A | N/A | 1.4 | 1 |
| Construction | 9,200 | 6,994 | 23,483 | 9,028 | 43,285 | 55,839 | (D) | 1,574 | 23,726 | 35,800 | 3,256 | 2,480 | 9,262 | 8,994 | 2,322,189 | 3,494,985 |
| | 3.8 | 3 | 16.5 | 9 | 15.7 | 17.4 | N/A | 8 | 12.4 | 9.6 | 9.7 | 6.6 | 10 | 9.7 | 8 | 9.3 |
| Manufacturing | 2,363 | 2,665 | 972 | 972 | 16,918 | 26,177 | (D) | 259 | 3,888 | 6,720 | (D) | 213 | 1,279 | 696 | 1,193,679 | 1,688,847 |
| | <1 | <1 | <1 | 1 | 6.2 | <1 | N/A | 1.3 | 2 | 1.9 | N/A | <1 | 1.4 | <1 | 4.1 | 4.5 |
| Wholesale trade | 11,195 | (D) | (D) | (D) | 17,166 | 19,799 | (D) | (D) | 1,816 | (D) | 5,455 | 6,418 | 2,260 | 2,758 | 1,124,741 | 1,556,606 |
| | 4.7 | N/A | N/A | N/A | 6.2 | 6.2 | N/A | N/A | <1 | N/A | 16.2 | 17.1 | 2.4 | 3 | 3.9 | 4.1 |
| Retail trade | 20,204 | 21,519 | 5,670 | 5,614 | 21,936 | 22,636 | 1,544 | (D) | 7,354 | 16,998 | 1,830 | 1,492 | 4,800 | 4,511 | 2,823,559 | 3,333,510 |
| | 8.4 | 9.1 | 4 | 5.6 | 8 | 7.1 | 11.4 | N/A | 3.8 | 4.7 | 5.4 | 4 | 5.2 | 4.8 | 9.7 | 8.9 |
| Transportation and warehousing | (D) | 47,209 | 17,106 | 13,750 | (D) | (D) | (D) | (D) | 6,416 | 6,713 | (D) | (D) | (D) | (D) | 1,141,695 | 1,421,264 |
| | N/A | 20 | 12 | 13.8 | N/A | N/A | N/A | N/A | 3.4 | 1.9 | N/A | N/A | N/A | N/A | 3.9 | 3.8 |
| Information | 6,782 | 6,066 | 1,637 | 633 | 3,425 | 2,621 | (D) | (D) | 438 | 12,231 | (D) | (D) | 2,252 | 1,118 | 566,122 | 591,752 |
| | 2.8 | 2.6 | 1.1 | <1 | 1.2 | <1 | N/A | N/A | <1 | 3.4 | N/A | N/A | 2.4 | 1.2 | 1.9 | 1.6 |
| Finance and insurance | 6,217 | 6,139 | (D) | 2,817 | 12,094 | 15,472 | (D) | (D) | 6,386 | 14,148 | (D) | (D) | (D) | (D) | 1,338,206 | 1,790,781 |
| | 2.6 | 2.6 | N/A | 2.8 | 4.4 | 4.8 | N/A | N/A | 3.3 | 3.9 | N/A | N/A | N/A | N/A | 4.6 | 4.8 |
| Real estate and rental and leasing | 3,578 | 4,535 | (D) | 538 | 4,119 | 11,980 | 128 | 466 | 6,304 | 9,011 | (D) | (D) | (D) | (D) | 545,074 | 1,353,015 |
| | 1.5 | 1.9 | N/A | <1 | 1.5 | 3.7 | <1 | 2.4 | 3.3 | 2.5 | N/A | N/A | N/A | N/A | 1.9 | 3.6 |
| Professional, scientific, and technical services | 4,150 | 6,992 | 2,563 | 2,109 | (D) | (D) | 138 | (D) | (D) | 16,162 | (D) | (D) | 1,163 | 2,223 | 1,834,809 | 2,879,811 |
| | 1.7 | 3 | 1.8 | 2.1 | N/A | N/A | 1 | N/A | N/A | 4.5 | N/A | N/A | 1.3 | 2.4 | 6.3 | 7.7 |
| Management of companies and enterprises | (D) | (D) | 0 | 0 | (D) | (D) | 0 | N/A | (D) | 0 | 0 | N/A | 631 | N/A | 153,953 | 272,776 |
| | N/A | N/A | <1 | 0 | N/A | N/A | <1 | N/A | N/A | 0 | <1 | N/A | <1 | N/A | <1 | <1 |
| Administrative and support and waste management and remediation services | (D) | (D) | 1,548 | 777 | 4,586 | (D) | 144 | (D) | 5,366 | 3,882 | 190 | (D) | 1,356 | 476 | 902,514 | 1,208,555 |
| | N/A | N/A | 1.1 | <1 | 1.7 | N/A | 1.1 | N/A | 2.8 | 1.1 | <1 | N/A | 1.5 | <1 | 3.1 | 3.2 |
| Educational services | 160 | (D) | 213 | 100 | (D) | 489 | 70 | 37 | 806 | (D) | 70 | 82 | 232 | 55 | 193,934 | 283,652 |
| | <1 | N/A | <1 | <1 | N/A | <1 | <1 | <1 | <1 | N/A | <1 | <1 | <1 | <1 | <1 | <1 |
| | 36,594 | (D) | 8,582 | 7,247 | (D) | 45,045 | (D) | 613 | 10,454 | (D) | (D) | (D) | 7,552 | 9,550 | 4,026,765 | 5,409,554 |

| Sector | Dawson County | | Fallon County | | Fergus County | | Garfield County | | Madison County | | McCone County | | Musselshell County | | State of Montana | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 |
| Health care and social assistance | 15.2 | N/A | 6 | 7.2 | N/A | 14 | N/A | 3.1 | 5.5 | N/A | N/A | N/A | 8.1 | 10.3 | 13.9 | 14.4 |
| Arts, entertainment, and recreation | 2,647 | 1,779 | (D) | (D) | 1,334 | 1,631 | (D) | (D) | 28,202 | 93,100 | 128 | 53 | (D) | 252 | 373,117 | 559,347 |
| | 1.1 | <1 | N/A | N/A | <1 | <1 | N/A | N/A | 14.7 | 25.7 | <1 | <1 | N/A | <1 | 1.3 | 1.5 |
| Accommodation and food services | 8,332 | 9,720 | (D) | (D) | 10,435 | 13,359 | (D) | (D) | 34,308 | 70,176 | 382 | 526 | (D) | 1,550 | 1,088,374 | 1,932,422 |
| | 3.5 | 4.1 | N/A | N/A | 3.8 | 4.2 | N/A | N/A | 17.9 | 19.4 | 1.1 | 1.4 | N/A | 1.7 | 3.7 | 5.1 |
| Other services (except government and government enterprises) | 10,684 | 7,601 | 7,630 | 4,284 | 12,505 | 10,345 | (D) | (D) | 7,139 | 5,901 | 1,657 | 1,373 | 5,979 | 3,773 | 1,146,396 | 1,389,360 |
| | 4.4 | 3.2 | 5.4 | 4.3 | 4.5 | 3.2 | N/A | N/A | 3.7 | 1.6 | 4.9 | 3.7 | 6.5 | 4.1 | 3.9 | 3.7 |
| Government and government enterprises | 46,758 | 44,215 | 15,875 | 17,454 | 62,628 | 59,937 | 6,559 | 8,651 | 30,601 | 32,405 | 7,028 | 7,573 | 14,253 | 14,164 | 6,458,437 | 6,824,631 |
| | 19.4 | 18.7 | 11.2 | 17.5 | 22.8 | 18.7 | 48.4 | 44 | 16 | 8.9 | 20.8 | 20.2 | 15.4 | 15.2 | 22.2 | 18.2 |

Sources: BEA 2010b, 2021b
Note: All percentages are rounded to the nearest tenth.
All 2010 dollar values were adjusted for inflation.
(D) represents data not shown to avoid disclosure of confidential information; estimates are included in high-level totals.
(N/A) means data are not available, or no information was given.

## Table A-9 (Part 3). Montana Analysis Area Labor Income by Sector, 2010 and 2021 (2021$)

| Sector | Petroleum County | | Phillips County | | Powder River County | | Prairie County | | Roosevelt County | | Rosebud County | | Stillwater County | | State of Montana | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 |
| Personal income (thousands of dollars) | 16,773 | 16,350 | 170,208 | 188,331 | 57,566 | 67,805 | 46,834 | 53,682 | 404,010 | 467,547 | 394,938 | 434,318 | 412,494 | 587,107 | 45,156,400 | 62,886,699 |
| Population (persons) | 489 | 519 | 4,259 | 4,192 | 1,739 | 1,702 | 1,183 | 1,091 | 10,440 | 10,821 | 9,231 | 8,124 | 9,091 | 9,044 | 990,863 | 1,104,271 |
| Per capita personal income (dollars) | 34,300 | 31,503 | 39,964 | 44,926 | 33,103 | 39,838 | 39,590 | 49,204 | 38,698 | 43,207 | 42,784 | 53,461 | 45,374 | 64,917 | 45,573 | 56,949 |
| Earnings by place of work (thousands of dollars) | 10,002 | 6,331 | 92,917 | 84,496 | 28,093 | 33,893 | 18,741 | 21,592 | 248,313 | 248,572 | 325,925 | 291,453 | 270,997 | 371,500 | 29,752,893 | 38,034,685 |
| Wages and salaries (thousands of dollars) | 4,815 | 4,821 | 54,664 | 53,660 | 15,669 | 20,389 | 11,975 | 13,765 | 147,893 | 161,681 | 237,082 | 217,772 | 197,023 | 289,750 | 19,419,036 | 26,086,727 |
| Supplement to wages and salaries | 1,608 | 4,821 | 16,798 | 53,660 | 5,183 | 20,389 | 4,345 | 13,765 | 45,349 | 161,681 | 71,125 | 217,772 | 45,031 | 289,750 | 5,234,925 | 26,086,727 |
| Proprietors' income | 3,579 | (100) | 21,455 | 15,179 | 7,240 | 7,292 | 2,421 | 2,808 | 55,071 | 39,791 | 17,718 | 8,959 | 28,943 | 21,623 | 5,098,932 | 5,696,876 |
| Farm earnings | 3,739 | 919 | 12,293 | 11,007 | -228 | 3,730 | 49 | 1,430 | 30,361 | 19,745 | 11,980 | 8,573 | 7,406 | 4,478 | 707,154 | 437,583 |
| Nonfarm earnings | 6,262 | 5,412 | 80,623 | 73,489 | 28,321 | 30,163 | 18,692 | 20,162 | 217,952 | 228,827 | 313,945 | 282,880 | 263,591 | 367,022 | 29,045,739 | 37,597,102 |
| Private nonfarm earnings | 3,748 | 2,734 | 55,647 | 50,313 | 18,507 | 19,063 | 8,302 | 7,198 | 109,023 | 116,668 | 208,522 | 174,238 | 236,829 | 337,553 | 22,587,303 | 30,772,471 |
| **By Industry (Earnings in Thousands of Dollars/Percentage of Nonfarm Earnings)** | | | | | | | | | | | | | | | | |
| Forestry, fishing, and related activities | (D) | (D) | (D) | (D) | (D) | (D) | (D) | (D) | (D) | (D) | (D) | (D) | 1,362 | (D) | 201,152 | 282,376 |
| | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | <1 | N/A | <1 | <1 |
| Mining (including quarrying and oil and gas extraction) | (D) | (D) | (D) | (D) | (D) | (D) | 14 | 82 | 2,421 | 3,997 | 55,679 | (D) | (D) | (D) | 1,213,872 | 933,503 |
| | N/A | N/A | N/A | N/A | N/A | N/A | <1 | <1 | 1.1 | 1.7 | 17.7 | N/A | N/A | N/A | 4.2 | 2.5 |
| Utilities | 5 | 18 | 1,788 | 2,329 | 19 | 61 | (D) | 18 | 3,112 | 4,021 | (D) | 46,830 | 2,161 | 1,846 | 397,152 | 390,355 |
| | <1 | <1 | 2.2 | 3.2 | <1 | <1 | N/A | <1 | 1.4 | 1.8 | N/A | 16.6 | <1 | <1 | 1.4 | 1 |
| Construction | 173 | (D) | 7,051 | 6,727 | (D) | (D) | (D) | 818 | 16,506 | 8,634 | 17,813 | 27,946 | (D) | 17,494 | 2,322,189 | 3,494,985 |
| | 2.8 | N/A | 8.7 | 9.2 | N/A | N/A | N/A | 4.1 | 7.6 | 3.8 | 5.7 | 9.9 | N/A | 4.8 | 8 | 9.3 |
| Manufacturing | 0 | 23 | 1,150 | 1,678 | (D) | (D) | (D) | 144 | 2,575 | 2,236 | 945 | 416 | 15,941 | 13,307 | 1,193,679 | 1,688,847 |
| | <1 | <1 | 1.4 | 2.3 | N/A | N/A | N/A | <1 | 1.2 | 1 | <1 | <1 | 6 | 3.6 | 4.1 | 4.5 |
| Wholesale trade | 0 | 13 | 2,556 | (D) | (D) | (D) | (D) | (D) | 5,192 | 5,969 | (D) | 174 | 4,443 | 4,833 | 1,124,741 | 1,556,606 |
| | <1 | <1 | 3.2 | N/A | N/A | N/A | N/A | N/A | 2.4 | 2.6 | N/A | <1 | 1.7 | 1.3 | 3.9 | 4.1 |

| Sector | Petroleum County | | Phillips County | | Powder River County | | Prairie County | | Roosevelt County | | Rosebud County | | Stillwater County | | State of Montana | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 |
| Retail trade | (D) | (D) | 6,418 | 7,505 | 2,408 | 4,500 | 848 | 968 | 15,229 | 22,349 | 10,187 | 7,528 | 7,354 | 12,400 | 2,823,559 | 3,333,510 |
| | N/A | N/A | 8 | 10.2 | 8.5 | 14.9 | 4.5 | 4.8 | 7 | 9.8 | 3.2 | 2.7 | 2.8 | 3.4 | 9.7 | 8.9 |
| Transportation and warehousing | (D) | (D) | 8,271 | (D) | (D) | (D) | 869 | (D) | 8,743 | 10,630 | 12,479 | 9,122 | 2,904 | 2,873 | 1,141,695 | 1,421,264 |
| | N/A | N/A | 10.3 | N/A | N/A | N/A | 4.6 | N/A | 4 | 4.6 | 4 | 3.2 | 1.1 | <1 | 3.9 | 3.8 |
| Information | (D) | (D) | 731 | (D) | (D) | (D) | 533 | 158 | 2,496 | 1,674 | 5,115 | 4,424 | 1,485 | 693 | 566,122 | 591,752 |
| | N/A | N/A | <1 | N/A | N/A | N/A | 2.9 | <1 | 1.1 | <1 | 1.6 | 1.6 | <1 | <1 | 1.9 | 1.6 |
| Finance and insurance | 0 | N/A | 3,644 | 3,336 | (D) | (D) | (D) | (D) | 5,790 | 5,389 | 3,459 | 3,294 | 2,874 | 1,416 | 1,338,206 | 1,790,781 |
| | <1 | N/A | 4.5 | 4.5 | N/A | N/A | N/A | N/A | 2.7 | 2.4 | 1.1 | 1.2 | 1.1 | <1 | 4.6 | 4.8 |
| Real estate and rental and leasing | 73 | 102 | 1,997 | 1,660 | (D) | 61 | (D) | (D) | 761 | 542 | 808 | 653 | 1,191 | 5,820 | 545,074 | 1,353,015 |
| | 1.2 | 1.9 | 2.5 | 2.3 | N/A | <1 | N/A | N/A | <1 | <1 | <1 | <1 | <1 | 1.6 | 1.9 | 3.6 |
| Professional, scientific, and technical services | 80 | 30 | (D) | 1,948 | (D) | (D) | 1,061 | 1,163 | 2,582 | (D) | 1,833 | (D) | 9,571 | 8,333 | 1,834,809 | 2,879,811 |
| | 1.3 | <1 | N/A | 2.7 | N/A | N/A | 5.7 | 5.8 | 1.2 | N/A | <1 | N/A | 3.6 | 2.3 | 6.3 | 7.7 |
| Management of companies and enterprises | 0 | N/A | 6 | N/A | 0 | (D) | 0 | N/A | 0 | (D) | 0 | (D) | (D) | (D) | 153,953 | 272,776 |
| | <1 | N/A | <1 | N/A | <1 | N/A | <1 | N/A | <1 | N/A | <1 | N/A | N/A | N/A | <1 | <1 |
| Administrative and support and waste management and remediation services | (D) | 10 | (D) | (D) | (D) | 127 | 179 | 94 | 2,831 | 2,118 | 2,697 | (D) | (D) | (D) | 902,514 | 1,208,555 |
| | N/A | <1 | N/A | N/A | N/A | <1 | <1 | <1 | 1.3 | <1 | <1 | N/A | N/A | N/A | 3.1 | 3.2 |
| Educational services | 26 | N/A | (D) | 13 | 136 | 63 | 93 | 45 | 73 | (D) | (D) | N/A | 308 | (D) | 193,934 | 283,652 |
| | <1 | N/A | N/A | <1 | <1 | <1 | <1 | <1 | <1 | N/A | N/A | N/A | <1 | N/A | <1 | <1 |
| Health care and social assistance | (D) | 188 | (D) | 9,407 | (D) | 548 | 204 | (D) | 22,986 | (D) | (D) | (D) | 8,820 | (D) | 4,026,765 | 5,409,554 |
| | N/A | 3.5 | N/A | 12.8 | N/A | 1.8 | 1.1 | N/A | 10.5 | N/A | N/A | N/A | 3.3 | N/A | 13.9 | 14.4 |
| Arts, entertainment, and recreation | (D) | (D) | (D) | 466 | 457 | 628 | 109 | (D) | (D) | 1,430 | 3,287 | 1,460 | 2,014 | 2,653 | 373,117 | 559,347 |
| | N/A | N/A | N/A | <1 | 1.6 | 2.1 | <1 | N/A | N/A | <1 | 1 | <1 | <1 | <1 | 1.3 | 1.5 |
| Accommodation and food services | (D) | 5 | (D) | 2,970 | 1,072 | 1,014 | 361 | (D) | 6,394 | 6,709 | 4,357 | 3,664 | 4,696 | 6,038 | 1,088,374 | 1,932,422 |
| | N/A | <1 | N/A | 4 | 3.8 | 3.4 | 1.9 | N/A | 2.9 | 2.9 | 1.4 | 1.3 | 1.8 | 1.6 | 3.7 | 5.1 |
| Other services (except government and government enterprises) | (D) | (D) | 4,757 | 4,176 | 1,241 | 1,314 | 661 | 685 | 8,456 | 6,978 | 4,851 | 6,089 | 4,906 | 6,289 | 1,146,396 | 1,389,360 |
| | N/A | N/A | 5.9 | 5.7 | 4.4 | 4.4 | 3.5 | 3.4 | 3.9 | 3 | 1.5 | 2.2 | 1.9 | 1.7 | 3.9 | 3.7 |

| Sector | Petroleum County | | Phillips County | | Powder River County | | Prairie County | | Roosevelt County | | Rosebud County | | Stillwater County | | State of Montana | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 |
| Government and government enterprises | 2,515 | 2,678 | 24,976 | 23,176 | 9,814 | 11,100 | 10,390 | 12,964 | 108,929 | 112,159 | 105,423 | 108,642 | 26,762 | 29,469 | 6,458,437 | 6,824,631 |
| | 40.2 | 49.5 | 31 | 31.5 | 34.7 | 36.8 | 55.6 | 64.3 | 50 | 49 | 33.6 | 38.4 | 10.2 | 8 | 22.2 | 18.2 |

Sources: BEA 2010b, 2021b
Note: All percentages are rounded to the nearest tenth.
All 2010 dollar values were adjusted for inflation.
(D) represents data not shown to avoid disclosure of confidential information; estimates are included in high-level totals.
(N/A) means data are not available, or no information was given

## Table A-9 (Part 4). Montana Analysis Area Labor Income by Sector, 2010 and 2021 (2021$)

| Sector | Sweet Grass County | | Treasure County | | Valley County | | Wibaux County | | Yellowstone County | | State of Montana | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 |
| Personal income (thousands of dollars) | 147,615 | 215,383 | 34,685 | 38,174 | 328,366 | 426,146 | 42,912 | 45,676 | 7,342,028 | 9,930,988 | 45,156,400 | 62,886,699 |
| Population (persons) | 3,617 | 3,723 | 716 | 768 | 7,383 | 7,537 | 1,008 | 934 | 148,451 | 167,146 | 990,863 | 1,104,271 |
| Per capita personal income (dollars) | 40,812 | 57,852 | 48,442 | 49,706 | 44,476 | 56,541 | 42,571 | 48,904 | 49,457 | 59,415 | 45,573 | 56,949 |
| Earnings by place of work (thousands of dollars) | 88,445 | 127,682 | 15,956 | 17,710 | 194,482 | 251,161 | 25,325 | 22,888 | 5,446,780 | 6,963,050 | 29,752,893 | 38,034,685 |
| Wages and salaries (thousands of dollars) | 63,525 | 98,180 | 6,748 | 8,396 | 123,119 | 149,817 | 12,039 | 11,744 | 3,803,424 | 4,945,455 | 19,419,036 | 26,086,727 |
| Supplement to wages and salaries | 16,213 | 98,180 | 2,248 | 8,396 | 36,166 | 149,817 | 3,806 | 11,744 | 953,042 | 4,945,455 | 5,234,925 | 26,086,727 |
| Proprietors' income | 8,707 | 7,801 | 6,960 | 6,708 | 35,197 | 59,312 | 9,481 | 7,140 | 690,315 | 890,270 | 5,098,932 | 5,696,876 |
| Farm earnings | 2,593 | 3,897 | 5,390 | 8,151 | 23,865 | 44,596 | 3,570 | 3,619 | 14,855 | 8,902 | 707,154 | 437,583 |
| Nonfarm earnings | 91,038 | 131,579 | 10,566 | 9,559 | 170,617 | 206,565 | 21,755 | 19,269 | 5,431,925 | 6,954,148 | 29,045,739 | 37,597,102 |
| Private nonfarm earnings | 72,332 | 119,091 | 7,539 | 6,800 | 122,612 | 153,599 | 16,947 | 11,792 | 4,703,956 | 6,184,009 | 22,587,303 | 30,772,471 |

| Sector | Sweet Grass County | | Treasure County | | Valley County | | Wibaux County | | Yellowstone County | | State of Montana | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 |
| **By Industry (Earnings in Thousands of Dollars/Percentage of Nonfarm Earnings)** | | | | | | | | | | | | |
| Forestry, fishing, and related activities | (D) | (D) | 525 | (D) | (D) | (D) | (D) | (D) | 5,951 | 24,405 | 201,152 | 282,376 |
| | N/A | N/A | 5 | N/A | N/A | N/A | N/A | N/A | <1 | <1 | <1 | <1 |
| Mining (including quarrying and oil and gas extraction) | (D) | (D) | 0 | N/A | (D) | N/A | (D) | (D) | 147,617 | 172,074 | 1,213,872 | 933,503 |
| | N/A | N/A | <1 | N/A | N/A | N/A | N/A | N/A | 2.7 | 2.5 | 4.2 | 2.5 |
| Utilities | (D) | (D) | (D) | (D) | 3,555 | 3,841 | (D) | (D) | 42,769 | 36,517 | 397,152 | 390,355 |
| | N/A | N/A | N/A | N/A | 2.1 | 1.9 | N/A | N/A | <1 | <1 | 1.4 | 1 |
| Construction | 11,484 | 12,665 | (D) | (D) | 9,299 | 11,640 | (D) | 993 | 440,607 | 565,853 | 2,322,189 | 3,494,985 |
| | 12.6 | 9.6 | N/A | N/A | 5.5 | 5.6 | N/A | 5.2 | 8.1 | 8.1 | 8 | 9.3 |
| Manufacturing | 3,083 | 4,628 | (D) | 25 | 1,729 | 1,024 | 215 | (D) | 312,943 | 407,865 | 1,193,679 | 1,688,847 |
| | 3.4 | 3.5 | N/A | <1 | 1 | <1 | <1 | N/A | 5.8 | 5.9 | 4.1 | 4.5 |
| Wholesale trade | 2,218 | 1,528 | 1,235 | 1,525 | 8,218 | 8,833 | (D) | (D) | 395,488 | 517,014 | 1,124,741 | 1,556,606 |
| | 2.4 | 1.2 | 11.7 | 16 | 4.8 | 4.3 | N/A | N/A | 7.3 | 7.4 | 3.9 | 4.1 |
| Retail trade | 4,869 | 5,011 | (D) | (D) | 15,431 | 11,475 | 1,380 | (D) | 440,051 | 518,990 | 2,823,559 | 3,333,510 |
| | 5.3 | 3.8 | N/A | N/A | 9 | 5.6 | 6.3 | N/A | 8.1 | 7.5 | 9.7 | 8.9 |
| Transportation and warehousing | (D) | (D) | (D) | (D) | 16,957 | 18,784 | 3,372 | (D) | 256,677 | 363,984 | 1,141,695 | 1,421,264 |
| | N/A | N/A | N/A | N/A | 9.9 | 9.1 | 15.5 | N/A | 4.7 | 5.2 | 3.9 | 3.8 |
| Information | (D) | 449 | (D) | 26 | 4,641 | 4,276 | (D) | (D) | 109,048 | 86,459 | 566,122 | 591,752 |
| | N/A | <1 | N/A | <1 | 2.7 | 2.1 | N/A | N/A | 2 | 1.2 | 1.9 | 1.6 |
| Finance and insurance | 2,180 | 2,756 | (D) | (D) | (D) | 8,358 | 629 | 432 | 293,700 | 368,412 | 1,338,206 | 1,790,781 |
| | 2.4 | 2.1 | N/A | N/A | N/A | 4 | 2.9 | 2.2 | 5.4 | 5.3 | 4.6 | 4.8 |
| Real estate and rental and leasing | 1,569 | 4,155 | 205 | 200 | (D) | 3,640 | 341 | 452 | 139,598 | 323,268 | 545,074 | 1,353,015 |
| | 1.7 | 3.2 | 1.9 | 2.1 | N/A | 1.8 | 1.6 | 2.3 | 2.6 | 4.6 | 1.9 | 3.6 |
| Professional, scientific, and technical services | 2,512 | 5,051 | (D) | (D) | 5,033 | 7,476 | (D) | (D) | 415,063 | 553,331 | 1,834,809 | 2,879,811 |
| | 2.8 | 3.8 | N/A | N/A | 2.9 | 3.6 | N/A | N/A | 7.6 | 8 | 6.3 | 7.7 |
| Management of companies and enterprises | (D) | 425 | 0 | N/A | (D) | N/A | 0 | N/A | 35,745 | 65,296 | 153,953 | 272,776 |
| | N/A | <1 | <1 | N/A | N/A | N/A | <1 | N/A | <1 | <1 | <1 | <1 |
| Administrative and support and waste management and remediation services | (D) | 1,349 | (D) | 62 | (D) | 7,033 | (D) | 142 | 214,827 | 268,185 | 902,514 | 1,208,555 |
| | N/A | 1 | N/A | <1 | N/A | 3.4 | N/A | <1 | 4 | 3.9 | 3.1 | 3.2 |
| Educational services | (D) | (D) | 16 | 10 | (D) | (D) | 36 | 29 | 32,471 | 47,570 | 193,934 | 283,652 |
| | N/A | N/A | <1 | <1 | N/A | N/A | <1 | <1 | <1 | <1 | <1 | <1 |
| Health care and social assistance | (D) | (D) | (D) | (D) | (D) | (D) | (D) | 425 | 978,412 | 1,243,338 | 4,026,765 | 5,409,554 |
| | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 2.2 | 18 | 19.9 | 13.9 | 14.4 |
| Arts, entertainment, and recreation | 803 | 1,319 | (D) | 27 | 991 | 961 | (D) | 67 | 53,348 | 71,642 | 373,117 | 559,347 |
| | <1 | 1 | N/A | <1 | <1 | <1 | N/A | <1 | <1 | 1 | 1.3 | 1.5 |

| Sector | Sweet Grass County | | Treasure County | | Valley County | | Wibaux County | | Yellowstone County | | State of Montana | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 |
| Accommodation and food services | 3,201 | 4,933 | (D) | (D) | 5,335 | 12,477 | (D) | 770 | 191,651 | 292,385 | 1,088,374 | 1,932,422 |
| | 3.5 | 3.7 | N/A | N/A | 3.1 | 6 | N/A | 4 | 3.5 | 4.2 | 3.7 | 5.1 |
| Other services (except government and government enterprises) | 3,449 | 4,315 | 465 | 359 | 4,276 | 5,437 | 657 | 617 | 197,990 | 257,421 | 1,146,396 | 1,389,360 |
| | 3.8 | 3.3 | 4.4 | 3.8 | 2.5 | 2.6 | 3 | 3.2 | 3.6 | 3.7 | 3.9 | 3.7 |
| Government and government enterprises | 18,706 | 12,488 | 3,028 | 2,759 | 48,005 | 52,966 | 4,809 | 7,477 | 727,968 | 770,139 | 6,458,437 | 6,824,631 |
| | 20.5 | 9.5 | 28.7 | 28.9 | 28.1 | 25.6 | 22.1 | 38.8 | 13.4 | 11.1 | 22.2 | 18.2 |

Sources: BEA 2010b, 2021b
Note: All percentages are rounded to the nearest tenth.
All 2010 dollar values were adjusted for inflation.
(D) represents data not shown to avoid disclosure of confidential information; estimates are included in high-level totals.
(N/A) means data are not available, or no information was given.

## Table A-10 (Part 1). Nevada Analysis Area Employment by Sector (2010 and 2021)

| Sector | Churchill County | | Elko County | | Eureka County | | Humboldt County | | Lander County | | State of Nevada | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 |
| Total employment (number of jobs) | 11,946 | 13,314 | 26,706 | 28,005 | 4,715 | 4,662 | 10,161 | 9,914 | 3,694 | 4,204 | 1,478,054 | 1,875,709 |
| Wage and salary employment | 9,151 | 10,451 | 21,930 | 22,729 | 4,427 | 4,361 | 8,142 | 8,146 | 3,118 | 3,668 | 1,153,901 | 1,409,465 |
| Proprietors employment | 2,795 | 2,863 | 4,776 | 5,276 | 288 | 301 | 2,019 | 1,768 | 576 | 536 | 324,153 | 466,244 |
| Farm proprietors employment | 575 | 505 | 439 | 402 | 78 | 69 | 266 | 254 | 96 | 95 | 3,254 | 2,982 |
| Nonfarm proprietors employment | 2,220 | 2,358 | 4,337 | 4,874 | 210 | 232 | 1,753 | 1,514 | 480 | 441 | 320,899 | 463,262 |
| Farm employment | 777 | 693 | 675 | 605 | 157 | 140 | 536 | 522 | 164 | 165 | 5,354 | 5,028 |
| Nonfarm employment | 11,169 | 12,621 | 26,031 | 27,400 | 4,558 | 4,522 | 9,625 | 9,392 | 3,530 | 4,039 | 1,472,700 | 1,870,681 |
| Private nonfarm employment | 8,211 | 9,276 | 22,126 | 23,639 | 4,339 | 4,304 | 8,117 | 7,800 | 2,975 | 3,479 | 1,303,611 | 1,693,540 |
| **By Industry (Number of Jobs/Percentage of Total Employment)** | | | | | | | | | | | | |
| Forestry, fishing, and related activities | (D) | (D) | (D) | 250 | (D) | (D) | (D) | 141 | (D) | (D) | 1,585 | 1,937 |
| | N/A | N/A | N/A | <1 | N/A | N/A | N/A | 1.4 | N/A | N/A | <1 | <1 |
| Mining (including quarrying and oil and gas extraction) | (D) | 134 | 2,261 | 2,449 | 3,868 | (D) | 1,926 | 2,095 | 1,662 | (D) | 17,025 | 18,132 |
| | N/A | 1 | 8.5 | 8.7 | 82 | N/A | 19 | 21.1 | 45 | N/A | 1.2 | 1 |
| Utilities | 115 | 87 | 106 | 155 | 78 | 77 | (D) | 118 | (D) | (D) | 4,542 | 4,526 |
| | 1 | <1 | <1 | <1 | 1.7 | 1.7 | N/A | 1.2 | N/A | N/A | <1 | <1 |
| Construction | 635 | 949 | 1,878 | 1,830 | (D) | (D) | 710 | 384 | (D) | (D) | 75,642 | 120,249 |
| | 5.3 | 7.1 | 7 | 6.5 | N/A | N/A | 7 | 3.9 | N/A | N/A | 5.1 | 6.4 |
| Manufacturing | 332 | 604 | 272 | 259 | 12 | (D) | 297 | 320 | (D) | (D) | 41,664 | 66,978 |
| | 2.8 | 4.5 | 1 | <1 | <1 | N/A | 2.9 | 3.2 | N/A | N/A | 2.8 | 3.6 |
| Wholesale trade | 202 | 182 | 954 | 1,356 | (D) | 7 | 139 | 177 | (D) | (D) | 37,488 | 43,982 |
| | 1.7 | 1.4 | 3.6 | 4.8 | N/A | <1 | 1.4 | 1.8 | N/A | N/A | 2.5 | 2.3 |
| Retail trade | 1,138 | 1,374 | 2,778 | 3,318 | 56 | (D) | 1,154 | 1,241 | 290 | 321 | 152,353 | 185,306 |
| | 9.5 | 10.3 | 10.4 | 11.8 | 1.2 | N/A | 11.4 | 12.5 | 7.9 | 7.6 | 10.3 | 9.9 |

| Sector | Churchill County | | Elko County | | Eureka County | | Humboldt County | | Lander County | | State of Nevada | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 |
| Transportation and warehousing | 823 | 947 | 731 | 884 | (D) | (D) | (D) | 358 | 210 | 85 | 53,215 | 137,427 |
| | 6.9 | 7.1 | 2.7 | 3.2 | N/A | N/A | N/A | 3.6 | 5.7 | 2 | 3.6 | 7.3 |
| Information | 128 | 90 | 189 | 138 | (D) | 4 | 93 | 63 | 7 | (D) | 17,692 | 21,137 |
| | 1.1 | <1 | <1 | <1 | N/A | <1 | <1 | <1 | <1 | N/A | 1.2 | 1.1 |
| Finance and insurance | 343 | 331 | 644 | 598 | (D) | (D) | 177 | 128 | (D) | (D) | 83,023 | 103,909 |
| | 2.9 | 2.5 | 2.4 | 2.1 | N/A | N/A | 1.7 | 1.3 | N/A | N/A | 5.6 | 5.5 |
| Real estate and rental and leasing | 468 | 464 | 867 | 1,061 | (D) | (D) | 227 | 283 | (D) | 81 | 94,364 | 110,419 |
| | 3.9 | 3.5 | 3.2 | 3.8 | N/A | N/A | 2.2 | 2.9 | N/A | 1.9 | 6.4 | 5.9 |
| Professional, scientific, and technical services | 389 | 503 | 843 | 1,078 | 23 | (D) | (D) | (D) | (D) | (D) | 81,695 | 109,638 |
| | 3.3 | 3.8 | 3.2 | 3.8 | <1 | N/A | N/A | N/A | N/A | N/A | 5.5 | 5.8 |
| Management of companies and enterprises | 5 | 5 | 304 | 303 | (D) | 0 | (D) | (D) | 0 | 0 | 21,738 | 32,573 |
| | <1 | <1 | 1.1 | 1.1 | N/A | 0 | N/A | N/A | 0 | 0 | 1.5 | 1.7 |
| Administrative and support and waste management and remediation services | 638 | 593 | 800 | 852 | (D) | (D) | 437 | 262 | (D) | (D) | 95,137 | 132,423 |
| | 5.3 | 4.5 | 3 | 3 | N/A | N/A | 4.3 | 2.6 | N/A | N/A | 6.4 | 7.1 |
| Educational services | 85 | (D) | (D) | 162 | (D) | 7 | (D) | (D) | 10 | 8 | 13,960 | 21,845 |
| | <1 | N/A | N/A | <1 | N/A | <1 | N/A | N/A | <1 | <1 | <1 | 1.2 |
| Health care and social assistance | 1,047 | (D) | 1,642 | 1,916 | (D) | 10 | (D) | (D) | 44 | 39 | 109,665 | 160,792 |
| | 8.8 | N/A | 6.1 | 6.8 | N/A | <1 | N/A | N/A | 1.2 | <1 | 7.4 | 8.6 |
| Arts, entertainment, and recreation | 450 | 413 | 715 | 640 | 11 | 6 | 166 | 170 | (D) | (D) | 46,697 | 55,322 |
| | 3.8 | 3.1 | 2.7 | 2.3 | <1 | <1 | 1.6 | 1.7 | N/A | N/A | 3.2 | 2.9 |
| Accommodation and food services | 705 | 774 | 5,495 | 4,919 | 59 | 57 | 1,059 | 1,029 | (D) | (D) | 290,878 | 276,961 |
| | 5.9 | 5.8 | 20.6 | 17.6 | 1.3 | 1.2 | 10.4 | 10.4 | N/A | N/A | 19.7 | 14.8 |
| Other services | 578 | 582 | 1,315 | 1,471 | 44 | (D) | 431 | 464 | 87 | 147 | 65,248 | 89,984 |
| | 4.8 | 4.4 | 4.9 | 5.3 | 0.9 | N/A | 4.2 | 4.7 | 2.4 | 3.5 | 4.4 | 4.8 |
| Government and government enterprises | 2,958 | 3,345 | 3,905 | 3,761 | 219 | 218 | 1,508 | 1,592 | 555 | 560 | 169,089 | 177,141 |
| | 24.8 | 25.1 | 14.6 | 13.4 | 4.6 | 4.7 | 14.8 | 16.1 | 15 | 13.3 | 11.4 | 9.4 |

Sources: BEA 2010a, 2021a

Note: All percentages are rounded to the nearest tenth.

(D) represents data not shown to avoid disclosure of confidential information; estimates are included in high-level totals.

(N/A) means data are not available, or no information was given.

**Table A-10 (Part 2). Nevada Analysis Area Employment by Sector (2010 and 2021)**

| Sector | Lincoln County | | Nye County | | Pershing County | | Washoe County | | White Pine County | | State of Nevada | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 |
| Total employment (number of jobs) | 2,109 | 2,406 | 14,938 | 17,889 | 2,175 | 2,641 | 250,062 | 306,029 | 6,076 | 5,513 | 1,478,054 | 1,875,709 |
| Wage and salary employment | 1,532 | 1,701 | 11,061 | 13,254 | 1,693 | 2,091 | 191,013 | 232,803 | 4,085 | 4,427 | 1,153,901 | 1,409,465 |
| Proprietors employment | 577 | 705 | 3,877 | 4,635 | 482 | 550 | 59,049 | 73,226 | 1,991 | 1,086 | 324,153 | 466,244 |
| Farm proprietors employment | 135 | 141 | 155 | 130 | 120 | 111 | 407 | 357 | 121 | 124 | 3,254 | 2,982 |
| Nonfarm proprietors employment | 442 | 564 | 3,722 | 4,505 | 362 | 439 | 58,642 | 72,869 | 1,870 | 962 | 320,899 | 463,262 |
| Farm employment | 212 | 229 | 245 | 177 | 230 | 215 | 514 | 474 | 194 | 192 | 5,354 | 5,028 |
| Nonfarm employment | 1,897 | 2,177 | 14,693 | 17,712 | 1,945 | 2,426 | 249,548 | 305,555 | 5,882 | 5,321 | 1,472,700 | 1,870,681 |
| Private nonfarm employment | 1,265 | 1,556 | 12,622 | 15,676 | 1,214 | 1,742 | 220,473 | 276,563 | 4,381 | 4,073 | 1,303,611 | 1,693,540 |
| **By Industry (Number of Jobs/Percentage of Total Employment)** | | | | | | | | | | | | |
| Forestry, fishing, and related activities | (D) | (D) | (D) | 95 | (D) | (D) | 215 | 312 | (D) | (D) | 1,585 | 1,937 |
| | N/A | N/A | N/A | 0.5 | N/A | N/A | 0.1 | 0.1 | N/A | N/A | <1 | <1 |
| Mining (including quarrying and oil and gas extraction) | 34 | (D) | 1,035 | 1,235 | 354 | 885 | 1,648 | 1,181 | (D) | 1,417 | 17,025 | 18,132 |
| | 1.6 | N/A | 6.9 | 6.9 | 16.3 | 33.5 | <1 | <1 | N/A | 25.7 | 1.2 | 1 |
| Utilities | (D) | (D) | 109 | 228 | (D) | 0 | 542 | 541 | (D) | (D) | 4,542 | 4,526 |
| | N/A | N/A | 0.7 | 1.3 | N/A | 0 | <1 | <1 | N/A | N/A | <1 | <1 |
| Construction | (D) | (D) | 624 | 988 | 25 | (D) | 12,011 | 22,322 | 169 | 183 | 75,642 | 120,249 |
| | N/A | N/A | 4.2 | 5.5 | 1.1 | N/A | 4.8 | 7.3 | 2.8 | 3.3 | 5.1 | 6.4 |
| Manufacturing | (D) | (D) | 189 | 259 | 89 | (D) | 11,578 | 15,447 | 54 | 50 | 41,664 | 66,978 |
| | N/A | N/A | 1.3 | 1.4 | 4.1 | N/A | 4.6 | 5 | <1 | <1 | 2.8 | 3.6 |
| Wholesale trade | (D) | 21 | 167 | 209 | (D) | (D) | 9,824 | 10,821 | 75 | (D) | 37,488 | 43,982 |
| | N/A | 0.9 | 1.1 | 1.2 | N/A | N/A | 3.9 | 3.5 | 1.2 | N/A | 2.5 | 2.3 |
| Retail trade | 244 | (D) | 1,793 | 2,365 | 191 | 212 | 25,917 | 29,485 | 558 | 564 | 152,353 | 185,306 |
| | 11.6 | N/A | 12 | 13.2 | 8.8 | 8 | 10.4 | 9.6 | 9.2 | 10.2 | 10.3 | 9.9 |

| Sector | Lincoln County | | Nye County | | Pershing County | | Washoe County | | White Pine County | | State of Nevada | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 |
| Transportation and warehousing | 42 | (D) | 247 | 482 | 44 | (D) | 11,413 | 23,030 | (D) | 109 | 53,215 | 137,427 |
| | 2 | N/A | 1.7 | 2.7 | 2 | N/A | 4.6 | 7.5 | N/A | 2 | 3.6 | 7.3 |
| Information | (D) | 29 | 134 | 194 | (D) | (D) | 3,234 | 3,657 | 39 | 21 | 17,692 | 21,137 |
| | N/A | 1.2 | <1 | 1.1 | N/A | N/A | 1.3 | 1.2 | <1 | <1 | 1.2 | 1.1 |
| Finance and insurance | 69 | 74 | 480 | 454 | (D) | 35 | 14,356 | 16,389 | 109 | 92 | 83,023 | 103,909 |
| | 3.3 | 3.1 | 3.2 | 2.5 | N/A | 1.3 | 5.7 | 5.4 | 1.8 | 1.7 | 5.6 | 5.5 |
| Real estate and rental and leasing | 55 | 83 | 777 | 867 | (D) | (D) | 18,110 | 22,298 | 984 | 169 | 94,364 | 110,419 |
| | 2.6 | 3.4 | 5.2 | 4.8 | N/A | N/A | 7.2 | 7.3 | 16.2 | 3.1 | 6.4 | 5.9 |
| Professional, scientific, and technical services | 286 | (D) | 1,769 | 1,862 | 49 | 61 | 16,833 | 21,167 | 116 | (D) | 81,695 | 109,638 |
| | 13.6 | N/A | 11.8 | 10.4 | 2.3 | 2.3 | 6.7 | 6.9 | 1.9 | N/A | 5.5 | 5.8 |
| Management of companies and enterprises | (D) | 0 | 45 | 60 | (D) | (D) | 3,920 | 4,231 | 41 | (D) | 21,738 | 32,573 |
| | N/A | 0 | <1 | <1 | N/A | N/A | 1.6 | 1.4 | <1 | N/A | 1.5 | 1.7 |
| Administrative and support and waste management and remediation services | (D) | (D) | 1,005 | 1,239 | (D) | (D) | 15,155 | 20,710 | 119 | 165 | 95,137 | 132,423 |
| | N/A | N/A | 6.7 | 6.9 | N/A | N/A | 6.1 | 6.8 | 2 | 3 | 6.4 | 7.1 |
| Educational services | 8 | (D) | (D) | (D) | (D) | 9 | 3,009 | 3,952 | (D) | 13 | 13,960 | 21,845 |
| | <1 | N/A | N/A | N/A | N/A | <1 | 1.2 | 1.3 | N/A | <1 | <1 | 1.2 |
| Health care and social assistance | 70 | (D) | (D) | (D) | (D) | (D) | 23,455 | 29,244 | (D) | 209 | 109,665 | 160,792 |
| | 3.3 | N/A | N/A | N/A | N/A | N/A | 9.4 | 9.6 | N/A | 3.8 | 7.4 | 8.6 |
| Arts, entertainment, and recreation | (D) | (D) | 710 | 715 | 11 | (D) | 8,417 | 8,235 | 56 | 62 | 46,697 | 55,322 |
| | N/A | N/A | 4.8 | 4 | <1 | N/A | 3.4 | 2.7 | <1 | 1.1 | 3.2 | 2.9 |
| Accommodation and food services | (D) | (D) | 1,509 | 1,697 | 148 | (D) | 29,452 | 29,589 | 536 | 537 | 290,878 | 276,961 |
| | N/A | N/A | 10.1 | 9.5 | 6.8 | N/A | 11.8 | 9.7 | 8.8 | 9.7 | 19.7 | 14.8 |
| Other services | (D) | (D) | 830 | 1,090 | 73 | 83 | 11,384 | 13,952 | 181 | 160 | 65,248 | 89,984 |
| | N/A | N/A | 5.6 | 6.1 | 3.4 | 3.1 | 4.6 | 4.6 | 3 | 2.9 | 4.4 | 4.8 |
| Government and government enterprises | 632 | 621 | 2,071 | 2,036 | 731 | 684 | 29,075 | 28,992 | 1,501 | 1,248 | 169,089 | 177,141 |
| | 30 | 25.8 | 13.9 | 11.4 | 33.6 | 25.9 | 11.6 | 9.5 | 24.7 | 22.6 | 11.4 | 9.4 |

Sources: BEA 2010a, 2021a

Note: All percentages are rounded to the nearest tenth.

(D) represents data not shown to avoid disclosure of confidential information; estimates are included in high-level totals.

(N/A) means data are not available, or no information was given.

## Table A-11 (Part 1). Nevada Analysis Area Labor Income by Sector, 2010 and 2021 (2021$)

| Sector | Churchill County | | Elko County | | Eureka County | | Humboldt County | | Lander County | | State of Nevada | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 |
| Personal income (thousands of dollars) | 1,045,616 | 1,407,718 | 2,526,098 | 2,844,208 | 81,408 | 2,844,208 | 850,755 | 945,297 | 334,080 | 420,418 | 126,861,149 | 189,308,244 |
| Population (persons) | 24,820 | 25,723 | 49,109 | 53,915 | 1,985 | 53,915 | 16,588 | 17,648 | 5,800 | 5,798 | 2,701,967 | 3,143,991 |
| Per capita personal income (dollars) | 42,128 | 54,726 | 51,438 | 52,754 | 41,012 | 52,754 | 51,287 | 53,564 | 57,599 | 72,511 | 46,952 | 60,213 |
| Earnings by place of work (thousands of dollars) | 691,119 | 867,906 | 1,737,203 | 1,769,968 | 556,653 | 561,959 | 726,249 | 684,448 | 316,902 | 385,183 | 89,557,454 | 117,154,278 |
| Wages and salaries (thousands of dollars) | 469,384 | 592,207 | 1,220,117 | 1,356,519 | 452,224 | 464,229 | 494,531 | 517,152 | 233,796 | 297,028 | 63,062,442 | 84,993,156 |
| Supplement to wages and salaries | 153,886 | 184,610 | 306,393 | 306,601 | 95,679 | 90,661 | 132,109 | 131,763 | 57,604 | 66,685 | 16,119,324 | 19,168,471 |
| Proprietors' income | 67,849 | 91,089 | 210,694 | 106,848 | 8,749 | 7,069 | 99,609 | 35,533 | 25,501 | 21,470 | 10,375,688 | 12,992,651 |
| Farm earnings | 16,356 | 29,692 | 22,595 | 17,945 | 3,256 | 4,787 | 29,838 | 7,183 | 4,256 | 14,357 | 181,052 | 183,317 |
| Nonfarm earnings | 674,763 | 838,214 | 1,714,608 | 1,752,023 | 553,397 | 557,172 | 696,411 | 677,265 | 312,645 | 370,826 | 89,376,402 | 116,970,961 |
| Private nonfarm earnings | 415,207 | 522,523 | 1,396,479 | 1,447,371 | 535,999 | 539,648 | 572,254 | 533,904 | 269,484 | 325,343 | 73,135,025 | 100,121,248 |
| **By Industry (Earnings in Thousands of Dollars/Percentage of Nonfarm Earnings)** | | | | | | | | | | | | |
| Forestry, fishing, and related activities | (D) | (D) | (D) | 4,792 | (D) | (D) | (D) | 4,687 | (D) | (D) | 25,259 | 32,921 |
| | N/A | N/A | N/A | <1 | N/A | N/A | N/A | <1 | N/A | N/A | <1 | <1 |
| Mining (including quarrying and oil and gas extraction) | (D) | 4,984 | 257,123 | 286,046 | 505,769 | (D) | 223,934 | 256,227 | 199,327 | (D) | 1,555,806 | 1,902,870 |
| | N/A | <1 | 15 | 16.3 | 91.4 | N/A | 32.2 | 37.8 | 63.8 | N/A | 1.7 | 1.6 |
| Utilities | 18,933 | 13,116 | 12,601 | 21,122 | 13,122 | 13,069 | (D) | 20,348 | (D) | (D) | 705,186 | 699,228 |
| | 2.8 | 1.6 | <1 | 1.2 | 2.4 | 2.4 | N/A | 3 | N/A | N/A | <1 | <1 |
| Construction | 37,286 | 75,550 | 224,168 | 160,279 | (D) | (D) | 80,856 | 24,925 | (D) | (D) | 8,579,831 | 10,028,444 |
| | 5.5 | 9 | 13.1 | 9.1 | N/A | N/A | 11.6 | 3.7 | N/A | N/A | 9.6 | 8.6 |
| Manufacturing | 20,856 | 57,362 | 15,765 | 13,671 | 6 | (D) | 18,205 | 22,496 | (D) | (D) | 3,095,377 | 5,749,340 |

| Sector | Churchill County | | Elko County | | Eureka County | | Humboldt County | | Lander County | | State of Nevada | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 |
| | 3.1 | 6.8 | <1 | <1 | <1 | N/A | 2.6 | 3.3 | N/A | N/A | 3.5 | 4.9 |
| Wholesale trade | 7,957 | 14,789 | 89,795 | 144,108 | (D) | 7 | 10,415 | 16,026 | (D) | (D) | 3,087,708 | 4,297,271 |
| | 1.2 | 1.8 | 5.2 | 8.2 | N/A | <1 | 1.5 | 2.4 | N/A | N/A | 3.5 | 3.7 |
| Retail trade | 47,235 | 47,800 | 111,966 | 130,709 | 3,283 | (D) | 68,691 | 47,329 | 20,469 | 12,320 | 5,970,063 | 8,561,779 |
| | 7 | 5.7 | 6.5 | 7.5 | <1 | N/A | 9.9 | 7 | 6.5 | 7.5 | 6.7 | 7.3 |
| Transportation and warehousing | 77,361 | 86,223 | 60,814 | 61,873 | (D) | (D) | (D) | 30,083 | 14,681 | 7,402 | 3,657,820 | 6,219,710 |
| | 11.5 | 10.3 | 3.5 | 3.5 | N/A | N/A | N/A | 4.4 | 4.7 | 2 | 4.1 | 5.3 |
| Information | 8,734 | 5,894 | 10,371 | 7,394 | (D) | 263 | 4,497 | 3,392 | 988 | (D) | 1,951,646 | 2,648,163 |
| | 1.3 | <1 | <1 | <1 | N/A | <1 | <1 | <1 | <1 | N/A | 2.2 | 2.3 |
| Finance and insurance | 14,167 | 14,075 | 22,225 | 25,583 | (D) | (D) | 4,372 | 4,427 | (D) | (D) | 3,029,518 | 5,408,498 |
| | 2.1 | 1.7 | 1.3 | 1.5 | N/A | N/A | <1 | <1 | N/A | N/A | 3.4 | 4.6 |
| Real estate and rental and leasing | 3,528 | 12,753 | 18,806 | 17,407 | (D) | (D) | 3,988 | 3,901 | (D) | 1,629 | 943,646 | 2,661,141 |
| | <1 | 1.5 | 1.1 | 1 | N/A | N/A | <1 | <1 | N/A | <1 | 1.1 | 2.3 |
| Professional, scientific, and technical services | 18,075 | 29,499 | 47,501 | 64,536 | 467 | (D) | (D) | (D) | (D) | (D) | 6,378,194 | 8,637,282 |
| | 2.7 | 5.6 | 2.8 | 4.5 | <1 | N/A | N/A | N/A | N/A | N/A | 7.1 | 8.6 |
| Management of companies and enterprises | 311 | 794 | 54,082 | 79,763 | (D) | N/A | (D) | (D) | 0 | N/A | 2,717,043 | 4,841,375 |
| | <1 | <1 | 3.2 | 5.5 | N/A | N/A | N/A | N/A | <1 | N/A | 3 | 4.8 |
| Administrative and support and waste management and remediation services | 33,240 | 26,286 | 26,630 | 37,767 | (D) | (D) | 21,462 | 10,132 | (D) | (D) | 3,709,803 | 5,498,172 |
| | 4.9 | 3.1 | 1.6 | 2.2 | N/A | N/A | 3.1 | 1.5 | N/A | N/A | 4.2 | 4.7 |
| Educational services | 3,227 | (D) | (D) | 3,775 | (D) | 30 | (D) | (D) | 178 | 137 | 678,968 | 979,134 |
| | <1 | N/A | N/A | <1 | N/A | <1 | N/A | N/A | <1 | <1 | <1 | <1 |
| Health care and social assistance | 60,634 | (D) | 102,271 | 116,835 | (D) | 30 | (D) | (D) | 2,913 | 1,388 | 7,906,142 | 11,228,471 |
| | 9 | N/A | 6 | 7 | N/A | <2 | N/A | N/A | <1 | <1 | 8.8 | 9.6 |
| Arts, entertainment, and recreation | 26,209 | 15,709 | 80,308 | 16,615 | 1,915 | 189 | 5,854 | 3,907 | (D) | (D) | 2,291,151 | 3,467,806 |
| | 3.9 | 1.9 | 4.7 | <1 | <1 | <1 | <1 | <1 | N/A | N/A | 2.6 | 3 |
| Accommodation and food services | 14,829 | 26,792 | 200,633 | 195,880 | 1,021 | 1,001 | 31,251 | 39,165 | (D) | (D) | 14,004,096 | 13,589,399 |
| | 2.2 | 3.2 | 11.7 | 11.2 | <1 | <1 | 4.5 | 5.8 | N/A | N/A | 15.7 | 11.6 |
| Other services (except government and government enterprises) | 20,809 | 19,243 | 56,062 | 59,216 | 751 | (D) | 17,997 | 23,308 | 4,782 | 9,789 | 2,847,767 | 3,670,244 |
| | 3.1 | 2.3 | 3.3 | 3.4 | <1 | N/A | 2.6 | 3.4 | 1.5 | 2.6 | 3.2 | 3.1 |

| Sector | Churchill County | | Elko County | | Eureka County | | Humboldt County | | Lander County | | State of Nevada | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 |
| Government and government enterprises | 259,556 | 315,691 | 318,129 | 304,652 | 17,397 | 17,524 | 124,156 | 143,361 | 43,161 | 45,483 | 16,241,376 | 16,849,713 |
| | 38.5 | 37.7 | 18.6 | 17.4 | 3.1 | 3.1 | 17.8 | 21.2 | 13.8 | 12.3 | 18.2 | 14.4 |

Sources: BEA 2010b, 2021b
Note: All percentages are rounded to the nearest tenth.
(D) represents data not shown to avoid disclosure of confidential information; estimates are included in higher-level totals.
(N/A) means data are not available, or no information was given.

## Table A-11 (Part 2). Nevada Analysis Area Labor Income by Sector, 2010 and 2021 (2021$)

| Sector | Lincoln County | | Nye County | | Pershing County | | Washoe County | | White Pine County | | State of Nevada | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 |
| Personal income (thousands of dollars) | 183,352 | 241,041 | 1,817,973 | 2,287,433 | 199,032 | 267,534 | 23,193,051 | 35,246,181 | 484,890 | 516,409 | 126,861,149 | 189,308,244 |
| Population (persons) | 5,333 | 4,525 | 43,932 | 53,450 | 6,736 | 6,741 | 422,183 | 493,392 | 10,017 | 9,182 | 2,701,967 | 3,143,991 |
| Per capita personal income (dollars) | 34,380 | 53,269 | 41,382 | 42,796 | 29,548 | 39,688 | 54,936 | 71,436 | 48,407 | 56,241 | 46,952 | 60,213 |
| Earnings by place of work (thousands of dollars) | 109,690 | 124,265 | 1,039,611 | 2,287,433 | 131,255 | 190,461 | 15,833,956 | 20,077,626 | 378,205 | 394,944 | 89,557,454 | 117,154,278 |
| Wages and salaries (thousands of dollars) | 68,970 | 78,272 | 625,223 | 753,277 | 89,514 | 144,050 | 10,188,037 | 14,546,215 | 223,264 | 282,365 | 63,062,442 | 84,993,156 |
| Supplement to wages and salaries | 25,590 | 26,744 | 164,358 | 179,460 | 32,369 | 40,376 | 2,794,286 | 3,233,297 | 76,582 | 79,354 | 16,119,324 | 19,168,471 |
| Proprietors' income | 15,131 | 19,249 | 250,029 | 151,629 | 9,372 | 6,035 | 2,851,633 | 2,298,114 | 78,359 | 33,225 | 10,375,688 | 12,992,651 |
| Farm earnings | 1,271 | 14,856 | 37,153 | 39,155 | 10,334 | 12,480 | 10,576 | 14,358 | 1,992 | 10,140 | 181,052 | 183,317 |
| Nonfarm earnings | 108,419 | 109,409 | 1,002,458 | 1,045,211 | 120,922 | 177,981 | 15,823,380 | 384,804 | 376,213 | 183,317 | 89,376,402 | 116,970,961 |
| Private nonfarm earnings | 61,093 | 62,405 | 825,141 | 895,543 | 60,877 | 119,742 | 13,073,857 | 268,747 | 241,037 | 116,970,961 | 73,135,025 | 100,121,248 |
| **By Industry (Earnings in Thousands of Dollars/Percentage of Nonfarm Earnings)** | | | | | | | | | | | | |
| Forestry, fishing, and related activities | (D) | (D) | (D) | 2,516 | (D) | (D) | 1,230 | 4,577 | (D) | (D) | 25,259 | 32,921 |
| | N/A | N/A | N/A | <1 | N/A | N/A | <1 | <1 | N/A | N/A | <1 | <1 |
| Mining (including quarrying and oil and gas extraction) | 629 | (D) | 103,288 | 141,117 | 33,086 | 97,951 | 92,950 | 49,839 | (D) | 160,370 | 1,555,806 | 1,902,870 |
| | <1 | N/A | 10.3 | 13.5 | 27.4 | 55 | <1 | <1 | N/A | 41.7 | 1.7 | 1.6 |

| Sector | Lincoln County | | Nye County | | Pershing County | | Washoe County | | White Pine County | | State of Nevada | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 |
| Utilities | (D) | (D) | 17,321 | 34,582 | (D) | N/A | 90,165 | 88,439 | (D) | (D) | 705,186 | 699,228 |
| | N/A | N/A | 1.7 | 3.3 | N/A | N/A | <1 | <1 | N/A | N/A | <1 | <1 |
| Construction | (D) | (D) | 29,504 | 49,383 | 602 | (D) | 1,440,852 | 2,152,457 | 21,056 | 19,719 | 8,579,831 | 10,028,444 |
| | N/A | N/A | 2.9 | 4.7 | <1 | N/A | 9.1 | 10.7 | 5.6 | 5.1 | 9.6 | 8.6 |
| Manufacturing | (D) | (D) | 7,033 | 18,090 | 3,303 | (D) | 921,157 | 1,279,737 | 725 | 980 | 3,095,377 | 5,749,340 |
| | N/A | N/A | <1 | 1.7 | 2.7 | N/A | 5.8 | 6.4 | <1 | <1 | 3.5 | 4.9 |
| Wholesale trade | (D) | 463 | 7,786 | 10,516 | (D) | (D) | 792,398 | 986,909 | 3,779 | (D) | 3,087,708 | 4,297,271 |
| | N/A | <1 | <1 | 1 | N/A | N/A | 5 | 4.9 | 1 | N/A | 3.5 | 3.7 |
| Retail trade | 11,551 | (D) | 225,854 | 93,746 | 6,820 | 5,290 | 901,792 | 1,297,884 | 46,136 | 15,954 | 5,970,063 | 8,561,779 |
| | 10.7 | N/A | 22.5 | 9 | 5.6 | 3 | 5.7 | 6.5 | 12.3 | 4.1 | 6.7 | 7.3 |
| Transportation and warehousing | 3,307 | (D) | 14,373 | 36,494 | 2,239 | (D) | 753,073 | 1,401,811 | (D) | 9,277 | 3,657,820 | 6,219,710 |
| | 3.1 | N/A | 1.4 | 3.5 | 1.9 | N/A | 4.8 | 7 | N/A | 2.4 | 4.1 | 5.3 |
| Information | (D) | 2,243 | 6,460 | 10,293 | (D) | (D) | 597,314 | 417,008 | 1,528 | 1,427 | 1,951,646 | 2,648,163 |
| | N/A | 2.1 | <1 | 1 | N/A | N/A | 3.8 | 2.1 | <1 | <1 | 2.2 | 2.3 |
| Finance and insurance | 2,295 | 2,267 | 7,396 | 10,005 | (D) | 616 | 636,871 | 1,082,367 | 4,016 | 3,371 | 3,029,518 | 5,408,498 |
| | 2.1 | 2.1 | <1 | 1 | N/A | <1 | 4 | 5.4 | 1.1 | <1 | 3.4 | 4.6 |
| Real estate and rental and leasing | 382 | 226 | 3,936 | 15,496 | (D) | (D) | 126,032 | 250,235 | -179 | 2,160 | 943,646 | 2,661,141 |
| | <1 | <1 | <1 | 1.5 | N/A | N/A | <1 | 1.2 | <1 | <1 | 1.1 | 2.3 |
| Professional, scientific, and technical services | 21,487 | (D) | 184,622 | 191,487 | 1,544 | 1,701 | 1,214,916 | 1,893,203 | 2,553 | (D) | 6,378,194 | 8,637,282 |
| | 19.8 | N/A | 18.4 | 18.3 | 1.3 | 1.4 | 7.7 | 10.9 | <1 | N/A | 7.1 | 8.6 |
| Management of companies and enterprises | (D) | N/A | 2,437 | 1,757 | (D) | (D) | 460,610 | 727,211 | 3,485 | (D) | 2,717,043 | 4,841,375 |
| | N/A | N/A | <1 | <1 | N/A | N/A | 2.9 | 4.2 | <1 | N/A | 3 | 4.8 |
| Administrative and support and waste management and remediation services | (D) | (D) | 78,035 | 78,698 | (D) | (D) | 589,615 | 1,063,768 | 2,766 | 5,713 | 3,709,803 | 5,498,172 |
| | N/A | N/A | 7.8 | 7.5 | N/A | N/A | 3.7 | 5.3 | <1 | 1.5 | 4.2 | 4.7 |
| Educational services | 11 | (D) | (D) | (D) | (D) | 2 | 114,799 | 164,178 | (D) | 50 | 678,968 | 979,134 |
| | <1 | N/A | N/A | N/A | N/A | <1 | <1 | <1 | N/A | <1 | <1 | <1 |
| Health care and social assistance | 2,628 | (D) | (D) | (D) | (D) | (D) | 1,762,921 | 2,172,356 | (D) | 8,643 | 7,906,142 | 11,228,471 |
| | 2.4 | N/A | N/A | N/A | N/A | N/A | 11.1 | 10.8 | N/A | 2.2 | 8.8 | 9.6 |
| Arts, entertainment, and recreation | (D) | (D) | 20,609 | 34,751 | 1,493 | (D) | 1,040,008 | 399,923 | 23,945 | 2,490 | 2,291,151 | 3,467,806 |
| | N/A | N/A | 2.1 | 3.3 | 1.2 | N/A | 6.6 | 2 | 6.4 | <1 | 2.6 | 3 |
| Accommodation and food services | (D) | (D) | 39,105 | 48,157 | 2,915 | (D) | 1,018,057 | 1,226,612 | 13,492 | 17,692 | 14,004,096 | 13,589,399 |
| | N/A | N/A | 3.9 | 4.6 | 2.4 | N/A | 6.4 | 6.1 | 3.6 | 4.6 | 15.7 | 11.6 |
| Other services (except government and government enterprises) | (D) | (D) | 23,795 | 30,928 | 2,606 | 1,535 | 519,095 | 666,499 | 7,259 | 6,079 | 2,847,767 | 3,670,244 |
| | N/A | N/A | 2.4 | 3 | 2.2 | <1 | 3.3 | 3.3 | 1.9 | 1.6 | 3.2 | 3.1 |

| Sector | Lincoln County | | Nye County | | Pershing County | | Washoe County | | White Pine County | | State of Nevada | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 |
| Government and government enterprises | 47,326 | 47,004 | 177,317 | 149,668 | 60,045 | 58,239 | 2,749,522 | 2,738,255 | 135,176 | 116,057 | 16,241,376 | 16,849,713 |
| | 43.7 | 43 | 17.7 | 14.3 | 49.7 | 32.7 | 17.4 | 13.6 | 35.9 | 30.2 | 18.2 | 14.4 |

Sources: BEA 2010b, 2021b
Note: All percentages are rounded to the nearest tenth.
(D) represents data not shown to avoid disclosure of confidential information; estimates are included in higher-level totals.
(N/A) means data are not available, or no information was given.

## Table A-12. North Dakota Analysis Area Employment by Sector (2010 and 2021)

| Sector | Bowman County | | Slope County | | State of North Dakota | |
|---|---|---|---|---|---|---|
| | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 |
| Total employment (number of jobs) | 2,428 | 2,228 | 486 | 470 | 503,813 | 566,374 |
| Wage and salary employment | 1,572 | 1,453 | 211 | 156 | 392,040 | 434,811 |
| Proprietors employment | 856 | 775 | 275 | 314 | 111,773 | 131,563 |
| Farm proprietors employment | 306 | 278 | 196 | 184 | 26,923 | 22,987 |
| Nonfarm proprietors employment | 550 | 497 | 79 | 130 | 84,850 | 108,576 |
| Farm employment | 366 | 350 | 226 | 222 | 31,652 | 29,425 |
| Nonfarm employment | 2,062 | 1,878 | 260 | 248 | 472,161 | 536,949 |
| Private nonfarm employment | 1,797 | 1,603 | 224 | 207 | 387,382 | 447,439 |
| **By Industry (Number of Jobs/Percentage of Total Employment)** | | | | | | |
| Forestry, fishing, and related activities | (D) | (D) | (D) | (D) | 4,401 | 4,887 |
| | N/A | N/A | N/A | N/A | <1 | <1 |
| Mining (including quarrying and oil and gas extraction) | 129 | 50 | 67 | (D) | 13,858 | 18,022 |
| | 5.3 | 2.2 | 13.8 | N/A | 2.8 | 3.2 |
| Utilities | (D) | (D) | 1 | 1 | 3,502 | 3,388 |
| | N/A | N/A | <1 | <1 | <1 | <1 |
| Construction | 161 | (D) | 6 | 7 | 29,925 | 34,650 |
| | 6.6 | N/A | 1.2 | 1.5 | 5.9 | 6.1 |
| Manufacturing | 31 | (D) | 3 | 7 | 23,815 | 27,786 |
| | 1.3 | N/A | <1 | 1.5 | 4.7 | 4.9 |
| Wholesale trade | 201 | 198 | (D) | 3 | 22,116 | 23,976 |
| | 8.3 | 8.9 | N/A | <1 | 4.4 | 4.2 |
| Retail trade | 260 | 232 | 6 | 12 | 53,725 | 56,544 |
| | 10.7 | 10.4 | 1.2 | 2.6 | 10.7 | 10 |
| Transportation and warehousing | (D) | (D) | (D) | 14 | 16,793 | 25,417 |
| | N/A | N/A | N/A | 3.0 | 3.3 | 4.5 |

| Sector | Bowman County | | Slope County | | State of North Dakota | |
|---|---|---|---|---|---|---|
| | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 |
| Information | 34 | 17 | 2 | 3 | 8,152 | 6,496 |
| | 1.4 | <1 | <1 | <1 | 1.6 | 1.1 |
| Finance and insurance | (D) | (D) | 9 | 14 | 24,416 | 28,261 |
| | N/A | N/A | 1.9 | 3 | 4.8 | 5 |
| Real estate and rental and leasing | (D) | (D) | 7 | 15 | 16,761 | 26,852 |
| | N/A | N/A | 1.4 | 3.2 | 3.3 | 4.7 |
| Professional, scientific, and technical services | 69 | 86 | (D) | 8 | 18,884 | 23,214 |
| | 2.8 | 3.9 | N/A | 1.7 | 3.7 | 4.1 |
| Management of companies and enterprises | (D) | (D) | 0 | 0 | 4,517 | 4,590 |
| | N/A | N/A | 0 | 0 | <1 | <1 |
| Administrative and support and waste management and remediation services | (D) | (D) | 6 | 8 | 16,413 | 18,147 |
| | N/A | N/A | 1.2 | 1.7 | 3.3 | 3.2 |
| Educational services | 11 | 11 | (D) | 3 | 5,786 | 6,540 |
| | <1 | <1 | N/A | <1 | 1.1 | 1.2 |
| Health care and social assistance | 259 | 267 | 4 | 6 | 59,475 | 69,282 |
| | 10.7 | 12 | <1 | 1.3 | 11.8 | 12.2 |
| Arts, entertainment, and recreation | (D) | 25 | 3 | 5 | 7,080 | 9,389 |
| | N/A | 1.1 | <1 | 1.1 | 1.4 | 1.7 |
| Accommodation and food services | (D) | 134 | (D) | (D) | 32,902 | 34,974 |
| | N/A | 6 | N/A | N/A | 6.5 | 6.2 |
| Other services | 111 | 131 | (D) | (D) | 24,861 | 25,024 |
| | 4.6 | 5.9 | N/A | N/A | 4.9 | 4.4 |
| Government and government enterprises | 265 | 275 | 36 | 41 | 84,779 | 89,510 |
| | 10.9 | 12.3 | 7.4 | 8.7 | 16.8 | 15.8 |

Sources: BEA 2010a, 2021a
(D) represents data not shown to avoid disclosure of confidential information; estimates are included in higher-level totals.
(N/A) means data are not available, or no information was given.

**Table A-13. North Dakota Analysis Area Labor Income by Sector, 2010 and 2021 (2021$)**

| Sector | Bowman County | | Slope County | | State of North Dakota | |
|---|---|---|---|---|---|---|
| | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 |
| Personal income (thousands of dollars) | 217,582 | 223,731 | 64,116 | 55,386 | 37,418,041 | 50,002,860 |
| Population (persons) | 3,142 | 2,903 | 731 | 690 | 675,054 | 774,948 |
| Per capita personal income (dollars) | 69,249 | 77,069 | 87,710 | 80,270 | 55,429 | 64,524 |
| Earnings by place of work (thousands of dollars) | 139,327 | 130,222 | 50,698 | 31,588 | 28,755,681 | 36,463,231 |
| Wages and salaries (thousands of dollars) | 66,803 | 64,191 | 13,782 | 8,241 | 18,460,145 | 24,245,559 |
| Supplement to wages and salaries | 15,006 | 15,293 | 2,493 | 2,035 | 4,458,848 | 5,707,439 |
| Proprietors' income | 57,518 | 50,738 | 34,423 | 21,312 | 5,836,687 | 6,510,233 |
| Farm earnings | 36,604 | 29,994 | 32,497 | 16,191 | 2,658,021 | 2,799,968 |
| Nonfarm earnings | 102,723 | 100,228 | 18,201 | 15,397 | 26,097,660 | 33,663,263 |
| Private nonfarm earnings | 88,809 | 85,557 | 16,937 | 13,444 | 20,650,976 | 27,373,788 |
| **By Industry (Earnings in Thousands of Dollars/Percentage of Nonfarm Earnings)** | | | | | | |
| Forestry, fishing, and related activities | (D) | (D) | (D) | (D) | 163,720 | 172,947 |
| | N/A | N/A | N/A | N/A | <1 | <1 |
| Mining (including quarrying and oil and gas extraction) | 10,739 | 4,212 | 7,086 | (D) | 1,343,011 | 1,914,580 |
| | 10.5 | 4.2 | 38.9 | N/A | 5.1 | 5.7 |
| Utilities | (D) | (D) | -24 | (185) | 462,965 | 525,295 |
| | N/A | N/A | <1 | -1.2 | 1.8 | 1.6 |
| Construction | 12,139 | (D) | 619 | 615 | 2,294,695 | 2,576,881 |
| | 11.8 | N/A | 3.4 | 4 | 8.8 | 7.7 |
| Manufacturing | 1,545 | (D) | 63 | 225 | 1,639,806 | 2,358,421 |
| | 1.5 | N/A | <1 | 1.5 | 6.3 | 7 |
| Wholesale trade | 16,707 | 18,447 | (D) | 1,023 | 1,834,880 | 2,238,107 |
| | 16.3 | 18.4 | N/A | 6.6 | 7 | 6.6 |
| Retail trade | 8,932 | 8,070 | 661 | 1,352 | 1,822,570 | 2,227,319 |
| | 8.7 | 8.1 | 3.6 | 8.8 | 7 | 6.6 |
| Transportation and warehousing | (D) | (D) | (D) | 784 | 1,205,636 | 1,821,656 |
| | N/A | N/A | N/A | 5.1 | 4.6 | 5.4 |
| Information | 1,390 | 138 | 187 | (22) | 640,038 | 627,386 |
| | 1.4 | <1 | 1 | <-1 | 2.5 | 1.3 |
| Finance and insurance | (D) | (D) | 94 | 84 | 1,272,817 | 1,748,208 |
| | N/A | N/A | <1 | <1 | 4.9 | 5.2 |

| Sector | Bowman County | | Slope County | | State of North Dakota | |
|---|---|---|---|---|---|---|
| | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 |
| Real estate and rental and leasing | (D) | (D) | 73 | 315 | 723,300 | 1,069,593 |
| | N/A | N/A | <1 | <1 | 2.8 | <1 |
| Professional, scientific, and technical services | 3,528 | 4,599 | (D) | 222 | 1,128,010 | 1,602,197 |
| | 3.4 | 4.6 | N/A | 1.4 | 4.3 | 4.8 |
| Management of companies and enterprises | (D) | (D) | 0 | N/A | 418,491 | 519,749 |
| | N/A | N/A | <1 | N/A | 1.6 | 1.5 |
| Administrative and support and waste management and remediation services | (D) | (D) | 109 | 380 | 531,624 | 780,464 |
| | N/A | N/A | <1 | 2.5 | 2 | 2.3 |
| Educational services | 258 | 170 | (D) | 64 | 146,655 | 183,430 |
| | <1 | <1 | N/A | <1 | <1 | <1 |
| Health care and social assistance | 12,318 | 14,332 | 144 | 169 | 3,297,522 | 4,746,838 |
| | 12 | 14.3 | <1 | 1.1 | 12.6 | 14.1 |
| Arts, entertainment, and recreation | (D) | 333 | 28 | 61 | 105,846 | 178,155 |
| | N/A | <1 | <1 | <1 | <1 | <1 |
| Accommodation and food services | (D) | 2,770 | (D) | (D) | 672,207 | 995,010 |
| | N/A | 2.8 | N/A | N/A | 2.6 | 3 |
| Other services (except government and government enterprises) | 4,949 | 5,624 | (D) | (D) | 947,184 | 1,087,552 |
| | 4.8 | 5.6 | N/A | N/A | 3.6 | 3.2 |
| Government and government enterprises | 13,914 | 14,671 | 1,265 | 1,953 | 5,446,684 | 6,289,475 |
| | 13.5 | 14.6 | 6.9 | 12.7 | 20.9 | 18.7 |

Sources: BEA 2010b, 2021b

Note: All percentages are rounded to the nearest tenth.

All 2010 dollar values were adjusted for inflation.

(D) represents data not shown to avoid disclosure of confidential information; estimates are included in high-level totals.

(N/A) means data are not available, or no information was given.

## Table A-14 (Part 1). Oregon Analysis Area Employment by Sector (2010 and 2021)

| Sector | Baker County | | Crook County | | Deschutes County | | Grant County | | State of Oregon | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 |
| Total employment (number of jobs) | 8,518 | 8,759 | 9,036 | 11,217 | 90,538 | 130,681 | 3,778 | 3,863 | 2,174,324 | 2,559,454 |
| Wage and salary employment | 5,600 | 5,988 | 5,955 | 7,401 | 62,259 | 89,924 | 2,557 | 2,642 | 1,676,367 | 1,952,352 |
| Proprietors employment | 2,918 | 2,771 | 3,081 | 3,816 | 28,279 | 40,757 | 1,221 | 1,221 | 497,957 | 607,102 |
| Farm proprietors employment | 614 | 632 | 565 | 572 | 1,304 | 1,310 | 372 | 381 | 34,460 | 34,950 |
| Nonfarm proprietors employment | 2,304 | 2,139 | 2,516 | 3,244 | 26,975 | 39,447 | 849 | 840 | 463,497 | 572,152 |
| Farm employment | 906 | 953 | 773 | 781 | 1,617 | 1,677 | 486 | 501 | 67,704 | 69,840 |
| Nonfarm employment | 7,612 | 7,806 | 8,263 | 10,436 | 88,921 | 129,004 | 3,292 | 3,362 | 2,106,620 | 2,489,614 |
| Private nonfarm employment | 6,395 | 6,645 | 7,057 | 9,113 | 80,104 | 119,197 | 2,223 | 2,331 | 1,818,680 | 2,201,646 |
| **By Industry (Number of Jobs/Percentage of Total Employment)** | | | | | | | | | | |
| Forestry, fishing, and related activities | (D) | (D) | 245 | (D) | 760 | 980 | 221 | (D) | 29,117 | 32,073 |
| | N/A | N/A | 2.7 | N/A | <1 | <1 | 5.8 | N/A | 1.3 | 1.3 |
| Mining (including quarrying and oil and gas extraction) | (D) | (D) | 48 | (D) | 311 | 278 | 20 | (D) | 4,836 | 4,442 |
| | N/A | N/A | <1 | N/A | <1 | <1 | <1 | N/A | <1 | <1 |
| Utilities | 75 | 118 | (D) | (D) | 318 | 348 | (D) | (D) | 4,863 | 5,199 |
| | <1 | 1.3 | N/A | N/A | <1 | <1 | N/A | N/A | <1 | <1 |
| Construction | 432 | 479 | 495 | 1,296 | 6,170 | 11,503 | 209 | (D) | 102,550 | 150,262 |
| | 5.1 | 5.5 | 5.5 | 11.6 | 6.8 | 8.8 | 5.5 | N/A | 4.7 | 5.9 |
| Manufacturing | 573 | 680 | 786 | 828 | 4,318 | 6,795 | (D) | (D) | 176,802 | 201,963 |
| | 6.7 | 7.8 | 8.7 | 7.4 | 4.8 | 5.2 | N/A | N/A | 8.1 | 7.9 |
| Wholesale trade | 114 | 119 | 753 | 373 | 1,846 | 2,930 | 53 | 49 | 80,544 | 81,845 |
| | 1.3 | 1.4 | 8.3 | 3.3 | 2 | 2.2 | 1.4 | 1.3 | 3.7 | 3.2 |
| Retail trade | 998 | 1,106 | 828 | 982 | 11,532 | 14,930 | 364 | 388 | 227,763 | 259,680 |
| | 11.7 | 12.6 | 9.2 | 8.8 | 12.7 | 11.4 | 9.6 | 10.0 | 10.5 | 10.1 |
| Transportation and warehousing | 248 | 220 | (D) | (D) | 1,365 | 4,026 | (D) | (D) | 61,071 | 123,175 |
| | 2.9 | 2.5 | N/A | N/A | 1.5 | 3.1 | N/A | N/A | 2.8 | 4.8 |
| Information | 94 | 66 | 51 | 412 | 1,811 | 2,248 | 49 | 67 | 40,248 | 43,247 |
| | 1.1 | <1 | <1 | 3.7 | 2 | 1.7 | 1.3 | 1.7 | 1.9 | 1.7 |

| Sector | Baker County | | Crook County | | Deschutes County | | Grant County | | State of Oregon | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 |
| Finance and insurance | 269 | 221 | 214 | 185 | 4,111 | 5,903 | 84 | 74 | 90,623 | 101,551 |
| | 3.2 | 2.5 | 2.4 | 1.6 | 4.5 | 4.5 | 2.2 | 1.9 | 4.2 | 4.0 |
| Real estate and rental and leasing | 390 | 414 | 461 | 665 | 6,955 | 9,270 | (D) | 100 | 102,732 | 125,673 |
| | 4.6 | 4.7 | 5.1 | 5.9 | 7.7 | 7.1 | N/A | 2.6 | 4.7 | 4.9 |
| Professional, scientific, and technical services | 313 | 336 | 293 | 592 | 6,307 | 10,665 | 98 | 119 | 131,571 | 176,991 |
| | 3.7 | 3.8 | 3.2 | 5.3 | 7 | 8.2 | 2.6 | 3.1 | 6.1 | 6.9 |
| Management of companies and enterprises | 58 | 28 | 93 | 44 | 331 | 1,311 | 0 | (D) | 31,608 | 50,637 |
| | <1 | <1 | 1 | <1 | <1 | 1 | 0 | N/A | 1.5 | 2 |
| Administrative and support and waste management and remediation services | 208 | 253 | 296 | 454 | 5,482 | 6,825 | 120 | (D) | 111,105 | 129,993 |
| | 2.4 | 2.9 | 3.3 | 4 | 6.1 | 5.2 | 3.2 | N/A | 5.1 | 5.1 |
| Educational services | 51 | (D) | 71 | 108 | 1,414 | 2,009 | (D) | 8 | 53,197 | 49,509 |
| | <1 | N/A | <1 | <1 | 1.6 | 1.5 | N/A | <1 | 2.4 | 1.9 |
| Health care and social assistance | 1,020 | (D) | 697 | 880 | 10,817 | 16,390 | (D) | 228 | 252,065 | 308,939 |
| | 12 | N/A | 7.7 | 7.8 | 11.9 | 12.5 | N/A | 5.9 | 11.6 | 12.1 |
| Arts, entertainment, and recreation | (D) | 99 | 145 | 161 | 3,084 | 4,070 | (D) | 74 | 52,546 | 57,662 |
| | N/A | 1.1 | 1.6 | 1.4 | 3.4 | 3.1 | N/A | 1.9 | 2.4 | 2.3 |
| Accommodation and food services | (D) | 637 | 518 | 833 | 7,950 | 11,327 | (D) | 217 | 153,331 | 173,376 |
| | N/A | 7.3 | 5.7 | 7.4 | 8.8 | 8.7 | N/A | 5.6 | 7.1 | 6.8 |
| Other services | 531 | 466 | 514 | 639 | 5,222 | 7,389 | 169 | 174 | 112,108 | 125,429 |
| | 6.2 | 5.3 | 5.7 | 5.7 | 5.8 | 5.7 | 4.5 | 4.5 | 5.2 | 4.9 |
| Government and government enterprises | 1,217 | 1,161 | 1,206 | 1,323 | 8,817 | 9,807 | 1,069 | 1,031 | 287,940 | 287,968 |
| | 14.3 | 13.3 | 13.3 | 11.8 | 9.7 | 7.5 | 28.3 | 26.7 | 13.2 | 11.3 |

Sources: BEA 2010a, 2021a

Note: (D) represents data not shown to avoid disclosure of confidential information; estimates are included in higher-level totals.
(N/A) means data are not available, or no information was given.

**Table A-14 (Part 2). Oregon Analysis Area Employment by Sector (2010 and 2021)**

| Sector | Harney County | | Lake County | | Malheur County | | Union County | | State of Oregon | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 |
| Total employment (number of jobs) | 4,166 | 4,413 | 3,809 | 3,947 | 17,199 | 17,561 | 14,350 | 14,827 | 2,174,324 | 2,559,454 |
| Wage and salary employment | 2,677 | 2,920 | 2,533 | 2,742 | 13,622 | 13,888 | 10,275 | 10,776 | 1,676,367 | 1,952,352 |
| Proprietors employment | 1,489 | 1,493 | 1,276 | 1,205 | 3,577 | 3,673 | 4,075 | 4,051 | 497,957 | 607,102 |
| Farm proprietors employment | 469 | 490 | 334 | 336 | 1,099 | 1,104 | 830 | 847 | 34,460 | 34,950 |
| Nonfarm proprietors employment | 1,020 | 1,003 | 942 | 869 | 2,478 | 2,569 | 3,245 | 3,204 | 463,497 | 572,152 |
| Farm employment | 787 | 866 | 610 | 630 | 2,141 | 2,254 | 1,065 | 1,119 | 67,704 | 69,840 |
| Nonfarm employment | 3,379 | 3,547 | 3,199 | 3,317 | 15,058 | 15,307 | 13,285 | 13,708 | 2,106,620 | 2,489,614 |
| Private nonfarm employment | 2,298 | 2,507 | 2,188 | 2,174 | 11,629 | 12,028 | 10,857 | 11,492 | 1,818,680 | 2,201,646 |
| **By Industry (Number of Jobs/Percentage of Total Employment)** | | | | | | | | | | |
| Forestry, fishing, and related activities | 170 | 180 | (D) | (D) | (D) | (D) | (D) | (D) | 29,117 | 32,073 |
| | 4.1 | 4.1 | N/A | N/A | N/A | N/A | N/A | N/A | 1.3 | 1.3 |
| Mining (including quarrying and oil and gas extraction) | 28 | 22 | (D) | (D) | (D) | (D) | (D) | (D) | 4,836 | 4,442 |
| | <1 | <1 | N/A | N/A | N/A | N/A | N/A | N/A | <1 | <1 |
| Utilities | (D) | (D) | (D) | (D) | 32 | 45 | (D) | (D) | 4,863 | 5,199 |
| | N/A | N/A | N/A | N/A | <1 | <1 | N/A | N/A | <1 | <1 |
| Construction | (D) | 213 | 164 | 178 | 367 | 458 | 711 | 850 | 102,550 | 150,262 |
| | N/A | 4.8 | 4.3 | 4.5 | 2.1 | 2.6 | 5 | 5.7 | 4.7 | 5.9 |
| Manufacturing | (D) | 41 | 201 | 250 | 1,028 | 1,133 | 1,156 | 1,364 | 176,802 | 201,963 |
| | N/A | <1 | 5.3 | 6.3 | 6 | 6.5 | 8.1 | 9.2 | 8.1 | 7.9 |
| Wholesale trade | 51 | 71 | 67 | 56 | 767 | 525 | 256 | (D) | 80,544 | 81,845 |
| | 1.2 | 1.6 | 1.8 | 1.4 | 4.5 | 3.0 | 1.8 | N/A | 3.7 | 3.2 |
| Retail trade | 452 | 505 | 389 | 346 | 2,159 | 2,564 | 1,798 | 1,827 | 227,763 | 259,680 |
| | 10.8 | 11.4 | 10.2 | 8.8 | 12.6 | 14.6 | 12.5 | 12.3 | 10.5 | 10.1 |
| Transportation and warehousing | (D) | (D) | (D) | (D) | 463 | 488 | (D) | 512 | 61,071 | 123,175 |
| | N/A | N/A | N/A | N/A | 2.7 | 2.8 | N/A | 3.5 | 2.8 | 4.8 |
| Information | 31 | 20 | (D) | 25 | 132 | 87 | 158 | 130 | 40,248 | 43,247 |
| | <1 | <1 | N/A | <1 | <1 | <1 | 1.1 | <1 | 1.9 | 1.7 |

| Sector | Harney County | | Lake County | | Malheur County | | Union County | | State of Oregon | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 |
| Finance and insurance | 78 | 58 | 48 | 50 | 350 | 336 | 479 | 494 | 90,623 | 101,551 |
| | 1.9 | 1.3 | 1.3 | 1.3 | 2 | 1.9 | 3.3 | 3.3 | 4.2 | 4 |
| Real estate and rental and leasing | 116 | 143 | 120 | 142 | 444 | 521 | 435 | 514 | 102,732 | 125,673 |
| | 2.8 | 3.2 | 3.2 | 3.6 | 2.6 | 3 | 3 | 3.5 | 4.7 | 4.9 |
| Professional, scientific, and technical services | (D) | 131 | 105 | 122 | 379 | 415 | 465 | 664 | 131,571 | 176,991 |
| | N/A | 3 | 2.8 | 3.1 | 2.2 | 2.4 | 3.2 | 4.5 | 6.1 | 6.9 |
| Management of companies and enterprises | (D) | 0 | (D) | 0 | (D) | 57 | 66 | 75 | 31,608 | 50,637 |
| | N/A | 0 | N/A | 0 | N/A | <1 | <1 | <1 | 1.5 | 2.0 |
| Administrative and support and waste management and remediation services | 117 | 124 | (D) | 90 | (D) | 411 | 358 | 418 | 111,105 | 129,993 |
| | 2.8 | 2.8 | N/A | 2.3 | N/A | 2.3 | 2.5 | 2.8 | 5.1 | 5.1 |
| Educational services | (D) | (D) | (D) | 17 | 80 | (D) | 102 | 83 | 53,197 | 49,509 |
| | N/A | N/A | N/A | <1 | <1 | N/A | <1 | <1 | 2.4 | 1.9 |
| Health care and social assistance | (D) | (D) | (D) | 153 | 1,950 | (D) | 1,969 | 1,963 | 252,065 | 308,939 |
| | N/A | N/A | N/A | 3.9 | 11.3 | N/A | 13.7 | 13.2 | 11.6 | 12.1 |
| Arts, entertainment, and recreation | (D) | 32 | 25 | (D) | 112 | (D) | 275 | 260 | 52,546 | 57,662 |
| | N/A | <1 | <1 | N/A | <1 | N/A | 1.9 | 1.8 | 2.4 | 2.3 |
| Accommodation and food services | (D) | 349 | 248 | (D) | 1,136 | (D) | 964 | 974 | 153,331 | 173,376 |
| | N/A | 7.9 | 6.5 | N/A | 6.6 | N/A | 6.7 | 6.6 | 7.1 | 6.8 |
| Other services | 203 | 196 | 172 | 190 | 772 | 783 | 718 | 710 | 112,108 | 125,429 |
| | 4.9 | 4.4 | 4.5 | 4.8 | 4.5 | 4.5 | 5 | 4.8 | 5.2 | 4.9 |
| Government and government enterprises | 1,081 | 1,040 | 1,011 | 1,143 | 3,429 | 3,279 | 2,428 | 2,216 | 287,940 | 287,968 |
| | 25.9 | 23.6 | 26.5 | 29 | 19.9 | 18.7 | 16.9 | 14.9 | 13.2 | 11.3 |

Sources: BEA 2010a, 2021a

Note: (D) represents data not shown to avoid disclosure of confidential information; estimates are included in higher-level totals.
(N/A) means data are not available, or no information was given.

**Table A-15 (Part 1). Oregon Analysis Area Labor Income by Sector, 2010 and 2021 (2021$)**

| Sector | Baker County | | Crook County | | Deschutes County | | Grant County | | State of Oregon | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 |
| Personal income (thousands of dollars) | 582,232 | 810,465 | 749,567 | 1,305,173 | 6,902,317 | 13,873,903 | 280,106 | 369,927 | 173,174,835 | 261,546,508 |
| Population (persons) | 16,126 | 16,847 | 20,878 | 25,739 | 157,697 | 204,801 | 7,466 | 7,272 | 3,837,611 | 4,246,155 |
| Per capita personal income (dollars) | 36,105 | 48,107 | 35,902 | 50,708 | 43,770 | 67,743 | 37,517 | 50,870 | 45,126 | 61,596 |
| Earnings by place of work (thousands of dollars) | 301,821 | 381,282 | 383,710 | 674,451 | 4,068,909 | 8,470,243 | 151,652 | 185,981 | 124,668,782 | 178,777,570 |
| Wages and salaries (thousands of dollars) | 214,392 | 260,615 | 269,772 | 466,459 | 2,818,266 | 5,224,799 | 101,129 | 120,530 | 88,738,555 | 126,291,390 |
| Supplement to wages and salaries | 70,061 | 83,293 | 78,715 | 118,207 | 770,130 | 1,246,968 | 39,292 | 47,284 | 23,523,615 | 30,493,856 |
| Proprietors' income | 15,195 | 37,374 | 7,691 | 89,785 | 24,135 | 1,998,476 | 5,004 | 18,167 | 81,335 | 21,992,324 |
| Farm earnings | 5,565 | 14,908 | 1,860 | 5,905 | 15,694 | 14,522 | 1,335 | 3,640 | 1,315,858 | 1,461,517 |
| Nonfarm earnings | 307,386 | 366,374 | 385,570 | 668,546 | 4,084,604 | 8,484,765 | 152,987 | 182,341 | 123,352,924 | 177,316,053 |
| Private nonfarm earnings | 217,289 | (D) | 289,698 | (D) | 3,376,445 | 49,181 | 73,589 | (D) | 99,057,914 | 1,851,520 |
| **By Industry (Total Income/Percentage of Total Nonfarm Income)** | | | | | | | | | | |
| Forestry, fishing, and related activities | (D) | (D) | 12,212 | (D) | 18,027 | 49,181 | 6,751 | (D) | 1,380,411 | 1,851,520 |
| | N/A | N/A | 3.2 | <1 | <1 | N/A | 4.4 | 5 | 1.1 | |
| Mining (including quarrying and oil and gas extraction) | (D) | (D) | 854 | (D) | 6,872 | 5,652 | 177 | (D) | 122,696 | 166,013 |
| | N/A | N/A | <1 | N/A | <1 | <1 | <1 | N/A | <1 | <1 |
| Utilities | 9,160 | 16,467 | (D) | (D) | 40,928 | 48,538 | (D) | (D) | 681,407 | 1,071,517 |
| | 3 | 4.5 | N/A | N/A | 1 | <1 | N/A | N/A | <1 | <1 |
| Construction | 15,080 | 18,820 | 17,449 | 113,717 | 235,235 | 1,274,736 | 11,827 | (D) | 6,662,320 | 12,849,056 |
| | 4.9 | 5.1 | 4.5 | 17 | 5.8 | 15 | 7.7 | N/A | 5.4 | 7.2 |
| Manufacturing | 32,518 | 41,989 | 38,947 | 48,705 | 252,786 | 453,159 | (D) | (D) | 15,388,320 | 18,808,215 |
| | 10.6 | 11.5 | 10.1 | 7.3 | 6.2 | 5.3 | N/A | N/A | 12.5 | 10.6 |
| Wholesale trade | 4,184 | 5,145 | 63,952 | 23,232 | 117,509 | 263,742 | 2,228 | 2,245 | 7,572,878 | 8,255,686 |
| | 1.4 | 1.4 | 16.6 | 3.5 | 2.9 | 3.1 | 1.5 | 1.2 | 6.1 | 4.7 |
| Retail trade | 25,943 | 34,671 | 19,022 | 27,590 | 387,348 | 588,210 | 9,835 | 9,860 | 8,535,431 | 11,605,989 |
| | 8.4 | 9.5 | 4.9 | 4.1 | 9.5 | 6.9 | 6.4 | 5.4 | 6.9 | 6.5 |

| Sector | Baker County | | Crook County | | Deschutes County | | Grant County | | State of Oregon | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 |
| Transportation and warehousing | 12,571 | 13,185 | (D) | (D) | 65,858 | 155,348 | (D) | (D) | 3,986,429 | 5,944,344 |
| | 4.1 | 3.6 | N/A | N/A | 1.6 | 1.8 | N/A | N/A | 3.2 | 3.4 |
| Information | 6,449 | 3,561 | 2,843 | 108,373 | 119,487 | 252,075 | 3,266 | 4,383 | 3,479,281 | 5,258,138 |
| | 2.1 | 1 | <1 | 16.2 | 2.9 | 3 | 2.1 | 2.4 | 2.8 | 3 |
| Finance and insurance | 8,082 | 6,087 | 6,167 | 10,163 | 214,438 | 379,337 | 3,626 | 3,154 | 6,058,482 | 7,752,690 |
| | 2.6 | 1.7 | 1.6 | 1.5 | 5.2 | 4.5 | 2.4 | 1.7 | 4.9 | 4.4 |
| Real estate and rental and leasing | 2,870 | 10,074 | 3,092 | 20,157 | 90,947 | 554,891 | (D) | 4,848 | 1,384,823 | 6,380,389 |
| | <1 | 2.7 | <1 | 3 | 2.2 | 6.5 | N/A | 2.7 | 1.1 | 3.6 |
| Professional, scientific, and technical services | 10,866 | 13,069 | 8,748 | 27,816 | 274,179 | 749,586 | 2,537 | 4,512 | 8,848,550 | 14,467,197 |
| | 3.5 | 3.6 | 2.3 | 4.2 | 6.7 | 8.8 | 1.7 | 2.5 | 7.2 | 8.2 |
| Management of companies and enterprises | 2,719 | (69) | 5,845 | 1,905 | 28,178 | 118,816 | 0 | (D) | 3,567,995 | 9,025,320 |
| | <1 | <1 | 1.5 | <1 | <1 | 1.4 | <1 | N/A | 2.9 | 5.1 |
| Administrative and support and waste management and remediation services | 4,340 | 9,971 | 7,478 | 22,167 | 203,908 | 322,819 | 2,794 | (D) | 4,472,827 | 6,670,856 |
| | 1.4 | 2.7 | 1.9 | 3.3 | 5 | 3.8 | 1.8 | N/A | 3.6 | 3.8 |
| Educational services | 1,491 | (D) | 1,471 | 2,538 | 36,449 | 63,387 | (D) | 57 | 1,729,919 | 1,930,682 |
| | <1 | N/A | <1 | <1 | <1 | <1 | N/A | <1 | 1.4 | 1.1 |
| Health care and social assistance | 46,848 | (D) | 36,447 | 52,789 | 837,289 | 1,399,662 | (D) | 9,265 | 15,726,462 | 21,549,412 |
| | 15.2 | N/A | 9.5 | 7.9 | 20.5 | 16.5 | N/A | 5.1 | 12.7 | 12.2 |
| Arts, entertainment, and recreation | (D) | 954 | 1,684 | 1,134 | 50,707 | 105,942 | (D) | 2,015 | 867,453 | 1,687,718 |
| | N/A | <1 | <1 | <1 | 1.2 | 1.2 | N/A | 1.1 | <1 | 1 |
| Accommodation and food services | (D) | 18,454 | 10,516 | 36,061 | 207,924 | 471,343 | (D) | 4,763 | 3,865,630 | 7,068,289 |
| | N/A | 5 | 2.7 | 5.4 | 5.1 | 5.6 | N/A | 2.6 | 3.1 | 4 |
| Other services (except government and government enterprises) | 16,706 | 12,302 | 18,357 | 24,937 | 188,375 | 310,177 | 5,628 | 5,661 | 4,726,598 | 6,004,113 |
| | 5.4 | 3.4 | 4.8 | 3.7 | 4.6 | 3.7 | 3.7 | 3.1 | 3.8 | 3.4 |
| Government and government enterprises | 90,096 | 95,372 | 95,872 | 120,545 | 708,159 | 918,164 | 79,397 | 88,819 | 24,295,009 | 28,968,909 |
| | 29.3 | 26 | 24.9 | 18 | 17.3 | 10.8 | 51.9 | 48.7 | 19.7 | 16.3 |

Sources: BEA 2010b, 2021b

Note: (D) represents data not shown to avoid disclosure of confidential information; estimates are included in higher-level totals.
(N/A) means data are not available, or no information was given.
All 2010 dollar values were adjusted for inflation.

**Table A-15 (Part 2). Oregon Analysis Area Labor Income by Sector, 2010 and 2021 (2021$)**

| Sector | Harney County | | Lake County | | Malheur County | | Union County | | State of Oregon | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 |
| Personal income (thousands of dollars) | 259,534 | 373,121 | 274,573 | 389,518 | 898,960 | 1,233,592 | 987,132 | 1,311,986 | 173,174,835 | 261,546,508 |
| Population (persons) | 7,406 | 7,575 | 7,880 | 8,276 | 31,364 | 31,693 | 25,715 | 26,212 | 3,837,611 | 4,246,155 |
| Per capita personal income (dollars) | 35,044 | 49,257 | 34,845 | 47,066 | 28,663 | 38,923 | 38,388 | 50,053 | 45,126 | 61,596 |
| Earnings by place of work (thousands of dollars) | 141,442 | 212,815 | 154,886 | 208,732 | 730,320 | 882,336 | 614,040 | 722,893 | 124,668,782 | 178,777,570 |
| Wages and salaries (thousands of dollars) | 101,457 | 121,528 | 104,577 | 126,055 | 509,566 | 592,114 | 415,336 | 506,981 | 88,738,555 | 126,291,390 |
| Supplement to wages and salaries | 37,835 | 46,171 | 38,217 | 49,840 | 173,009 | 194,947 | 135,842 | 155,902 | 23,523,615 | 30,493,856 |
| Proprietors' income | 10,798 | 45,116 | 4,305 | 32,837 | 15,359 | 95,275 | 10,390 | 60,010 | 81,335 | 21,992,324 |
| Farm earnings | 213 | 27,818 | 7,203 | 22,023 | 21,527 | 54,823 | 1,703 | 9,612 | 1,315,858 | 1,461,517 |
| Nonfarm earnings | 141,655 | 184,997 | 147,683 | 186,709 | 708,793 | 827,513 | 615,743 | 713,281 | 123,352,924 | 177,316,053 |
| Private nonfarm earnings | 63,193 | 9,239 | 70,731 | (D) | 454,488 | (D) | 444,957 | (D) | 99,057,914 | 1,851,520 |
| **By Industry (Total income/percent of total nonfarm income)** | | | | | | | | | | |
| Forestry, fishing, and related activities | 3,950 | 9,239 | (D) | (D) | (D) | (D) | (D) | (D) | 1,380,411 | 1,851,520 |
| | 2.8 | N/A | N/A | N/A | N/A | N/A | N/A | 1 | 1.1 | 1 |
| Mining (including quarrying and oil and gas extraction) | 45 | 38 | (D) | (D) | (D) | (D) | (D) | (D) | 122,696 | 166,013 |
| | <1 | <1 | N/A | N/A | N/A | N/A | N/A | N/A | <1 | <1 |
| Utilities | (D) | (D) | (D) | (D) | 2,128 | 4,727 | (D) | (D) | 681,407 | 1,071,517 |
| | N/A | N/A | N/A | N/A | <1 | <1 | N/A | N/A | <1 | <1 |
| Construction | (D) | 7,687 | 8,678 | 8,887 | 17,390 | 21,075 | 40,218 | 45,071 | 6,662,320 | 12,849,056 |
| | N/A | 4.2 | 5.9 | 4.8 | 2.5 | 2.5 | 6.5 | 6.3 | 5.4 | 7.2 |
| Manufacturing | (D) | 511 | 10,024 | 12,882 | 48,975 | 71,216 | 70,469 | 91,796 | 15,388,320 | 18,808,215 |
| | N/A | <1 | 6.8 | 6.9 | 6.9 | 8.6 | 11.4 | 129 | 12.5 | 10.6 |
| Wholesale trade | 1,759 | 4,335 | 3,285 | 3,433 | 38,594 | 30,555 | 13,477 | (D) | 7,572,878 | 8,255,686 |
| | 1.2 | 2.3 | 2.2 | 1.8 | 5.4 | 3.7 | 2.2 | N/A | 6.1 | 4.7 |
| Retail trade | 11,926 | 17,455 | 10,848 | 9,903 | 72,247 | 96,018 | 51,823 | 60,842 | 8,535,431 | 11,605,989 |
| | 8.4 | 9.4 | 7.3 | 5.3 | 10.2 | 11.6 | 8.4 | 8.5 | 6.9 | 6.5 |

| Sector | Harney County | | Lake County | | Malheur County | | Union County | | State of Oregon | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 |
| Transportation and warehousing | (D) | (D) | (D) | (D) | 23,570 | 26,854 | (D) | 37,986 | 3,986,429 | 5,944,344 |
| | N/A | N/A | N/A | N/A | 3.3 | 3.2 | N/A | 5.3 | 3.2 | 3.4 |
| Information | 1,722 | 726 | (D) | 1,778 | 5,714 | 4,867 | 7,483 | 6,766 | 3,479,281 | 5,258,138 |
| | 1.2 | <1 | N/A | 1 | <1 | <1 | 1.2 | <1 | 2.8 | 3 |
| Finance and insurance | 2,491 | 1,779 | 1,585 | 2,186 | 16,475 | 15,723 | 16,627 | 16,534 | 6,058,482 | 7,752,690 |
| | 1.8 | 1 | 1.1 | 1.2 | 2.3 | 1.9 | 2.7 | 2.3 | 4.9 | 4.4 |
| Real estate and rental and leasing | 1,335 | 2,191 | 1,266 | 5,724 | 6,271 | 23,381 | 7,592 | 15,552 | 1,384,823 | 6,380,389 |
| | <1 | 1.2 | <1 | 3.1 | <1 | 1.8 | 1.2 | 2.2 | 1.1 | 3.6 |
| Professional, scientific, and technical services | (D) | 4,243 | 3,563 | 3,898 | 17,407 | 19,245 | 16,729 | 27,247 | 8,848,550 | 14,467,197 |
| | N/A | 2.3 | 2.4 | 2.1 | 2.5 | 2.3 | 2.7 | 3.8 | 7.2 | 8.2 |
| Management of companies and enterprises | (D) | N/A | (D) | N/A | (D) | 927 | 3,548 | 7,280 | 3,567,995 | 9,025,320 |
| | N/A | N/A | N/A | N/A | N/A | <1 | <1 | 1 | 2.9 | 5.1 |
| Administrative and support and waste management and remediation services | 1,995 | 4,534 | (D) | 2,790 | (D) | 11,451 | 9,030 | 11,173 | 4,472,827 | 6,670,856 |
| | 1.4 | 2.5 | N/A | 1.5 | N/A | 1.4 | 1.5 | 1.6 | 3.6 | 3.8 |
| Educational services | (D) | (D) | (D) | 501 | 1,622 | (D) | 1,285 | 1,564 | 1,729,919 | 1,930,682 |
| | N/A | N/A | N/A | <1 | <1 | N/A | <1 | <1 | 1.4 | 1.1 |
| Health care and social assistance | (D) | (D) | (D) | 6,019 | 95,599 | (D) | 102,064 | 119,424 | 15,726,462 | 21,549,412 |
| | N/A | N/A | N/A | 3.2 | 13.5 | N/A | 16.6 | 16.7 | 12.7 | 12.2 |
| Arts, entertainment, and recreation | (D) | 455 | 94 | (D) | 1,191 | (D) | 1,733 | 4,056 | 867,453 | 1,687,718 |
| | N/A | <1 | <1 | N/A | <1 | N/A | <1 | <1 | <1 | 1 |
| Accommodation and food services | (D) | 15,785 | 3,732 | (D) | 25,484 | (D) | 19,465 | 26,361 | 3,865,630 | 7,068,289 |
| | N/A | 8.5 | 2.5 | N/A | 3.6 | N/A | 3.2 | 3.7 | 3.1 | 4 |
| Other services (except government and government enterprises) | 4,288 | 5,581 | 3,561 | 5,606 | 25,437 | 28,353 | 21,329 | 23,694 | 4,726,598 | 6,004,113 |
| | 3 | 3 | 2.4 | 3 | 3.6 | 3.4 | 3.5 | 3.3 | 3.8 | 3.4 |
| Government and government enterprises | 78,462 | 89,911 | 76,953 | 100,242 | 254,304 | 287,852 | 170,786 | 181,584 | 24,295,009 | 28,968,909 |
| | 55.4 | 48.6 | 52.1 | 53.7 | 35.9 | 24.8 | 27.7 | 25.5 | 19.7 | 16.3 |

Sources: BEA 2010b, 2021b

Note: (D) represents data not shown to avoid disclosure of confidential information; estimates are included in higher-level totals.
(N/A) means data are not available, or no information was given.
All 2010 dollar values were adjusted for inflation.

## Table A-16. South Dakota Analysis Area Employment by Sector (2010 and 2021)

| Sector | Butte County | | Harding County | | State of South Dakota | |
|---|---|---|---|---|---|---|
| | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 |
| Total employment (number of jobs) | 5,094 | 5,299 | 1,020 | 1,140 | 558,135 | 622,335 |
| Wage and salary employment | 2,997 | 2,962 | 551 | 550 | 423,052 | 462,954 |
| Proprietors employment | 2,097 | 2,337 | 469 | 590 | 135,083 | 159,381 |
| Farm proprietors employment | 545 | 511 | 212 | 207 | 27,400 | 25,473 |
| Nonfarm proprietors employment | 1,552 | 1,826 | 257 | 383 | 107,683 | 133,908 |
| Farm employment | 608 | 586 | 281 | 301 | 32,343 | 32,170 |
| Nonfarm employment | 4,486 | 4,713 | 739 | 839 | 525,792 | 590,165 |
| Private nonfarm employment | 3,752 | 4,040 | 599 | 722 | 440,023 | 503,470 |
| **By Industry (Number of Jobs/Percentage of Total Jobs)** | | | | | | |
| Forestry, fishing, and related activities | (D) | (D) | (D) | (D) | 5,121 | 5,866 |
| | N/A | N/A | N/A | N/A | <1 | <1 |
| Mining (including quarrying and oil and gas extraction) | (D) | (D) | (D) | 40 | 2,216 | 2,143 |
| | N/A | N/A | N/A | 3.5 | <1 | <1 |
| Utilities | 23 | 20 | (D) | (D) | 2,170 | 2,111 |
| | <1 | <1 | N/A | N/A | <1 | <1 |
| Construction | 337 | 380 | 87 | 99 | 31,847 | 38,292 |
| | 6.6 | 7.2 | 8.5 | 8.7 | 5.7 | 6.2 |
| Manufacturing | 154 | 180 | 13 | 15 | 38,718 | 46,208 |
| | 3 | 3.4 | 1.3 | 1.3 | 6.9 | 7.4 |
| Wholesale trade | 159 | 201 | (D) | (D) | 19,792 | 22,931 |
| | 3.1 | 3.8 | N/A | N/A | 3.5 | 3.7 |
| Retail trade | 623 | 779 | 60 | 105 | 62,968 | 66,796 |
| | 12.2 | 14.7 | 5.9 | 9.2 | 11.3 | 10.7 |
| Transportation and warehousing | 277 | 174 | 32 | 62 | 15,047 | 19,188 |
| | 5.4 | 3.3 | 3.1 | 5.4 | 2.7 | 3.1 |
| Information | 18 | 25 | (D) | (D) | 7,640 | 6,418 |
| | <1 | <1 | N/A | N/A | 1.4 | 1 |
| Finance and insurance | 206 | 245 | (D) | (D) | 38,052 | 41,863 |
| | 4.0 | 4.6 | N/A | N/A | 6.8 | 6.7 |
| Real estate and rental and leasing | 194 | 288 | 29 | 68 | 19,319 | 29,574 |
| | 3.8 | 5.4 | 2.8 | 6.0 | 3.5 | 4.8 |
| Professional, scientific, and technical services | 166 | 188 | (D) | (D) | 19,350 | 25,389 |
| | 3.3 | 3.5 | N/A | N/A | 3.5 | 4.1 |

| Sector | Butte County | | Harding County | | State of South Dakota | |
|---|---|---|---|---|---|---|
| | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 |
| Management of companies and enterprises | 0 | (D) | 0 | 0 | 3,943 | 5,943 |
| | 0 | N/A | 0 | 0 | <1 | 1 |
| Administrative and support and waste management and remediation services | 135 | (D) | (D) | (D) | 18,691 | 19,916 |
| | 2.7 | N/A | N/A | N/A | 3.3 | 3.2 |
| Educational services | (D) | 21 | 38 | (D) | 10,448 | 10,327 |
| | N/A | <1 | 3.7 | N/A | 1.9 | 1.7 |
| Health care and social assistance | (D) | 310 | (D) | (D) | 64,525 | 73,902 |
| | N/A | 5.9 | N/A | N/A | 11.6 | 11.9 |
| Arts, entertainment, and recreation | 94 | 79 | (D) | (D) | 11,302 | 12,643 |
| | 1.8 | 1.5 | N/A | N/A | 2 | 2 |
| Accommodation and food services | 344 | 383 | (D) | (D) | 40,155 | 43,681 |
| | 6.8 | 7.2 | N/A | N/A | 7.2 | 7 |
| Other services | 400 | 380 | (D) | (D) | 28,719 | 30,279 |
| | 7.9 | 7.2 | N/A | N/A | 5.1 | 4.9 |
| Government and government enterprises | 734 | 673 | 140 | 117 | 85,769 | 86,695 |
| | 14.4 | 12.7 | 13.7 | 10.3 | 15.4 | 13.9 |

Sources: BEA 2010a, 2021a
(D) represents data not shown to avoid disclosure of confidential information; estimates are included in high-level totals.
(N/A) means data are not available, or no information was given.

**Table A-17. South Dakota Analysis Area Labor Income by Sector, 2010 and 2021 (2021$)**

| Sector | Butte County | | Harding County | | State of South Dakota | |
|---|---|---|---|---|---|---|
| | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 |
| Personal income (thousands of dollars) | 370,562 | 479,774 | 54,176 | 80,170 | 42,330,863 | 57,717,754 |
| Population (persons) | 10,138 | 10,456 | 1,246 | 1,327 | 816,078 | 895,376 |
| Per capita personal income (dollars) | 36,552 | 45,885 | 43,480 | 60,414 | 51,872 | 64,462 |
| Earnings by place of work (thousands of dollars) | 186,319 | 203,113 | 39,810 | 51,581 | 29,532,513 | 38,919,395 |
| Wages and salaries (thousands of dollars) | 102,511 | 110,512 | 20,156 | 22,754 | 17,965,636 | 23,346,225 |
| Supplement to wages and salaries | 26,754 | 28,050 | 5,500 | 6,046 | 4,387,422 | 5,418,333 |
| Proprietors' income | 57,053 | 64,551 | 14,154 | 22,781 | 7,179,455 | 10,154,837 |
| Farm earnings | 8,965 | 12,598 | 8,062 | 16,661 | 2,166,912 | 3,479,442 |
| Nonfarm earnings | 177,354 | 190,515 | 31,748 | 34,920 | 27,365,601 | 35,439,953 |
| Private nonfarm earnings | 143,924 | 157,368 | 24,706 | 28,692 | 22,221,838 | 29,965,848 |
| **By Industry (Earnings in Thousands of Dollars/Percentage of Nonfarm Earnings)** | | | | | | |
| Forestry, fishing, and related activities | (D) | (D) | (D) | (D) | 191,893 | 143,947 |
| | N/A | N/A | N/A | N/A | <1 | <1 |
| Mining (including quarrying and oil and gas extraction) | (D) | (D) | (D) | 4,379 | 79,677 | 109,970 |
| | N/A | N/A | N/A | 12.5 | <1 | <1 |
| Utilities | 2,081 | 1,444 | (D) | (D) | 246,683 | 282,289 |
| | 1.2 | <1 | N/A | N/A | <1 | <1 |
| Construction | 16,292 | 19,276 | 5,670 | 6,634 | 1,878,663 | 2,657,325 |
| | 9.2 | 10.1 | 17.9 | 19 | 6.9 | 7.5 |
| Manufacturing | 5,887 | 8,565 | 136 | 114 | 2,411,355 | 3,464,611 |
| | 3.3 | 4.5 | <1 | <1 | 8.8 | 9.8 |
| Wholesale trade | 9,353 | 11,858 | (D) | (D) | 1,407,998 | 1,956,820 |
| | 5.3 | 6.2 | N/A | N/A | 5.1 | 5.5 |
| Retail trade | 20,161 | 23,520 | 2,691 | 2,778 | 2,222,038 | 2,526,073 |
| | 11.4 | 12.3 | 8.5 | 8 | 8.1 | 7.1 |
| Transportation and warehousing | 16,756 | 12,174 | 1,439 | 4,928 | 856,546 | 1,028,383 |
| | 9.4 | 6.4 | 4.5 | 14.1 | 3.1 | 2.9 |
| Information | 1,883 | 1,977 | (D) | (D) | 542,094 | 571,211 |
| | 1.1 | 1 | N/A | N/A | 2 | 1.6 |
| Finance and insurance | 8,570 | 6,224 | (D) | (D) | 3,404,504 | 4,160,892 |
| | 4.8 | 3.3 | N/A | N/A | 12.4 | 11.7 |

| Sector | Butte County | | Harding County | | State of South Dakota | |
|---|---|---|---|---|---|---|
| | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 |
| Real estate and rental and leasing | 2,239 | 9,290 | 436 | 1,412 | 408,254 | 911,691 |
| | 1.3 | <1 | 1.4 | <1 | 1.5 | <1 |
| Professional, scientific, and technical services | 7,400 | 8,673 | (D) | (D) | 1,150,879 | 1,718,557 |
| | 4.2 | 4.6 | N/A | N/A | 4.2 | 4.8 |
| Management of companies and enterprises | 0 | (D) | 0 | N/A | 473,515 | 729,863 |
| | <1 | N/A | <1 | N/A | 1.7 | 2.1 |
| Administrative and support and waste management and remediation services | 3,323 | (D) | (D) | (D) | 591,336 | 843,721 |
| | 1.9 | N/A | N/A | N/A | 2.2 | 2.4 |
| Educational services | (D) | 731 | 1,471 | (D) | 326,173 | 347,851 |
| | N/A | <1 | 4.6 | N/A | 1.2 | 1 |
| Health care and social assistance | (D) | 15,031 | (D) | (D) | 4,032,738 | 5,828,012 |
| | N/A | 7.9 | N/A | N/A | 14.7 | 16.4 |
| Arts, entertainment, and recreation | 581 | 604 | (D) | (D) | 198,851 | 259,225 |
| | <1 | <1 | N/A | N/A | <1 | <1 |
| Accommodation and food services | 5,307 | 7,460 | (D) | (D) | 750,024 | 1,233,597 |
| | 3 | 3.9 | N/A | N/A | 2.7 | 3.5 |
| Other services (except government and government enterprises) | 16,659 | 14,558 | (D) | (D) | 1,048,616 | 1,191,810 |
| | 9.4 | 7.6 | N/A | N/A | 3.8 | 3.4 |
| Government and government enterprises | 33,430 | 33,147 | 7,043 | 6,228 | 5,143,762 | 5,474,105 |
| | 18.8 | 17.4 | 22.2 | 17.8 | 18.8 | 15.4 |

Sources: BEA 2010b, 2021b
Note: All percentages are rounded to the nearest tenth.
All 2010 dollar values were adjusted for inflation.
(D) represents data not shown to avoid disclosure of confidential information; estimates are included in high-level totals.
(N/A) means data are not available, or no information was given.

## Table A-18 (Part 1). Utah Analysis Area Employment by Sector (2010 and 2021)

| Sector | Beaver County | | Box Elder County | | Cache County | | Carbon County | | Daggett County | | Duchesne County | | State of Utah | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 |
| Total employment (number of jobs) | 3,609 | 4,343 | 24,826 | 32,065 | 66,056 | 87,483 | 11,865 | 11,472 | 598 | 644 | 11,081 | 11,667 | 1,620,799 | 2,229,147 |
| Wage and salary employment | 2,609 | 3,017 | 18,366 | 23,687 | 50,265 | 65,712 | 9,513 | 8,919 | 438 | 453 | 7,871 | 8,199 | 1,235,051 | 1,688,168 |
| Proprietors employment | 1,000 | 1,326 | 6,460 | 8,378 | 15,791 | 21,771 | 2,352 | 2,553 | 160 | 191 | 3,210 | 3,468 | 385,748 | 540,979 |
| Farm proprietors employment | 208 | 229 | 1,014 | 1,080 | 1,040 | 1,077 | 274 | 291 | 42 | 45 | 876 | 931 | 15,262 | 15,766 |
| Nonfarm proprietors employment | 792 | 1,097 | 5,446 | 7,298 | 14,751 | 20,694 | 2,078 | 2,262 | 118 | 146 | 2,334 | 2,537 | 370,486 | 525,213 |
| Farm employment | 599 | 635 | 1,402 | 1,453 | 1,448 | 1,508 | 307 | 317 | 57 | 66 | 978 | 1,036 | 20,007 | 20,552 |
| Nonfarm employment | 3,010 | 3,708 | 23,424 | 30,612 | 64,608 | 85,975 | 11,558 | 11,155 | 541 | 578 | 10,103 | 10,631 | 1,600,792 | 2,208,595 |
| Private nonfarm employment | 2,266 | 2,940 | 20,640 | 27,379 | 53,678 | 73,691 | 9,411 | 8,970 | 307 | 409 | 8,168 | 8,173 | 1,366,353 | 1,937,761 |
| **By Industry (Number of Jobs/Percentage of Total Employment)** | | | | | | | | | | | | | | |
| Forestry, fishing, and related activities | (D) | (D) | 137 | 182 | 230 | 283 | (D) | 36 | (D) | (D) | (D) | (D) | 3,313 | 4,358 |
| | N/A | N/A | <1 | <1 | <1 | <1 | N/A | <1 | N/A | N/A | N/A | N/A | <1 | <1 |
| Mining (including quarrying and oil and gas extraction) | 68 | (D) | 87 | 78 | 103 | 104 | 913 | 802 | (D) | 1 | 1,790 | 1,366 | 14,668 | 11,812 |
| | 1.9 | N/A | <1 | <1 | <1 | <1 | 7.7 | 7 | N/A | <1 | 16.2 | 11.7 | <1 | <1 |
| Utilities | (D) | (D) | 37 | 62 | 66 | 90 | 138 | 77 | 0 | 0 | 41 | 53 | 4,275 | 5,036 |
| | N/A | N/A | <1 | <1 | <1 | <1 | 1.2 | <1 | 0 | 0 | <1 | <1 | <1 | <1 |
| Construction | 166 | 267 | 1,477 | 2,711 | 3,314 | 4,634 | 556 | 570 | (D) | (D) | 831 | 569 | 90,998 | 156,909 |
| | 4.6 | 6.1 | 5.9 | 8.5 | 5 | 5.3 | 4.7 | 5 | N/A | N/A | 7.5 | 4.9 | 5.6 | 7 |

| Sector | Beaver County | | Box Elder County | | Cache County | | Carbon County | | Daggett County | | Duchesne County | | State of Utah | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 |
| Manufacturing | 86 | 229 | 5,939 | 7,233 | 10,645 | 14,390 | 364 | 455 | (D) | 4 | 222 | 249 | 118,121 | 155,858 |
| | 2.4 | 5.3 | 23.9 | 22.6 | 16.1 | 16.4 | 3.1 | 4 | N/A | <1 | 2 | 2.1 | 7.3 | 7 |
| Wholesale trade | (D) | (D) | 593 | 790 | 990 | 1,578 | 495 | 314 | 1 | 5 | 170 | 202 | 49,833 | 61,996 |
| | N/A | N/A | 2.4 | 2.5 | 1.5 | 1.8 | 4.2 | 2.7 | <1 | <1 | 1.5 | 1.7 | 3.1 | 2.8 |
| Retail trade | 380 | 535 | 2,414 | 2,863 | 7,097 | 9,630 | 1,441 | 1,421 | (D) | (D) | 1,000 | 1,245 | 172,249 | 227,274 |
| | 10.5 | 12.3 | 9.7 | 8.9 | 10.7 | 11 | 12.1 | 12.4 | N/A | N/A | 9 | 10.7 | 10.6 | 10.2 |
| Transportation and warehousing | 240 | 182 | 1,502 | 2,236 | 1,242 | 2,106 | 500 | 418 | (D) | (D) | 889 | 694 | 50,900 | 97,325 |
| | 6.7 | 4.2 | 6.1 | 7 | 1.9 | 2.4 | 4.2 | 3.6 | N/A | N/A | 8 | 5.9 | 3.1 | 4.4 |
| Information | (D) | 8 | 157 | 117 | 788 | 711 | 89 | 52 | (D) | 3 | 208 | (D) | 34,345 | 46,605 |
| | N/A | <1 | <1 | <1 | 1.2 | <1 | <1 | <1 | N/A | <1 | 1.9 | N/A | 2.1 | 2.1 |
| Finance and insurance | (D) | 107 | 878 | 1,087 | 3,043 | 4,088 | 368 | 339 | 0 | (D) | 240 | 265 | 111,543 | 159,236 |
| | N/A | 2.5 | 3.5 | 3.4 | 4.6 | 4.7 | 3.1 | 3 | 0 | N/A | 2.2 | 2.3 | 6.9 | 7.1 |
| Real estate and rental and leasing | (D) | 249 | 1,137 | 1,626 | 3,730 | 5,441 | 390 | 467 | (D) | (D) | 490 | 610 | 93,568 | 131,835 |
| | N/A | 5.7 | 4.6 | 5.1 | 5.6 | 6.2 | 3.3 | 4.1 | N/A | N/A | 4.4 | 5.2 | 5.8 | 5.9 |
| Professional, scientific, and technical services | 38 | (D) | 616 | (D) | 4,325 | 7,425 | (D) | (D) | (D) | 3 | 221 | (D) | 107,017 | 177,495 |
| | 1.1 | N/A | 2.5 | N/A | 6.5 | 8.5 | N/A | N/A | N/A | <1 | 2 | N/A | 6.6 | 8 |
| Management of companies and enterprises | 1 | (D) | 74 | (D) | 435 | 872 | (D) | (D) | 0 | (D) | (D) | (D) | 22,682 | 33,989 |
| | 0 | N/A | <1 | N/A | <1 | 1 | N/A | N/A | 0 | N/A | N/A | N/A | 1.4 | 1.5 |
| Administrative and support and waste management and remediation services | (D) | 89 | 670 | 1,102 | 3,063 | 3,228 | 637 | 361 | (D) | (D) | (D) | 260 | 89,810 | 118,472 |
| | N/A | 2 | 2.7 | 3.4 | 4.6 | 3.7 | 5.4 | 3.1 | N/A | N/A | N/A | 2.2 | 5.5 | 5.3 |
| Educational services | 11 | 12 | 345 | 443 | 1,029 | 1,687 | (D) | (D) | 6 | 4 | 55 | (D) | 48,952 | 75,217 |
| | <1 | <1 | 1.4 | 1.4 | 1.6 | 1.9 | N/A | N/A | 1 | <1 | <1 | N/A | 3 | 3.4 |
| Health care and social assistance | 117 | 123 | 1,662 | 1,977 | 5,668 | 7,386 | (D) | (D) | 4 | (D) | 503 | (D) | 137,138 | 185,491 |
| | 3.2 | 2.8 | 6.7 | 6.2 | 8.6 | 8.4 | N/A | N/A | <1 | N/A | 4.5 | N/A | 8.5 | 8.3 |
| Arts, entertainment, and recreation | (D) | (D) | 333 | 505 | 1,193 | 1,618 | 156 | 156 | 52 | 46 | 103 | 90 | 34,480 | 48,191 |
| | N/A | N/A | 1.3 | 1.6 | 1.8 | 1.8 | 1.3 | 1.4 | 8.7 | 7.1 | <1 | <1 | 2.1 | 2.2 |

| Sector | Beaver County | | Box Elder County | | Cache County | | Carbon County | | Daggett County | | Duchesne County | | State of Utah | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 |
| Accommodation and food services | (D) | (D) | 1,325 | 1,773 | 3,447 | 4,585 | 770 | 784 | 96 | 124 | 407 | 625 | 99,679 | 135,066 |
| | N/A | N/A | 5.3 | 5.5 | 5.2 | 5.2 | 6.5 | 6.8 | 16.1 | 19.3 | 3.7 | 5.4 | 6.1 | 6.1 |
| Other services | 167 | (D) | 1,257 | 1,617 | 3,270 | 3,835 | 826 | 851 | (D) | (D) | 639 | (D) | 82,782 | 105,596 |
| | 4.6 | N/A | 5.1 | 5 | 5 | 4.4 | 7 | 7.4 | N/A | N/A | 5.8 | N/A | 5.1 | 4.7 |
| Government and government enterprises | 744 | 768 | 2,784 | 3,233 | 10,930 | 12,284 | 2,147 | 2,185 | 234 | 169 | 1,935 | 2,458 | 234,439 | 270,834 |
| | 20.6 | 17.7 | 11.2 | <1 | 16.5 | 14 | 18.1 | 19 | 39.1 | 26.2 | 17.5 | 21.1 | 14.5 | 12.1 |

Sources: BEA 2010a, 2021a
(D) represents data not shown to avoid disclosure of confidential information; estimates are included in high-level totals.
(N/A) means data are not available, or no information was given.

**Table A-18 (Part 2). Utah Analysis Area Employment by Sector (2010 and 2021)**

| Sector | Emery County | | Garfield County | | Grand County | | Iron County | | Juab County | | Kane County | | State of Utah | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 |
| Total employment (number of jobs) | 5,594 | 5,100 | 3,427 | 3,576 | 6,456 | 8,801 | 22,222 | 32,095 | 4,775 | 5,991 | 4,381 | 5,727 | 1,620,799 | 2,229,147 |
| Wage and salary employment | 3,976 | 3,555 | 2,505 | 2,550 | 4,700 | 6,642 | 15,987 | 23,436 | 3,355 | 4,228 | 3,122 | 4,030 | 1,235,051 | 1,688,168 |
| Proprietors employment | 1,618 | 1,545 | 922 | 1,026 | 1,756 | 2,159 | 6,235 | 8,659 | 1,420 | 1,763 | 1,259 | 1,697 | 385,748 | 540,979 |
| Farm proprietors employment | 534 | 561 | 236 | 229 | 64 | 62 | 419 | 434 | 287 | 291 | 142 | 152 | 15,262 | 15,766 |
| Nonfarm proprietors employment | 1,084 | 984 | 686 | 797 | 1,692 | 2,097 | 5,816 | 8,225 | 1,133 | 1,472 | 1,117 | 1,545 | 370,486 | 525,213 |
| Farm employment | 575 | 599 | 293 | 283 | 97 | 98 | 731 | 785 | 374 | 383 | 159 | 169 | 20,007 | 20,552 |
| Nonfarm employment | 5,019 | 4,501 | 3,134 | 3,293 | 6,359 | 8,703 | 21,491 | 31,310 | 4,401 | 5,608 | 4,222 | 5,558 | 1,600,792 | 2,208,595 |

| Sector | Emery County | | Garfield County | | Grand County | | Iron County | | Juab County | | Kane County | | State of Utah | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 |
| Private nonfarm employment | 4,081 | 3,634 | 2,521 | 2,727 | 5,406 | 7,620 | 17,121 | 26,081 | 3,625 | 4,697 | 3,482 | 4,785 | 1,366,353 | 1,937,761 |
| **By Industry (Number of Jobs/Percentage of Total Employment)** | | | | | | | | | | | | | | |
| Forestry, fishing, and related activities | (D) | (D) | (D) | (D) | (D) | (D) | 218 | 346 | (D) | (D) | (D) | (D) | 3,313 | 4,358 |
| | N/A | N/A | N/A | N/A | N/A | N/A | 1 | 1.1 | N/A | N/A | N/A | N/A | <1 | <1 |
| Mining (including quarrying and oil and gas extraction) | (D) | 322 | (D) | (D) | (D) | (D) | 156 | 191 | (D) | 69 | (D) | (D) | 14,668 | 11,812 |
| | N/A | 6.3 | N/A | N/A | N/A | N/A | <1 | <1 | N/A | 1.2 | N/A | N/A | <1 | <1 |
| Utilities | (D) | (D) | (D) | 34 | 28 | 41 | 94 | 173 | (D) | (D) | (D) | (D) | 4,275 | 5,036 |
| | N/A | N/A | N/A | 1 | <1 | <1 | <1 | <1 | N/A | N/A | N/A | N/A | <1 | <1 |
| Construction | 603 | 516 | 137 | 128 | 429 | 512 | 1,205 | 2,857 | 471 | 540 | 214 | 311 | 90,998 | 156,909 |
| | 10.8 | 10.1 | 4 | 3.6 | 6.6 | 5.8 | 5.4 | 8.9 | 9.9 | 9 | 4.9 | 5.4 | 5.6 | 7 |
| Manufacturing | 61 | 50 | 67 | (D) | 87 | 171 | 1,453 | 2,512 | 668 | 955 | (D) | 168 | 118,121 | 155,858 |
| | 1.1 | 1 | 2 | N/A | 1.3 | 1.9 | 6.5 | 7.8 | 14 | 15.9 | N/A | 2.9 | 7.3 | 7 |
| Wholesale trade | (D) | (D) | 48 | 21 | 87 | 115 | 319 | 490 | 43 | 47 | (D) | 41 | 49,833 | 61,996 |
| | N/A | N/A | 1.4 | <1 | 1.3 | 1.3 | 1.4 | 1.5 | <1 | <1 | N/A | <1 | 3.1 | 2.8 |
| Retail trade | 611 | 686 | 236 | 272 | 854 | 990 | 2,647 | 3,621 | 406 | 480 | 456 | 571 | 172,249 | 227,274 |
| | 10.9 | 13.5 | 6.9 | 7.6 | 13.2 | 11.2 | 11.9 | 11.3 | 8.5 | 8 | 10.4 | 10 | 10.6 | 10.2 |
| Transportation and warehousing | 103 | 93 | (D) | 48 | 103 | 205 | 457 | 762 | (D) | (D) | 76 | (D) | 50,900 | 97,325 |
| | 1.8 | 1.8 | N/A | 1.3 | 1.6 | 2.3 | 2.1 | 2.4 | N/A | N/A | 1.7 | N/A | 3.1 | 4.4 |
| Information | 137 | (D) | (D) | 155 | 60 | 74 | 196 | 210 | (D) | 21 | 27 | 34 | 34,345 | 46,605 |
| | 2.4 | N/A | N/A | 4.3 | <1 | <1 | <1 | <1 | N/A | <1 | <1 | <1 | 2.1 | 2.1 |
| Finance and insurance | (D) | 93 | 54 | 68 | 122 | 137 | 1,143 | 1,414 | 113 | 125 | 131 | 111 | 111,543 | 159,236 |
| | N/A | 1.8 | 1.6 | 1.9 | 1.9 | 1.6 | 5.1 | 4.4 | 2.4 | 2.1 | 3 | 1.9 | 6.9 | 7.1 |
| Real estate and rental and leasing | (D) | (D) | 95 | 146 | 370 | 649 | 1,422 | 2,134 | 181 | 233 | 271 | 443 | 93,568 | 131,835 |
| | N/A | N/A | 2.8 | 4.1 | 5.7 | 7.4 | 6.4 | 6.6 | 3.8 | 3.9 | 6.2 | 7.7 | 5.8 | 5.9 |
| Professional, scientific, and technical services | 258 | 158 | 53 | 90 | 313 | 394 | 831 | 1,473 | 219 | (D) | 124 | 187 | 107,017 | 177,495 |
| | 4.6 | 3.1 | 1.5 | 2.5 | 4.8 | 4.5 | 3.7 | 4.6 | 4.6 | N/A | 2.8 | 3.3 | 6.6 | 8 |

| Sector | Emery County | | Garfield County | | Grand County | | Iron County | | Juab County | | Kane County | | State of Utah | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 |
| Management of companies and enterprises | (D) | (D) | 0 | 0 | (D) | (D) | 80 | 165 | 25 | (D) | 0 | 49 | 22,682 | 33,989 |
| | N/A | N/A | 0 | 0 | N/A | N/A | <1 | <1 | <1 | N/A | 0 | <1 | 1.4 | 1.5 |
| Administrative and support and waste management and remediation services | (D) | (D) | (D) | 59 | (D) | (D) | 1,264 | 1,446 | 79 | 260 | 114 | 218 | 89,810 | 118,472 |
| | N/A | N/A | N/A | 1.6 | N/A | N/A | 5.7 | 4.5 | 1.7 | 4.3 | 2.6 | 3.8 | 5.5 | 5.3 |
| Educational services | (D) | (D) | (D) | (D) | 118 | 153 | 323 | 543 | (D) | (D) | (D) | 11 | 48,952 | 75,217 |
| | N/A | N/A | N/A | N/A | 1.8 | 1.7 | 1.5 | 1.7 | N/A | N/A | N/A | <1 | 3 | 3.4 |
| Health care and social assistance | (D) | (D) | (D) | (D) | 332 | 521 | 1,885 | 2,741 | (D) | (D) | (D) | 198 | 137,138 | 185,491 |
| | N/A | N/A | N/A | N/A | 5.1 | 5.9 | 8.5 | 8.5 | N/A | N/A | N/A | 3.5 | 8.5 | 8.3 |
| Arts, entertainment, and recreation | 34 | 44 | (D) | 68 | 359 | 590 | 502 | 695 | (D) | 64 | 97 | 348 | 34,480 | 48,191 |
| | <1 | <1 | N/A | 1.9 | 5.6 | 6.7 | 2.3 | 2.2 | N/A | 1.1 | 2.2 | 6.1 | 2.1 | 2.2 |
| Accommodation and food services | 290 | 325 | (D) | 1,095 | 1,432 | 2,254 | 1,698 | 2,759 | (D) | 389 | 876 | 1,158 | 99,679 | 135,066 |
| | 5.2 | 6.4 | N/A | 30.6 | 22.2 | 25.6 | 7.6 | 8.6 | N/A | 6.5 | 20 | 20.2 | 6.1 | 6.1 |
| Other services | 395 | 304 | 117 | 115 | 262 | 289 | 1,228 | 1,549 | (D) | 315 | 623 | 709 | 82,782 | 105,596 |
| | 7.1 | 6 | 3.4 | 3.2 | 4.1 | 3.3 | 5.5 | 4.8 | N/A | 5.3 | 14.2 | 12.4 | 5.1 | 4.7 |
| Government and government enterprises | 938 | 867 | 613 | 566 | 953 | 1,083 | 4,370 | 5,229 | 776 | 911 | 740 | 773 | 234,439 | 270,834 |
| | 16.8 | 17 | 17.9 | 15.8 | 14.8 | 12.3 | 19.7 | 16.3 | 16.3 | 15.2 | 16.9 | 13.5 | 14.5 | 12.1 |

Sources: BEA 2010a, 2021a

(D) represents data not shown to avoid disclosure of confidential information; estimates are included in high-level totals.

(N/A) means data are not available, or no information was given.

## Table A-18 (Part 3). Utah Analysis Area Employment by Sector (2010 and 2021)

| Sector | Millard County | | Morgan County | | Piute County | | Rich County | | Sanpete County | | Sevier County | | State of Utah | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 |
| Total employment (number of jobs) | 6,559 | 7,417 | 4,026 | 5,796 | 630 | 650 | 1,291 | 1,856 | 11,308 | 13,973 | 11,206 | 13,045 | 1,620,799 | 2,229,147 |
| Wage and salary employment | 4,580 | 5,110 | 2,124 | 3,028 | 335 | 307 | 724 | 1,089 | 7,149 | 9,354 | 8,269 | 9,662 | 1,235,051 | 1,688,168 |
| Proprietors employment | 1,979 | 2,307 | 1,902 | 2,768 | 295 | 343 | 567 | 767 | 4,159 | 4,619 | 2,937 | 3,383 | 385,748 | 540,979 |
| Farm proprietors employment | 624 | 650 | 263 | 252 | 106 | 118 | 118 | 124 | 786 | 787 | 596 | 590 | 15,262 | 15,766 |
| Nonfarm proprietors employment | 1,355 | 1,657 | 1,639 | 2,516 | 189 | 225 | 449 | 643 | 3,373 | 3,832 | 2,341 | 2,793 | 370,486 | 525,213 |
| Farm employment | 1,013 | 1,059 | 318 | 299 | 148 | 152 | 188 | 196 | 1,038 | 1,006 | 717 | 718 | 20,007 | 20,552 |
| Nonfarm employment | 5,546 | 6,358 | 3,708 | 5,497 | 482 | 498 | 1,103 | 1,660 | 10,270 | 12,967 | 10,489 | 12,327 | 1,600,792 | 2,208,595 |
| Private nonfarm employment | 4,454 | 5,316 | 3,238 | 4,839 | 334 | 371 | 895 | 1,433 | 7,606 | 9,780 | 8,740 | 10,335 | 1,366,353 | 1,937,761 |
| **By Industry (Number of Jobs/Percentage of Total Employment)** | | | | | | | | | | | | | | |
| Forestry, fishing, and related activities | (D) | 158 | (D) | (D) | (D) | (D) | (D) | (D) | 138 | 210 | (D) | (D) | 3,313 | 4,358 |
| | N/A | 2.1 | N/A | N/A | N/A | N/A | N/A | N/A | 1.2 | 1.5 | N/A | N/A | <1 | <1 |
| Mining (including quarrying and oil and gas extraction) | 120 | 129 | (D) | (D) | 22 | (D) | (D) | (D) | 84 | 90 | 613 | 650 | 14,668 | 11,812 |
| | 1.8 | 1.7 | N/A | N/A | 3.5 | N/A | N/A | N/A | <1 | <1 | 5.5 | 5 | <1 | <1 |
| Utilities | (D) | (D) | 17 | 28 | 0 | 0 | (D) | (D) | 14 | 22 | (D) | (D) | 4,275 | 5,036 |
| | N/A | N/A | <1 | <1 | 0 | 0 | N/A | N/A | <1 | <1 | N/A | N/A | <1 | <1 |
| Construction | 284 | 278 | 436 | 837 | 32 | (D) | (D) | 149 | 682 | 966 | 523 | 647 | 90,998 | 156,909 |
| | 4.3 | 3.7 | 10.8 | 14.4 | 5.1 | N/A | N/A | 8 | 6 | 6.9 | 4.7 | 5 | 5.6 | 7 |
| Manufacturing | 230 | 304 | 249 | 241 | 15 | (D) | (D) | 39 | 692 | 1,480 | 437 | 610 | 118,121 | 155,858 |
| | 3.5 | 4.1 | 6.2 | 4.2 | 2.4 | N/A | N/A | 2.1 | 6.1 | 10.6 | 3.9 | 4.7 | 7.3 | 7 |
| Wholesale trade | (D) | (D) | 157 | 153 | (D) | 8 | 10 | (D) | 141 | 207 | (D) | (D) | 49,833 | 61,996 |
| | N/A | N/A | 3.9 | 2.6 | N/A | 1.2 | <1 | N/A | 1.2 | 1.5 | N/A | N/A | 3.1 | 2.8 |
| Retail trade | 740 | 858 | 353 | 513 | (D) | (D) | 89 | 168 | 1,240 | 1,328 | 1,660 | 1,766 | 172,249 | 227,274 |
| | 11.3 | 11.6 | 8.8 | 8.9 | N/A | N/A | 6.9 | 9.1 | 11 | 9.5 | 14.8 | 13.5 | 10.6 | 10.2 |
| Transportation and warehousing | 157 | 218 | 23 | 56 | 32 | (D) | (D) | (D) | 241 | 269 | 1,058 | 1,126 | 50,900 | 97,325 |
| | 2.4 | 2.9 | <1 | 1 | 5.1 | N/A | N/A | N/A | 2.1 | 1.9 | 9.4 | 8.6 | 3.1 | 4.4 |
| Information | 37 | 27 | (D) | 26 | 0 | 4 | 9 | (D) | 213 | 244 | 86 | 41 | 34,345 | 46,605 |
| | <1 | <1 | N/A | <1 | 0 | <1 | <1 | N/A | 1.9 | 1.7 | <1 | <1 | 2.1 | 2.1 |
| Finance and insurance | 195 | 225 | 378 | 612 | (D) | (D) | (D) | (D) | 445 | 701 | 363 | 397 | 111,543 | 159,236 |
| | 3 | 3 | 9.4 | 10.6 | N/A | N/A | N/A | N/A | 3.9 | 5 | 3.2 | 3 | 6.9 | 7.1 |
| Real estate and rental and leasing | 188 | 272 | 367 | 659 | 16 | (D) | (D) | (D) | 880 | 657 | 416 | 523 | 93,568 | 131,835 |
| | 2.9 | 3.7 | 9.1 | 11.4 | 2.5 | N/A | N/A | N/A | 7.8 | 4.7 | 3.7 | 4 | 5.8 | 5.9 |

| Sector | Millard County | | Morgan County | | Piute County | | Rich County | | Sanpete County | | Sevier County | | State of Utah | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 |
| Professional, scientific, and technical services | (D) | (D) | 190 | 453 | (D) | (D) | (D) | (D) | (D) | 434 | 308 | 525 | 107,017 | 177,495 |
| | N/A | N/A | 4.7 | 7.8 | N/A | N/A | N/A | N/A | N/A | 3.1 | 2.7 | 4 | 6.6 | 8 |
| Management of companies and enterprises | (D) | (D) | (D) | (D) | 0 | 0 | (D) | (D) | (D) | 68 | 38 | 72 | 22,682 | 33,989 |
| | N/A | N/A | N/A | N/A | 0 | 0 | N/A | N/A | N/A | <1 | <1 | <1 | 1.4 | 1.5 |
| Administrative and support and waste management and remediation services | 337 | 591 | (D) | (D) | 10 | (D) | 26 | 115 | 220 | 317 | 268 | 371 | 89,810 | 118,472 |
| | 5.1 | 8 | N/A | N/A | 1.6 | N/A | 2 | 6.2 | 1.9 | 2.3 | 2.4 | 2.8 | 5.5 | 5.3 |
| Educational services | (D) | (D) | (D) | 114 | 8 | 5 | (D) | 20 | (D) | (D) | (D) | (D) | 48,952 | 75,217 |
| | N/A | N/A | N/A | 2 | 1.3 | <1 | N/A | 1.1 | N/A | N/A | N/A | N/A | 3 | 3.4 |
| Health care and social assistance | (D) | (D) | (D) | 223 | (D) | (D) | (D) | (D) | (D) | (D) | (D) | (D) | 137,138 | 185,491 |
| | N/A | N/A | N/A | 3.8 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 8.5 | 8.3 |
| Arts, entertainment, and recreation | (D) | 79 | (D) | 111 | 14 | (D) | (D) | 82 | 161 | 202 | 87 | 125 | 34,480 | 48,191 |
| | N/A | 1.1 | N/A | 1.9 | 2.2 | N/A | N/A | 4.4 | 1.4 | 1.4 | <1 | 1 | 2.1 | 2.2 |
| Accommodation and food services | (D) | 383 | (D) | 168 | 49 | (D) | (D) | 224 | 507 | 694 | 907 | 965 | 99,679 | 135,066 |
| | N/A | 5.2 | N/A | 2.9 | 7.8 | N/A | N/A | 12.1 | 4.5 | 5 | 8.1 | 7.4 | 6.1 | 6.1 |
| Other services | 342 | 353 | (D) | 325 | (D) | (D) | 97 | 122 | 648 | 717 | 599 | 686 | 82,782 | 105,596 |
| | 5.2 | 4.8 | N/A | 5.6 | N/A | N/A | 7.5 | 6.6 | 5.7 | 5.1 | 5.3 | 5.3 | 5.1 | 4.7 |
| Government and government enterprises | 1,092 | 1,042 | 470 | 658 | 148 | 127 | 208 | 227 | 2,664 | 3,187 | 1,749 | 1,992 | 234,439 | 270,834 |
| | 16.6 | 14 | 11.7 | 11.4 | 23.5 | 19.5 | 16.1 | 12.2 | 23.6 | 22.8 | 15.6 | 15.3 | 14.5 | 12.1 |

Sources: BEA 2010a, 2021a

(D) represents data not shown to avoid disclosure of confidential information; estimates are included in high-level totals.

(N/A) means data are not available, or no information was given.

## Table A-18 (Part 4). Utah Analysis Area Employment by Sector (2010 and 2021)

| Sector | Summit County | | Tooele County | | Uintah County | | Wasatch County | | Wayne County | | State of Utah | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 |
| Total employment (number of jobs) | 33,294 | 44,134 | 21,319 | 27,493 | 18,017 | 18,038 | 10,973 | 20,375 | 1,737 | 1,940 | 1,620,799 | 2,229,147 |
| Wage and salary employment | 21,945 | 28,767 | 16,562 | 20,548 | 14,086 | 13,322 | 6,305 | 11,776 | 1,129 | 1,199 | 1,235,051 | 1,688,168 |
| Proprietors employment | 11,349 | 15,367 | 4,757 | 6,945 | 3,931 | 4,716 | 4,668 | 8,599 | 608 | 741 | 385,748 | 540,979 |
| Farm proprietors employment | 532 | 521 | 388 | 422 | 995 | 1,055 | 394 | 394 | 166 | 154 | 15,262 | 15,766 |
| Nonfarm proprietors employment | 10,817 | 14,846 | 4,369 | 6,523 | 2,936 | 3,661 | 4,274 | 8,205 | 442 | 587 | 370,486 | 525,213 |
| Farm employment | 633 | 613 | 500 | 546 | 1,130 | 1,200 | 451 | 459 | 207 | 193 | 20,007 | 20,552 |
| Nonfarm employment | 32,661 | 43,521 | 20,819 | 26,947 | 16,887 | 16,838 | 10,522 | 19,916 | 1,530 | 1,747 | 1,600,792 | 2,208,595 |
| Private nonfarm employment | 29,959 | 40,611 | 15,999 | 22,439 | 13,916 | 13,654 | 9,199 | 17,782 | 1,224 | 1,473 | 1,366,353 | 1,937,761 |
| **By Industry (Number of Jobs/Percentage of Total Employment)** | | | | | | | | | | | | |
| Forestry, fishing, and related activities | 141 | (D) | (D) | (D) | 90 | 102 | (D) | (D) | (D) | (D) | 3,313 | 4,358 |
| | <1 | N/A | N/A | N/A | <1 | <1 | N/A | N/A | N/A | N/A | <1 | <1 |
| Mining (including quarrying and oil and gas extraction) | 243 | 185 | 151 | (D) | 3,184 | 1,481 | 134 | (D) | (D) | (D) | 14,668 | 11,812 |
| | <1 | <1 | <1 | N/A | 17.7 | 8.2 | 1.2 | N/A | N/A | N/A | <1 | <1 |
| Utilities | 59 | (D) | (D) | 48 | 149 | 157 | (D) | 29 | (D) | (D) | 4,275 | 5,036 |
| | <1 | N/A | N/A | <1 | <1 | <1 | N/A | <1 | N/A | N/A | <1 | <1 |
| Construction | 1,959 | 2,962 | 971 | 1,845 | 1,127 | 1,112 | 1,051 | 2,490 | 135 | 251 | 90,998 | 156,909 |
| | 5.9 | 6.7 | 4.6 | 6.7 | 6.3 | 6.2 | 9.6 | 12.2 | 7.8 | 12.9 | 5.6 | 7 |
| Manufacturing | 833 | 1,198 | 1,568 | 3,038 | 238 | 358 | 295 | 628 | 35 | (D) | 118,121 | 155,858 |
| | 2.5 | 2.7 | 7.4 | 11.1 | 1.3 | 2 | 2.7 | 3.1 | 2 | N/A | 7.3 | 7 |
| Wholesale trade | 377 | 685 | (D) | 253 | 634 | 418 | 182 | 312 | 27 | (D) | 49,833 | 61,996 |
| | 1.1 | 1.6 | N/A | <1 | 3.5 | 2.3 | 1.7 | 1.5 | 1.6 | N/A | 3.1 | 2.8 |

| Sector | Summit County | | Tooele County | | Uintah County | | Wasatch County | | Wayne County | | State of Utah | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 |
| Retail trade | 3,739 | 4,042 | 2,178 | 3,020 | 1,805 | 2,288 | 1,034 | 1,857 | 121 | 169 | 172,249 | 227,274 |
| | 11.2 | 9.2 | 10.2 | 11 | 10 | 12.7 | 9.4 | 9.1 | 7 | 8.7 | 10.6 | 10.2 |
| Transportation and warehousing | 469 | 618 | 1,104 | 2,390 | 936 | 828 | (D) | 367 | (D) | 29 | 50,900 | 97,325 |
| | 1.4 | 1.4 | 5.2 | 8.7 | 5.2 | 4.6 | N/A | 1.8 | N/A | 1.5 | 3.1 | 4.4 |
| Information | 366 | 605 | 270 | 277 | 156 | 154 | 159 | 166 | (D) | (D) | 34,345 | 46,605 |
| | 1.1 | 1.4 | 1.3 | 1 | <1 | <1 | 1.4 | <1 | N/A | N/A | 2.1 | 2.1 |
| Finance and insurance | 1,976 | 3,404 | 647 | 831 | 379 | 514 | 673 | 1,629 | (D) | (D) | 111,543 | 159,236 |
| | 5.9 | 7.7 | 3 | 3 | 2.1 | 2.8 | 6.1 | 8 | N/A | N/A | 6.9 | 7.1 |
| Real estate and rental and leasing | 4,066 | 5,343 | 795 | 1,139 | 890 | 984 | 1,032 | 1,978 | 27 | (D) | 93,568 | 131,835 |
| | 12.2 | 12.1 | 3.7 | 4.1 | 4.9 | 5.5 | 9.4 | 9.7 | 1.6 | N/A | 5.8 | 5.9 |
| Professional, scientific, and technical services | 2,221 | 3,599 | (D) | 1,111 | 565 | 589 | (D) | 1,601 | (D) | (D) | 107,017 | 177,495 |
| | 6.7 | 8.2 | N/A | 4 | 3.1 | 3.3 | N/A | 7.9 | N/A | N/A | 6.6 | 8 |
| Management of companies and enterprises | 311 | 750 | (D) | 85 | (D) | (D) | (D) | 495 | 0 | 27 | 22,682 | 33,989 |
| | <1 | 1.7 | N/A | <1 | N/A | N/A | N/A | 2.4 | 0 | 1.4 | 1.4 | 1.5 |
| Administrative and support and waste management and remediation services | 1,140 | 1,573 | 2,348 | 1,430 | (D) | (D) | 509 | 860 | (D) | (D) | 89,810 | 118,472 |
| | 3.4 | 3.6 | 11 | 5.2 | N/A | N/A | 4.6 | 4.2 | N/A | N/A | 5.5 | 5.3 |
| Educational services | 617 | 809 | 276 | 769 | 100 | 306 | 160 | 428 | (D) | 8 | 48,952 | 75,217 |
| | 1.9 | 1.8 | 1.3 | 2.8 | <1 | 1.7 | 1.5 | 2.1 | N/A | <1 | 3 | 3.4 |
| Health care and social assistance | 1,181 | 2,052 | 1,509 | 2,042 | 1,083 | 1,202 | 656 | 1,335 | (D) | 169 | 137,138 | 185,491 |
| | 3.5 | 4.6 | 7.1 | 7.4 | 6 | 6.7 | 6 | 6.6 | N/A | 8.7 | 8.5 | 8.3 |
| Arts, entertainment, and recreation | 3,439 | 4,622 | 457 | 518 | 117 | 192 | 322 | 773 | 39 | 51 | 34,480 | 48,191 |
| | 10.3 | 10.5 | 2.1 | 1.9 | <1 | 1.1 | 2.9 | 3.8 | 2.2 | 2.6 | 2.1 | 2.2 |
| Accommodation and food services | 5,082 | 5,892 | 1,136 | 1,737 | 982 | 1,392 | 1,127 | 1,586 | 277 | 342 | 99,679 | 135,066 |
| | 15.3 | 13.4 | 5.3 | 6.3 | 5.5 | 7.7 | 10.3 | 7.8 | 15.9 | 17.6 | 6.1 | 6.1 |
| Other services | 1,740 | 2,064 | 1,223 | 1,675 | 1,047 | 1,160 | 709 | 1,118 | 83 | 105 | 82,782 | 105,596 |
| | 5.2 | 4.7 | 5.7 | 6.1 | 5.8 | 6.4 | 6.5 | 5.5 | 4.8 | 5.4 | 5.1 | 4.7 |

| Sector | Summit County | | Tooele County | | Uintah County | | Wasatch County | | Wayne County | | State of Utah | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 |
| Government and government enterprises | 2,702 | 2,910 | 4,820 | 4,508 | 2,971 | 3,184 | 1,323 | 2,134 | 306 | 274 | 234,439 | 270,834 |
| | 8.1 | 6.6 | 22.6 | 16.4 | 16.5 | 17.7 | 12.1 | 10.5 | 17.6 | 14.1 | 14.5 | 12.1 |

Sources: BEA 2010a, 2021a
(D) represents data not shown to avoid disclosure of confidential information; estimates are included in high-level totals.
(N/A) means data are not available, or no information was given.

## Table A-19 (Part 1). Utah Analysis Area Labor Income by Sector, 2010 and 2021 (2021$)

| Sector | Beaver County | | Box Elder County | | Cache County | | Carbon County | | Daggett County | | Duchesne County | | State of Utah | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 |
| Personal income (thousands of dollars) | 228,833 | 340,414 | 1,760,360 | 2,713,188 | 4,031,753 | 6,495,574 | 854,493 | 919,193 | 45,261 | 50,432 | 723,373 | 849,060 | 111,999,656 | 186,990,527 |
| Population (persons) | 6,664 | 7,249 | 50,198 | 59,688 | 113,463 | 137,417 | 21,396 | 20,372 | 1,075 | 976 | 18,640 | 19,790 | 2,776,094 | 3,337,975 |
| Per capita personal income (dollars) | 34,339 | 46,960 | 35,068 | 45,456 | 35,534 | 47,269 | 39,937 | 45,120 | 42,103 | 51,672 | 38,807 | 42,903 | 40,345 | 56,019 |
| Earnings by place of work (thousands of dollars) | 164,645 | 243,624 | 1,294,392 | 1,656,545 | 2,959,223 | 4,590,587 | 613,494 | 573,959 | 24,296 | 25,942 | 569,873 | 567,099 | 83,829,430 | 135,242,519 |
| Wages and salaries (thousands of dollars) | 111,892 | 130,330 | 964,724 | 1,242,040 | 2,007,123 | 3,143,584 | 457,110 | 413,077 | 16,948 | 17,257 | 415,943 | 404,553 | 62,116,762 | 98,905,986 |
| Supplement to wages and salaries | 31,659 | 35,118 | 246,829 | 280,336 | 587,717 | 773,402 | 117,130 | 106,284 | 5,967 | 5,487 | 103,940 | 104,638 | 15,249,963 | 21,218,296 |
| Proprietors' income | 21,094 | 78,176 | 82,840 | 134,169 | 364,383 | 673,601 | 39,254 | 54,598 | 1,381 | 3,198 | 49,990 | 57,908 | 6,462,704 | 15,118,237 |
| Farm earnings | 39,510 | 44,244 | 28,154 | 12,681 | 33,452 | 43,713 | 1,315 | 999 | 601 | 1,046 | 481 | 13,151 | 272,662 | 432,762 |
| Nonfarm earnings | 125,136 | 199,380 | 1,266,238 | 1,643,864 | 2,925,771 | 4,546,874 | 614,809 | 572,960 | 23,695 | 24,896 | 570,353 | 553,948 | 83,556,767 | 134,809,757 |
| Private nonfarm earnings | 81,941 | 151,105 | 1,100,753 | 1,450,795 | 2,238,667 | 3,776,019 | 481,614 | 451,452 | 8,714 | 13,236 | 457,595 | 410,018 | 66,547,085 | 114,574,889 |
| **By Industry (Earnings in Thousands of Dollars/Percentage of Nonfarm Earnings)** | | | | | | | | | | | | | | |
| Forestry, fishing, and related activities | (D) | (D) | 2,379 | 3,059 | 4,800 | 5,280 | (D) | 331 | (D) | (D) | (D) | (D) | 54,317 | 110,151 |
| | N/A | N/A | <1 | <1 | <1 | <1 | N/A | <1 | N/A | N/A | N/A | N/A | N/A | <1 |

| Sector | Beaver County | | Box Elder County | | Cache County | | Carbon County | | Daggett County | | Duchesne County | | State of Utah | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 |
| Mining (including quarrying and oil and gas extraction) | 2,575 | (D) | 1,525 | 6,571 | -322 | 6,199 | 113,622 | 81,734 | (D) | 155 | 161,071 | 119,454 | 960,774 | 1,446,946 |
| | 2.1 | N/A | <1 | <1 | <1 | <1 | 18.5 | 14.3 | N/A | <1 | 28.2 | 21.6 | N/A | 1.1 |
| Utilities | (D) | (D) | 3,094 | 15,248 | 7,822 | 20,894 | 20,444 | 26,585 | 0 | N/A | 3,163 | 18,559 | 602,446 | 1,684,115 |
| | N/A | N/A | <1 | <1 | <1 | <1 | 3.3 | 4.6 | <1 | N/A | <1 | 3.4 | N/A | 1.2 |
| Construction | 8,539 | 12,076 | 69,284 | 170,437 | 207,359 | 310,814 | 38,783 | 26,776 | (D) | (D) | 69,825 | 30,671 | 5,404,695 | 12,018,858 |
| | 6.8 | 6.1 | 5.5 | 10.4 | 7.1 | 6.8 | 6.3 | 4.7 | N/A | N/A | 12.2 | 5.5 | 8.4 | 8.9 |
| Manufacturing | 3,779 | 10,498 | 632,076 | 675,824 | 685,001 | 1,140,439 | 25,087 | 35,782 | (D) | 95 | 11,647 | 10,506 | 9,046,028 | 12,657,653 |
| | 3.0 | 5.3 | 49.9 | 41.1 | 23.4 | 25.1 | 4.1 | 6.2 | N/A | <1 | 2.0 | 1.9 | 1.3 | 9.4 |
| Wholesale trade | (D) | (D) | 31,763 | 51,357 | 59,956 | 179,716 | 37,561 | 20,740 | 5 | N/A | 11,606 | 13,297 | 4,010,937 | 6,047,750 |
| | N/A | N/A | 2.5 | 3.1 | 2.0 | 4.0 | 6.1 | 3.6 | <1 | N/A | 2.0 | 2.4 | 1.6 | 4.5 |
| Retail trade | 8,485 | 13,765 | 60,516 | 73,763 | 175,562 | 316,161 | 44,075 | 53,688 | (D) | (D) | 27,435 | 39,003 | 6,409,896 | 10,085,319 |
| | 6.8 | 6.9 | 4.8 | 4.5 | 6.0 | 7.0 | 7.2 | 9.4 | N/A | N/A | 4.8 | 7.0 | 4.0 | 7.5 |
| Transportation and warehousing | 22,664 | 15,775 | 80,606 | 115,027 | 58,053 | 66,995 | 31,516 | 28,266 | (D) | (D) | 63,193 | 49,610 | 3,174,689 | 5,323,967 |
| | 18.1 | 7.9 | 6.4 | 7.0 | 2.0 | 1.5 | 5.1 | 4.9 | N/A | N/A | 11.1 | 9.0 | N/A | 3.9 |
| Information | (D) | 992 | 6,363 | 3,370 | 91,279 | 43,240 | 3,767 | 2,210 | (D) | 43 | 12,620 | (D) | 2,676,796 | 5,386,442 |
| | N/A | <1 | <1 | <1 | 3.1 | 1.0 | <1 | <1 | N/A | <1 | 2.2 | N/A | N/A | 4.0 |
| Finance and insurance | (D) | 2,718 | 19,104 | 28,277 | 86,645 | 105,580 | 11,168 | 8,785 | 0 | (D) | 6,746 | 8,479 | 4,662,518 | 8,962,858 |
| | N/A | 1.4 | 1.5 | 1.7 | 3.0 | 2.3 | 1.8 | 1.5 | <1 | N/A | 1.2 | 1.5 | N/A | 6.6 |
| Real estate and rental and leasing | (D) | 4,703 | 14,003 | 31,740 | 112,409 | 197,421 | 10,390 | 11,602 | (D) | (D) | 10,781 | 9,880 | 1,390,393 | 3,843,223 |
| | N/A | 2.4 | 1.1 | 1.9 | 3.8 | 4.3 | 1.7 | 2.0 | N/A | N/A | 1.9 | 1.8 | <1 | 2.9 |
| Professional, scientific, and technical services | 907 | (D) | 18,264 | (D) | 164,785 | 422,162 | (D) | (D) | (D) | 86 | 7,634 | (D) | 6,693,375 | 13,963,377 |
| | <1 | N/A | 1.4 | N/A | 5.6 | 9.3 | N/A | N/A | N/A | <1 | 1.3 | N/A | N/A | 10.4 |
| Management of companies and enterprises | 5 | (D) | 1,356 | (D) | 29,262 | 77,412 | (D) | (D) | 0 | (D) | (D) | (D) | 1,915,068 | 2,519,282 |
| | <1 | N/A | <1 | N/A | 1.0 | 1.7 | N/A | N/A | <1 | N/A | N/A | N/A | <1 | 1.9 |
| Administrative and support and waste management and remediation services | (D) | 1,346 | 14,761 | 30,569 | 80,156 | 167,157 | 22,904 | 13,015 | (D) | (D) | (D) | 9,444 | 3,228,691 | 5,573,755 |
| | N/A | <1 | 1.2 | 1.9 | 2.7 | 3.7 | 3.7 | 2.3 | N/A | N/A | N/A | 1.7 | N/A | 4.1 |
| Educational services | 88 | 112 | 2,994 | 5,932 | 18,357 | 35,499 | (D) | (D) | 20 | 60 | 363 | (D) | 1,756,196 | 2,952,678 |
| | <1 | <1 | <1 | <1 | <1 | <1 | N/A | N/A | <1 | <1 | <1 | N/A | N/A | 2.2 |
| Health care and social assistance | 3,669 | 3,560 | 66,384 | 91,362 | 253,706 | 378,805 | (D) | (D) | 49 | (D) | 26,645 | (D) | 7,648,607 | 11,147,476 |
| | 2.9 | 1.8 | 5.2 | 5.6 | 8.7 | 8.3 | N/A | N/A | <1 | N/A | 4.7 | N/A | N/A | 8.3 |
| Arts, entertainment, and recreation | (D) | (D) | 2,295 | 5,495 | 12,738 | 19,285 | 1,903 | 1,154 | 1,458 | 1,940 | 506 | 603 | 744,715 | 1,259,816 |
| | N/A | N/A | <1 | <1 | <1 | <1 | <1 | <1 | 6.2 | 7.8 | <1 | <1 | 1.7 | <1 |
| Accommodation and food services | (D) | (D) | 22,438 | 37,982 | 61,817 | 100,205 | 13,520 | 15,793 | 2,848 | 3,213 | 7,880 | 11,384 | 2,277,932 | 4,006,686 |
| | N/A | N/A | 1.8 | 2.3 | 2.1 | 2.2 | 2.2 | 2.8 | 12.0 | 12.9 | 1.4 | 2.1 | 9.8 | 3.0 |

| Sector | Beaver County | | Box Elder County | | Cache County | | Carbon County | | Daggett County | | Duchesne County | | State of Utah | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 |
| Other services (except government and government enterprises) | 6,904 | (D) | 51,546 | 67,697 | 129,282 | 182,755 | 33,113 | 34,688 | (D) | (D) | 26,113 | (D) | 3,889,012 | 5,584,537 |
| | 5.5 | N/A | 4.1 | 4.1 | 4.4 | 4.0 | 5.4 | 6.1 | N/A | N/A | 4.6 | N/A | 4.9 | 4.1 |
| Government and government enterprises | 43,195 | 48,275 | 165,485 | 193,069 | 687,104 | 770,855 | 133,195 | 121,508 | 14,981 | 11,660 | 112,758 | 143,930 | 17,009,682 | 20,234,868 |
| | 34.5 | 24.2 | 13.1 | 11.7 | 23.5 | 17.0 | 21.7 | 21.2 | 63.2 | 46.8 | 19.8 | 26.0 | 34.3 | 15.0 |

Sources: BEA 2010b, 2021b
Note: All percentages are rounded to the nearest tenth.
All 2010 dollar values were adjusted for inflation.
(D) represents data not shown to avoid disclosure of confidential information; estimates are included in high-level totals.
(N/A) means data are not available, or no information was given.

## Table A-19 (Part 2). Utah Analysis Area Labor Income by Sector, 2010 and 2021 (2021$)

| Sector | Emery County | | Garfield County | | Grand County | | Iron County | | Juab County | | Kane County | | State of Utah | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 |
| Personal income (thousands of dollars) | 392,208 | 407,359 | 184,950 | 257,521 | 426,517 | 674,784 | 1,319,606 | 2,350,189 | 318,600 | 584,171 | 270,297 | 398,337 | 111,999,656 | 186,990,527 |
| Population (persons) | 10,996 | 9,967 | 5,197 | 5,129 | 9,298 | 9,663 | 46,281 | 60,519 | 10,257 | 12,155 | 7,209 | 7,992 | 2,776,094 | 3,337,975 |
| Per capita personal income (dollars) | 35,668 | 40,871 | 35,588 | 50,209 | 45,872 | 69,832 | 28,512 | 38,834 | 31,062 | 48,060 | 37,495 | 49,842 | 40,345 | 56,019 |
| Earnings by place of work (thousands of dollars) | 304,382 | 251,157 | 122,745 | 163,522 | 288,755 | 464,141 | 817,108 | 1,386,490 | 180,463 | 303,000 | 157,087 | 252,789 | 83,829,430 | 135,242,519 |
| Wages and salaries (thousands of dollars) | 234,672 | 174,025 | 89,310 | 124,259 | 172,063 | 286,745 | 595,150 | 977,609 | 134,370 | 182,539 | 112,383 | 174,972 | 62,116,762 | 98,905,986 |
| Supplement to wages and salaries | 61,853 | 50,255 | 26,154 | 26,705 | 44,829 | 65,210 | 180,441 | 253,588 | 36,398 | 45,336 | 30,399 | 40,642 | 15,249,963 | 21,218,296 |
| Proprietors' income | 7,857 | 26,877 | 7,281 | 12,558 | 71,863 | 112,186 | 41,517 | 155,293 | 9,696 | 75,125 | 14,304 | 37,175 | 6,462,704 | 15,118,237 |
| Farm earnings | 973 | 8,372 | 1,505 | 5,859 | 965 | 1,815 | 15,046 | 36,456 | 1,861 | 18,350 | 497 | 2,676 | 272,662 | 432,762 |
| Nonfarm earnings | 303,409 | 242,785 | 124,250 | 157,663 | 289,720 | 462,326 | 802,062 | 1,350,034 | 178,603 | 284,650 | 156,589 | 250,113 | 83,556,767 | 134,809,757 |
| Private nonfarm earnings | 249,005 | 195,237 | 84,036 | 121,972 | 226,120 | 384,793 | 530,658 | 1,016,836 | 139,057 | 238,019 | 110,492 | 200,472 | 66,547,085 | 114,574,889 |
| **By Industry (Earnings in Thousands of Dollars/Percentage of Nonfarm Earnings)** | | | | | | | | | | | | | | |
| Forestry, fishing, and related activities | (D) | (D) | (D) | (D) | (D) | (D) | 5,228 | 12,055 | (D) | (D) | (D) | (D) | 54,317 | 110,151 |
| | N/A | N/A | N/A | N/A | N/A | N/A | <1 | <1 | N/A | N/A | N/A | N/A | N/A | <1 |

| Sector | Emery County | | Garfield County | | Grand County | | Iron County | | Juab County | | Kane County | | State of Utah | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 |
| Mining (including quarrying and oil and gas extraction) | (D) | 34,845 | (D) | (D) | (D) | (D) | 2,517 | 5,387 | (D) | 10,614 | (D) | (D) | 960,774 | 1,446,946 |
| | N/A | 14.4 | N/A | N/A | N/A | N/A | <1 | <1 | N/A | 3.7 | N/A | N/A | N/A | 1.1 |
| Utilities | (D) | (D) | (D) | 2,816 | 3,570 | 18,277 | 11,512 | 33,750 | (D) | (D) | (D) | (D) | 602,446 | 1,684,115 |
| | N/A | N/A | N/A | 1.8 | 1.2 | 4.0 | 1.4 | 2.5 | N/A | N/A | N/A | N/A | N/A | 1.2 |
| Construction | 42,143 | 27,873 | 8,623 | 5,016 | 34,537 | 27,301 | 43,200 | 143,480 | 26,019 | 23,677 | 7,570 | 12,466 | 5,404,695 | 12,018,858 |
| | 13.9 | 11.5 | 6.9 | 3.2 | 11.9 | 5.9 | 5.4 | 10.6 | 14.6 | 8.3 | 4.8 | 5.0 | 8.4 | 8.9 |
| Manufacturing | 1,206 | 3,614 | 1,917 | (D) | 3,198 | 14,867 | 87,181 | 142,811 | 37,278 | 72,422 | (D) | 14,294 | 9,046,028 | 12,657,653 |
| | <1 | 1.5 | 1.5 | N/A | 1.1 | 3.2 | 10.9 | 10.6 | 20.9 | 25.4 | N/A | 5.7 | 1.3 | 9.4 |
| Wholesale trade | (D) | (D) | 1,508 | 714 | 3,874 | 5,828 | 11,685 | 21,951 | 1,514 | 3,868 | (D) | 1,222 | 4,010,937 | 6,047,750 |
| | N/A | N/A | 1.2 | <1 | 1.3 | 1.3 | 1.5 | 1.6 | <1 | 1.4 | N/A | <1 | 1.6 | 4.5 |
| Retail trade | 12,092 | 17,184 | 4,409 | 6,140 | 31,729 | 36,000 | 75,165 | 112,580 | 8,069 | 8,925 | 10,132 | 15,109 | 6,409,896 | 10,085,319 |
| | 4.0 | 7.1 | 3.5 | 3.9 | 11.0 | 7.8 | 9.4 | 8.3 | 4.5 | 3.1 | 6.5 | 6.0 | 4.0 | 7.5 |
| Transportation and warehousing | 4,723 | 3,810 | (D) | 1,887 | 4,698 | 8,278 | 18,016 | 31,546 | (D) | (D) | 3,172 | (D) | 3,174,689 | 5,323,967 |
| | 1.6 | 1.6 | N/A | 1.2 | 1.6 | 1.8 | 2.2 | 2.3 | N/A | N/A | 2.0 | N/A | N/A | 3.9 |
| Information | 8,579 | (D) | (D) | 37,841 | 2,876 | 2,600 | 7,237 | 8,935 | (D) | 4,151 | 978 | 2,931 | 2,676,796 | 5,386,442 |
| | 2.8 | N/A | N/A | 24.0 | <1 | <1 | <1 | <1 | N/A | 1.5 | <1 | 1.2 | N/A | 4.0 |
| Finance and insurance | (D) | 3,620 | 1,120 | 1,639 | 4,700 | 6,330 | 39,080 | 67,871 | 2,846 | 6,421 | 3,816 | 4,111 | 4,662,518 | 8,962,858 |
| | N/A | 1.5 | <1 | 1.0 | 1.6 | 1.4 | 4.9 | 5.0 | 1.6 | 2.3 | 2.4 | 1.6 | N/A | 6.6 |
| Real estate and rental and leasing | (D) | (D) | 413 | 403 | 19,311 | 28,439 | 6,107 | 36,329 | 267 | 1,599 | 3,141 | 3,284 | 1,390,393 | 3,843,223 |
| | N/A | N/A | <1 | <1 | 6.7 | 6.2 | <1 | 2.7 | <1 | <1 | 2.0 | 1.3 | <1 | 2.9 |
| Professional, scientific, and technical services | 22,116 | 5,422 | 874 | 2,774 | 11,865 | 18,967 | 19,818 | 55,085 | 9,498 | (D) | 3,461 | 7,804 | 6,693,375 | 13,963,377 |
| | 7.3 | 2.2 | <1 | 1.8 | 4.1 | 4.1 | 2.5 | 4.1 | 5.3 | N/A | 2.2 | 3.1 | N/A | 10.4 |
| Management of companies and enterprises | (D) | (D) | 0 | N/A | (D) | (D) | 2,193 | 7,390 | 8 | (D) | 0 | (42) | 1,915,068 | 2,519,282 |
| | N/A | N/A | <1 | N/A | N/A | N/A | <1 | <1 | <1 | N/A | <1 | N/A | <1 | 1.9 |
| Administrative and support and waste management and remediation services | (D) | (D) | (D) | 971 | (D) | (D) | 30,293 | 39,367 | 4,157 | 7,033 | 1,026 | 3,662 | 3,228,691 | 5,573,755 |
| | N/A | N/A | N/A | <1 | N/A | N/A | 3.8 | 2.9 | 2.3 | 2.5 | <1 | 1.5 | N/A | 4.1 |
| Educational services | (D) | (D) | (D) | (D) | 2,060 | 3,270 | 4,367 | 10,446 | (D) | (D) | (D) | 276 | 1,756,196 | 2,952,678 |
| | N/A | N/A | N/A | N/A | <1 | <1 | <1 | <1 | N/A | N/A | N/A | <1 | N/A | 2.2 |
| Health care and social assistance | (D) | (D) | (D) | (D) | 17,133 | 34,546 | 76,482 | 129,154 | (D) | (D) | (D) | 7,771 | 7,648,607 | 11,147,476 |
| | N/A | N/A | N/A | N/A | 5.9 | 7.5 | 9.5 | 9.6 | N/A | N/A | N/A | 3.1 | N/A | 8.3 |
| Arts, entertainment, and recreation | 252 | 103 | (D) | 1,532 | 7,750 | 16,929 | 5,653 | 12,129 | (D) | 718 | 2,444 | 13,782 | 744,715 | 1,259,816 |
| | <1 | <1 | N/A | 1.0 | 2.7 | 3.7 | <1 | <1 | N/A | <1 | 1.6 | 5.5 | 1.7 | <1 |
| Accommodation and food services | 5,259 | 8,017 | (D) | 37,234 | 45,757 | 100,475 | 30,331 | 70,792 | (D) | 7,167 | 25,343 | 50,720 | 2,277,932 | 4,006,686 |
| | 1.7 | 3.3 | N/A | 23.6 | 15.8 | 21.7 | 3.8 | 5.2 | N/A | 2.5 | 16.2 | 20.3 | 9.8 | 3.0 |

| Sector | Emery County | | Garfield County | | Grand County | | Iron County | | Juab County | | Kane County | | State of Utah | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 |
| Other services (except government and government enterprises) | 17,451 | 12,856 | 4,925 | 4,820 | 11,878 | 15,495 | 54,595 | 75,778 | (D) | 15,017 | 29,715 | 38,252 | 3,889,012 | 5,584,537 |
| | 5.8 | 5.3 | 4.0 | 3.1 | 4.1 | 3.4 | 6.8 | 5.6 | N/A | 5.3 | 19.0 | 15.3 | 4.9 | 4.1 |
| Government and government enterprises | 54,404 | 47,548 | 40,215 | 35,691 | 63,600 | 77,533 | 271,404 | 333,198 | 39,546 | 46,631 | 46,098 | 49,641 | 17,009,682 | 20,234,868 |
| | 17.9 | 19.6 | 32.4 | 22.6 | 22.0 | 16.8 | 33.8 | 24.7 | 22.1 | 16.4 | 29.4 | 19.8 | 34.3 | 15.0 |

Sources: BEA 2010b, 2021b
Note: All percentages are rounded to the nearest tenth.
All 2010 dollar values were adjusted for inflation.
(D) represents data not shown to avoid disclosure of confidential information; estimates are included in high-level totals.
(N/A) means data are not available, or no information was given.

## Table A-19 (Part 3). Utah Analysis Area Labor Income by Sector, 2010 and 2021 (2021$)

| Sector | Millard County | | Morgan County | | Piute County | | Rich County | | Sanpete County | | Sevier County | | State of Utah | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 |
| Personal income (thousands of dollars) | 422,182 | 422,182 | 454,446 | 800,633 | 45,515 | 73,210 | 72,817 | 112,397 | 777,229 | 1,139,182 | 667,189 | 919,681 | 111,999,656 | 186,990,527 |
| Population (persons) | 12,534 | 12,534 | 9,522 | 12,657 | 1,562 | 1,487 | 2,256 | 2,597 | 27,873 | 29,106 | 20,794 | 21,906 | 2,776,094 | 3,337,975 |
| Per capita personal income (dollars) | 33,683 | 33,683 | 47,726 | 63,256 | 29,140 | 49,233 | 32,277 | 43,280 | 27,885 | 39,139 | 32,086 | 41,983 | 40,345 | 56,019 |
| Earnings by place of work (thousands of dollars) | 293,914 | 293,914 | 160,559 | 236,146 | 18,312 | 34,138 | 31,615 | 63,370 | 403,388 | 577,034 | 448,405 | 586,407 | 83,829,430 | 135,242,519 |
| Wages and salaries (thousands of dollars) | 209,142 | 209,142 | 93,859 | 156,089 | 10,987 | 10,236 | 23,809 | 39,056 | 255,048 | 371,111 | 326,856 | 415,938 | 62,116,762 | 98,905,986 |
| Supplement to wages and salaries | 62,828 | 62,828 | 22,873 | 33,813 | 3,853 | 3,298 | 7,220 | 9.808 | 85,774 | 109,646 | 90,278 | 107,352 | 15,249,963 | 21,218,296 |
| Proprietors' income | 21,944 | 21,944 | 43,826 | 46,244 | 3,471 | 20,604 | 586 | 14,506 | 62,566 | 96,277 | 31,271 | 63,117 | 6,462,704 | 15,118,237 |
| Farm earnings | 25,437 | 25,437 | 4,064 | (2,682) | 2,347 | 17,824 | 2,064 | 11,127 | 33,618 | 44,600 | 1,746 | 23,194 | 272,662 | 432,762 |
| Nonfarm earnings | 268,477 | 268,477 | 156,495 | 238,828 | 15,965 | 16,314 | 29,552 | 52,243 | 369,770 | 532,434 | 446,659 | 563,213 | 83,556,767 | 134,809,757 |
| Private nonfarm earnings | 202,957 | 202,957 | 131,555 | 203,008 | 8,084 | 10,096 | 17,301 | 39,411 | 218,477 | 350,900 | 341,481 | 446,017 | 66,547,085 | 114,574,889 |
| **By Industry (Earnings in Thousands of Dollars/Percentage of Nonfarm Earnings)** | | | | | | | | | | | | | | |
| Forestry, fishing, and related activities | (D) | (D) | (D) | (D) | (D) | (D) | (D) | (D) | 2,650 | 6,464 | (D) | (D) | 54,317 | 110,151 |
| | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | <1 | 1.2 | N/A | N/A | N/A | <1 |
| Mining (including quarrying and oil and gas extraction) | 6,591 | 6,591 | (D) | (D) | 207 | (D) | (D) | (D) | 4,181 | 7,100 | 44,655 | 60,822 | 960,774 | 1,446,946 |
| | 2.5 | 2.5 | N/A | N/A | 1.3 | N/A | N/A | N/A | 1.1 | 1.3 | 10.0 | 10.8 | N/A | 1.1 |
| Utilities | (D) | (D) | 637 | 10,804 | 0 | (D) | (D) | (D) | 1,061 | 12,587 | (D) | (D) | 602,446 | 1,684,115 |
| | N/A | N/A | <1 | 4.5 | <1 | N/A | N/A | N/A | <1 | 2.4 | N/A | N/A | N/A | 1.2 |
| Construction | 15,883 | 15,883 | 35,159 | 51,956 | 1,335 | (D) | (D) | 6,535 | 28,625 | 37,536 | 21,744 | 23,744 | 5,404,695 | 12,018,858 |
| | 5.9 | 5.9 | 22.5 | 21.8 | 8.4 | N/A | N/A | 12.5 | 7.7 | 7.0 | 4.9 | 4.2 | 8.4 | 8.9 |
| Manufacturing | 11,819 | 11,819 | 16,145 | 17,842 | 13 | (D) | (D) | 860 | 33,344 | 74,072 | 21,597 | 33,274 | 9,046,028 | 12,657,653 |
| | 4.4 | 4.4 | 10.3 | 7.5 | <1 | N/A | N/A | 1.6 | 9.0 | 13.9 | 4.8 | 5.9 | 1.3 | 9.4 |

| Sector | Millard County | | Morgan County | | Piute County | | Rich County | | Sanpete County | | Sevier County | | State of Utah | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 |
| Wholesale trade | (D) | (D) | 14,708 | 15,507 | (D) | 29 | 0 | (D) | 3,689 | 7,609 | (D) | (D) | 4,010,937 | 6,047,750 |
| | N/A | N/A | 9.4 | 6.5 | N/A | <1 | <1 | N/A | <1 | 1.4 | N/A | N/A | 1.6 | 4.5 |
| Retail trade | 15,393 | 15,393 | 7,442 | 18,035 | (D) | (D) | 1,809 | 4,428 | 25,771 | 32,080 | 47,103 | 57,117 | 6,409,896 | 10,085,319 |
| | 5.7 | 5.7 | 4.8 | 7.6 | N/A | N/A | 6.1 | 8.5 | 7.0 | 6.0 | 10.5 | 10.1 | 4.0 | 7.5 |
| Transportation and warehousing | 9,830 | 9,830 | 589 | 6,262 | 1,843 | (D) | (D) | (D) | 7,991 | 13,167 | 67,199 | 74,339 | 3,174,689 | 5,323,967 |
| | 3.7 | 3.7 | <1 | 2.6 | 11.5 | N/A | N/A | N/A | 2.2 | 2.5 | 15.0 | 13.2 | N/A | 3.9 |
| Information | 2,546 | 2,546 | (D) | 808 | 0 | 98 | 51 | (D) | 14,559 | 17,074 | 3,893 | 1,151 | 2,676,796 | 5,386,442 |
| | <1 | <1 | N/A | <1 | <1 | <1 | <1 | N/A | 3.9 | 3.2 | <1 | <1 | N/A | 4.0 |
| Finance and insurance | 2,844 | 2,844 | 11,968 | 12,158 | (D) | (D) | (D) | (D) | 7,785 | 19,193 | 10,794 | 12,787 | 4,662,518 | 8,962,858 |
| | 1.1 | 1.1 | 7.6 | 5.1 | N/A | N/A | N/A | N/A | 2.1 | 3.6 | 2.4 | 2.3 | N/A | 6.6 |
| Real estate and rental and leasing | 1,099 | 1,099 | 3,833 | 1,403 | 0 | (D) | (D) | (D) | 6,682 | 10,513 | 5,695 | 8,667 | 1,390,393 | 3,843,223 |
| | <1 | <1 | 2.4 | <1 | <1 | N/A | N/A | N/A | 1.8 | 2.0 | 1.3 | 1.5 | <1 | 2.9 |
| Professional, scientific, and technical services | (D) | (D) | 5,191 | 26,201 | (D) | (D) | (D) | (D) | (D) | 11,768 | 14,718 | 23,528 | 6,693,375 | 13,963,377 |
| | N/A | N/A | 3.3 | 11.0 | N/A | N/A | N/A | N/A | N/A | 2.2 | 3.3 | 4.2 | N/A | 10.4 |
| Management of companies and enterprises | (D) | (D) | (D) | (D) | 0 | 0 | (D) | (D) | (D) | 1,651 | 13 | 262 | 1,915,068 | 2,519,282 |
| | N/A | N/A | N/A | N/A | <1 | 0 | N/A | N/A | N/A | <1 | <1 | <1 | <1 | 1.9 |
| Administrative and support and waste management and remediation services | 12,656 | 12,656 | (D) | (D) | 128 | (D) | 327 | 2,763 | 4,038 | 7.396 | 5,620 | 10,606 | 3,228,691 | 5,573,755 |
| | 4.7 | 4.7 | N/A | N/A | <1 | N/A | 1.1 | 5.3 | 1.1 | 1.4 | 1.3 | 1.9 | N/A | 4.1 |
| Educational services | (D) | (D) | (D) | 1,126 | 40 | 120 | (D) | 325 | (D) | (D) | (D) | (D) | 1,756,196 | 2,952,678 |
| | N/A | N/A | N/A | <1 | <1 | < | N/A | <1 | N/A | N/A | N/A | N/A | N/A | 2.2 |
| Health care and social assistance | (D) | (D) | (D) | 10,696 | (D) | (D) | (D) | (D) | (D) | (D) | (D) | (D) | 7,648,607 | 11,147,476 |
| | N/A | N/A | N/A | 4.5 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 8.3 |
| Arts, entertainment, and recreation | (D) | (D) | (D) | 2,845 | 503 | (D) | (D) | 1,821 | 1,133 | 1,151 | 498 | 1,186 | 744,715 | 1,259,816 |
| | N/A | N/A | N/A | 1.2 | 3.2 | N/A | N/A | 3.5 | <1 | <1 | <1 | <1 | 1.7 | <1 |
| Accommodation and food services | (D) | (D) | (D) | 4,029 | 501 | (D) | (D) | 6,349 | 5,785 | 9,849 | 16,884 | 22,251 | 2,277,932 | 4,006,686 |
| | N/A | N/A | N/A | 1.7 | 3.1 | N/A | N/A | 12.2 | 1.6 | 1.8 | 3.8 | 4.0 | 9.8 | 3.0 |
| Other services | 12,992 | 12,992 | (D) | 12,758 | (D) | (D) | 3,176 | 4,823 | 25,424 | 30,510 | 22,024 | 27,260 | 3,889,012 | 5,584,537 |
| | 4.8 | 4.8 | N/A | 5.3 | N/A | N/A | 10.7 | 9.2 | 6.9 | 5.7 | 4.9 | 4.8 | 4.9 | 4.1 |
| Government and government enterprises | 65,520 | 65,520 | 24,941 | 35,820 | 7,880 | 6,218 | 12,251 | 12,832 | 151,294 | 282,534 | 105,178 | 117,196 | 17,009,682 | 20,234,868 |
| | 24.4 | 24.4 | 15.9 | 15.0 | 49.4 | 38.1 | 41.5 | 24.6 | 40.9 | 34.1 | 23.5 | 20.8 | 34.3 | 15.0 |

Sources: BEA 2010b, 2021b

Note: All percentages are rounded to the nearest tenth.

All 2010 dollar values were adjusted for inflation.

(D) represents data not shown to avoid disclosure of confidential information; estimates are included in high-level totals.

(N/A) means data are not available, or no information was given.

## Table A-19 (Part 4). Utah Analysis Area Labor Income by Sector, 2010 and 2021 (2021$)

| Sector | Summit County | | Tooele County | | Uintah County | | Wasatch County | | Wayne County | | State of Utah | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 |
| Personal income (thousands of dollars) | 3,266,191 | 7,927,922 | 2,138,705 | 3,535,506 | 1,263,931 | 1,271,778 | 965,359 | 2,581,316 | 93,930 | 134,670 | 111,999,656 | 186,990,527 |
| Population (persons) | 36,501 | 43,093 | 58,479 | 76,640 | 32,457 | 36,204 | 23,638 | 36,173 | 2,765 | 2,558 | 2,776,094 | 3,337,975 |
| Per capita personal income (dollars) | 89,482 | 183,972 | 36,572 | 46,131 | 38,942 | 35,128 | 40,839 | 71,360 | 33,971 | 52,647 | 40,345 | 56,019 |
| Earnings by place of work (thousands of dollars) | 1,493,459 | 2,528,676 | 1,185,602 | 1,337,111 | 1,021,101 | 836,943 | 390,259 | 834,504 | 56,002 | 73,536 | 83,829,430 | 135,242,519 |
| Wages and salaries (thousands of dollars) | 993,090 | 1,692,750 | 878,183 | 999,031 | 769,034 | 619,476 | 259,221 | 584,359 | 39,399 | 48,000 | 62,116,762 | 98,905,986 |
| Supplement to wages and salaries | 207,126 | 296,520 | 225,577 | 240,755 | 171,894 | 151,280 | 65,728 | 124,501 | 11,676 | 12,768 | 15,249,963 | 21,218,296 |
| Proprietors' income | 293,243 | 539,406 | 81,843 | 97,325 | 80,172 | 66,187 | 65,311 | 125,644 | 4,926 | 12,768 | 6,462,704 | 15,118,237 |
| Farm earnings | 7,577 | 8,127 | 8,127 | 9,878 | 948 | 11,257 | -1,654 | 660 | 2,178 | 6,459 | 272,662 | 432,762 |
| Nonfarm earnings | 1,485,882 | 2,520,549 | 1,177,475 | 1,327,233 | 1,020,153 | 825,686 | 391,914 | 833,844 | 53,824 | 67,077 | 83,556,767 | 134,809,757 |
| Private nonfarm earnings | 1,297,403 | 2,320,400 | 787,401 | 978,262 | 830,793 | 627,335 | 298,946 | 696,612 | 35,378 | 49,901 | 66,547,085 | 114,574,889 |
| **By Industry (Earnings in Thousands of Dollars/Percentage of Nonfarm Earnings)** | | | | | | | | | | | | |
| Forestry, fishing, and related activities | 1,491 | (D) | (D) | (D) | 991 | 1,095 | (D) | (D) | (D) | (D) | 54,317 | 110,151 |
| | <1 | N/A | N/A | N/A | <1 | <1 | <1 | N/A | N/A | N/A | N/A | <1 |
| Mining (including quarrying and oil and gas extraction) | 7,632 | 22,609 | 5,425 | (D) | 283,594 | 123,080 | 4,915 | (D) | (D) | (D) | 960,774 | 1,446,946 |
| | <1 | <1 | <1 | N/A | 27.8 | 14.9 | 1.1 | N/A | 1.3 | N/A | N/A | 1.1 |
| Utilities | 7,550 | (D) | (D) | 15,019 | 23,383 | 37,962 | (D) | 13,872 | (D) | (D) | 602,446 | 1,684,115 |
| | <1 | N/A | N/A | 1.1 | 2.3 | 4.6 | <1 | 1.7 | N/A | N/A | N/A | 1.2 |
| Construction | 148,178 | 199,723 | 59,626 | 91,845 | 93,650 | 58,059 | 54,322 | 189,855 | 4,504 | 12,384 | 5,404,695 | 12,018,858 |
| | 10.0 | 7.9 | 5.1 | 6.9 | 9.2 | 7.0 | 6.5 | 22.8 | 13.9 | 18.5 | 8.4 | 8.9 |
| Manufacturing | 80,309 | 104,591 | 120,158 | 225,760 | 8,925 | 13,303 | 12,005 | 33,467 | 710 | (D) | 9,046,028 | 12,657,653 |
| | 5.4 | 4.1 | 10.2 | 17.0 | <1 | 1.6 | 10.8 | 4.0 | 3.1 | N/A | 1.3 | 9.4 |
| Wholesale trade | 37,173 | 82,536 | (D) | 13,611 | 51,440 | 27,360 | 12,168 | 16,584 | 835 | (D) | 4,010,937 | 6,047,750 |
| | 2.5 | 3.3 | N/A | 1.0 | 5.0 | 3.3 | 4.8 | 2.0 | 3.1 | N/A | 1.6 | 4.5 |
| Retail trade | 132,318 | 164,590 | 56,131 | 82,845 | 58,058 | 74,513 | 25,140 | 69,273 | 2,164 | 4,498 | 6,409,896 | 10,085,319 |
| | 8.9 | 6.5 | 4.8 | 6.2 | 5.7 | 9.0 | 7.7 | 8.3 | 6.4 | 6.7 | 4.0 | 7.5 |
| Transportation and warehousing | 24,289 | 28,317 | 67,133 | 112,436 | 71,558 | 54,797 | (D) | 18,647 | (D) | 1,088 | 3,174,689 | 5,323,967 |
| | 1.6 | 1.1 | 5.7 | 8.5 | 7.0 | 6.6 | 3.8 | 2.2 | N/A | 1.6 | N/A | 3.9 |
| Information | 27,497 | (D) | 15,919 | 11,481 | 7,894 | 8,370 | 8,739 | 8,723 | (D) | (D) | 2,676,796 | 5,386,442 |
| | 1.9 | N/A | 1.4 | <1 | <1 | 1.0 | 3.2 | 1.0 | 2.2 | N/A | N/A | 4.0 |
| Finance and insurance | 67,184 | 98,775 | 13,896 | 20,271 | 17,697 | 14,678 | 10,086 | 21,847 | (D) | (D) | 4,662,518 | 8,962,858 |
| | 4.5 | 3.9 | 1.2 | 1.5 | 1.7 | 1.8 | 5.6 | 2.6 | 2.6 | N/A | N/A | 6.6 |
| Real estate and rental and leasing | 69,834 | 298,003 | 7,674 | 13,119 | 35,704 | 23,106 | 9,093 | 13,688 | 30 | (D) | 1,390,393 | 3,843,223 |
| | 4.7 | 11.8 | <1 | 1.0 | 3.5 | 2.8 | 1.7 | 1.6 | 2.3 | N/A | <1 | 2.9 |
| Professional, scientific, and technical services | 143,140 | 322,409 | (D) | 51,347 | 36,092 | 26,541 | (D) | 72,696 | (D) | (D) | 6,693,375 | 13,963,377 |
| | 9.6 | 12.8 | N/A | 3.9 | 3.5 | 3.2 | 8.0 | 8.7 | N/A | N/A | N/A | 10.4 |
| Management of companies and enterprises | 14,572 | 39,566 | (D) | 2,132 | (D) | (D) | (D) | 2,481 | 0 | 186 | 1,915,068 | 2,519,282 |
| | <1 | 1.6 | N/A | <1 | N/A | N/A | 2.3 | <1 | N/A | <1 | <1 | 1.9 |

| Sector | Summit County | | Tooele County | | Uintah County | | Wasatch County | | Wayne County | | State of Utah | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 |
| Administrative and support and waste management and remediation services | 42,084 | 78,860 | 175,397 | 68,687 | (D) | (D) | 15,425 | 24,155 | (D) | (D) | 3,228,691 | 5,573,755 |
| | 2.8 | 3.1 | 14.9 | 5.2 | N/A | N/A | 3.9 | 2.9 | 3.9 | N/A | N/A | 4.1 |
| Educational services | 18,263 | 24,348 | 4,812 | 22,209 | 1,513 | 7,561 | 3,116 | 9,299 | (D) | 49 | 1,756,196 | 2,952,678 |
| | 1.2 | 1.0 | <1 | 1.7 | <1 | <1 | 2.1 | 1.1 | <1 | <1 | N/A | 2.2 |
| Health care and social assistance | 65,069 | 139,393 | 68,638 | 93,726 | 50,854 | 57,358 | 36,879 | 63,330 | (D) | 7,226 | 7,648,607 | 11,147,476 |
| | 4.4 | 5.5 | 5.8 | 7.1 | 5.0 | 6.9 | 9.2 | 7.6 | 9.4 | 10.8 | N/A | 8.3 |
| Arts, entertainment, and recreation | 156,294 | 225,991 | 38,558 | 8,005 | 699 | 2,812 | 2,798 | 19,035 | 894 | 929 | 744,715 | 1,259,816 |
| | 10.5 | 9.0 | 3.3 | <1 | <1 | <1 | <1 | 2.3 | <1 | 1.4 | 1.7 | <1 |
| Accommodation and food services | 174,544 | 296,361 | 21,292 | 39,480 | 20,166 | 30,894 | 41,288 | 65,171 | 5,293 | 10,793 | 2,277,932 | 4,006,686 |
| | 11.7 | 11.8 | 1.8 | 3.0 | 2.0 | 3.7 | 2.7 | 7.8 | 10.5 | 16.1 | 9.8 | 3.0 |
| Other services | 79,981 | 103,625 | 59,409 | 89,750 | 49,415 | 54,226 | 28,615 | 53,405 | 2,637 | 3,032 | 3,889,012 | 5,584,537 |
| | 5.4 | 4.1 | 5.0 | 6.8 | 4.8 | 6.6 | 4.7 | 6.4 | 7.3 | 4.5 | 4.9 | 4.1 |
| Government and government enterprises | 188,479 | 200,149 | 390,074 | 348,971 | 189,361 | 198,351 | 92,968 | 137,232 | 18,446 | 17,176 | 17,009,682 | 20,234,868 |
| | 12.7 | 7.9 | 33.1 | 26.3 | 18.6 | 24.0 | 20.4 | 16.5 | 23.7 | 11.9 | 34.3 | 15.0 |

Sources: BEA 2010b, 2021b

Note: All percentages are rounded to the nearest tenth.

All 2010 dollar values were adjusted for inflation.

(D) represents data not shown to avoid disclosure of confidential information; estimates are included in high-level totals.

(N/A) means data are not available, or no information was given.

## Table A-20 (Part 1). Wyoming Analysis Area Employment by Sector (2010 and 2021)

| Sector | Albany County | | Big Horn County | | Campbell County | | Carbon County | | Converse County | | Crook County | | Fremont County | | State of Wyoming | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 |
| Total employment (number of jobs) | 22,700 | 25,169 | 6,750 | 6,800 | 36,344 | 32,069 | 9,599 | 9,852 | 8,203 | 8,763 | 4,291 | 4,676 | 24,428 | 23,249 | 385,059 | 409,176 |
| Wage and salary employment | 17,995 | 19,178 | 4,572 | 4,519 | 29,759 | 24,482 | 7,217 | 7,321 | 5,993 | 6,266 | 2,591 | 2,743 | 17,735 | 16,220 | 290,013 | 284,326 |
| Proprietors employment | 4,705 | 5,991 | 2,178 | 2,281 | 6,585 | 7,587 | 2,382 | 2,531 | 2,210 | 2,497 | 1,700 | 1,933 | 6,693 | 7,029 | 95,046 | 124,850 |
| Farm proprietors employment | 394 | 414 | 584 | 607 | 661 | 733 | 241 | 251 | 362 | 367 | 419 | 434 | 1,251 | 1,244 | 10,216 | 10,847 |
| Nonfarm proprietors employment | 4,311 | 5,577 | 1,594 | 1,674 | 5,924 | 6,854 | 2,141 | 2,280 | 1,848 | 2,130 | 1,281 | 1,499 | 5,442 | 5,785 | 84,830 | 114,003 |
| Farm employment | 516 | 567 | 745 | 786 | 793 | 917 | 392 | 446 | 499 | 533 | 511 | 553 | 1,471 | 1,501 | 13,053 | 14,277 |
| Nonfarm employment | 22,184 | 24,602 | 6,005 | 6,014 | 35,551 | 31,152 | 9,207 | 9,406 | 7,704 | 8,230 | 3,780 | 4,123 | 22,957 | 21,748 | 372,006 | 394,899 |
| Private nonfarm employment | 14,176 | 16,663 | 4,426 | 4,493 | 30,964 | 26,377 | 7,000 | 7,482 | 6,159 | 6,536 | 3,011 | 3,385 | 16,812 | 16,091 | 296,953 | 320,988 |
| **By Industry (Number of Jobs/Percentage of Total Employment)** | | | | | | | | | | | | | | | | |
| Forestry, fishing, and related activities | 113 | 146 | (D) | 130 | 120 | (D) | (D) | 169 | 95 | 117 | 127 | 146 | 234 | (D) | 2,816 | 3,323 |
| | <1 | <1 | N/A | 1.9 | <1 | N/A | N/A | 1.7 | 1.2 | 1.3 | 3 | 3.1 | 1 | N/A | <1 | <1 |
| Mining (including quarrying and oil and gas extraction) | 151 | 167 | 639 | 479 | 8,978 | 5,532 | 459 | (D) | 1,297 | 1,266 | 387 | 399 | 1,071 | 578 | 30,919 | 18,824 |
| | <1 | <1 | 9.5 | 7 | 24.7 | 17.3 | 4.8 | N/A | 15.8 | 14.4 | 9.0 | 8.5 | 4.4 | 2.5 | 8.0 | 4.6 |
| Utilities | 36 | 46 | 26 | 33 | 273 | 336 | 78 | 42 | (D) | (D) | (D) | (D) | 75 | 81 | 2,586 | 2,551 |
| | <1 | <1 | <1 | <1 | <1 | 1 | <1 | <1 | N/A | N/A | N/A | N/A | <1 | <1 | <1 | <1 |
| Construction | 1,134 | 1,198 | 477 | 607 | 4,288 | 2,457 | 763 | (D) | 765 | 589 | 369 | 411 | 1,589 | 1,386 | 30,543 | 29,989 |
| | 5 | 4.8 | 7.1 | 8.9 | 11.8 | 7.7 | 7.9 | N/A | 9.3 | 6.7 | 8.6 | 8.8 | 6.5 | 6 | 7.9 | 7.3 |
| Manufacturing | 410 | 679 | 304 | 402 | 588 | 607 | (D) | (D) | 127 | 194 | 208 | 280 | 397 | 515 | 10,441 | 12,284 |
| | 1.8 | 2.7 | 4.5 | 5.9 | 1.6 | 1.9 | N/A | N/A | 1.5 | 2.2 | 4.8 | 6.0 | 1.6 | 2.2 | 2.7 | 3.0 |
| Wholesale trade | 198 | 200 | 165 | 123 | 1,697 | 1,339 | 72 | 77 | (D) | (D) | (D) | 91 | 440 | 398 | 9,387 | 8,547 |
| | <1 | <1 | 2.4 | 1.8 | 4.7 | 4.2 | <1 | <1 | N/A | N/A | N/A | 1.9 | 1.8 | 1.7 | 2.4 | 2.1 |
| Retail trade | 2,144 | 2,159 | (D) | 460 | 3,066 | 3,263 | 938 | 996 | 616 | 661 | 326 | 417 | 2,516 | 2,334 | 38,004 | 39,259 |
| | 9.4 | 8.6 | N/A | 6.8 | 8.4 | 10.2 | 9.8 | 10.1 | 7.5 | 7.5 | 7.6 | 8.9 | 10.3 | 10 | 9.9 | 9.6 |
| Transportation and warehousing | 275 | 513 | 214 | 185 | 1,491 | 1,396 | 529 | 349 | 459 | 471 | 136 | (D) | 554 | 475 | 14,094 | 16,124 |
| | 1.2 | 2 | 3.2 | 2.7 | 4.1 | 4.4 | 5.5 | 3.5 | 5.6 | 5.4 | 3.2 | N/A | 2.3 | 2 | 3.7 | 3.9 |
| Information | 201 | 179 | 131 | 80 | 240 | 280 | 98 | 68 | 75 | 46 | (D) | (D) | 285 | 181 | 4,701 | 4,197 |
| | <1 | <1 | 1.9 | 1.2 | <1 | <1 | 1 | <1 | <1 | <1 | N/A | N/A | 1.2 | <1 | 1.2 | 1 |

| Sector | Albany County | | Big Horn County | | Campbell County | | Carbon County | | Converse County | | Crook County | | Fremont County | | State of Wyoming | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 |
| Finance and insurance | 788 | 1,066 | 222 | 242 | 752 | 994 | 275 | 409 | 176 | 341 | (D) | 181 | 671 | 911 | 14,999 | 26,587 |
| | 3.5 | 4.2 | 3.3 | 3.6 | 2.1 | 3.1 | 2.9 | 4.2 | 2.1 | 3.9 | N/A | 3.9 | 2.7 | 3.9 | 3.9 | 6.5 |
| Real estate and rental and leasing | 987 | 1,283 | 176 | 227 | 1,500 | 1,748 | 377 | 446 | 346 | 420 | (D) | 264 | 1,255 | 1,203 | 19,797 | 27,667 |
| | 4.3 | 5.1 | 2.6 | 3.3 | 4.1 | 5.5 | 3.9 | 4.5 | 4.2 | 4.8 | N/A | 5.6 | 5.1 | 5.2 | 5.1 | 6.8 |
| Professional, scientific, and technical services | 1,402 | 1,722 | (D) | (D) | 1,249 | 1,071 | 283 | 250 | 248 | (D) | 133 | 155 | 878 | 853 | 16,595 | 19,159 |
| | 6.2 | 6.8 | N/A | N/A | 3.4 | 3.3 | 2.9 | 2.5 | 3.0 | N/A | 3.1 | 3.3 | 3.6 | 3.7 | 4.3 | 4.7 |
| Management of companies and enterprises | (D) | (D) | (D) | (D) | 265 | 118 | 20 | 16 | (D) | (D) | 3 | (D) | 38 | 103 | 1,242 | 2,192 |
| | N/A | N/A | N/A | N/A | <1 | <1 | <1 | <1 | N/A | N/A | <1 | N/A | <1 | <1 | <1 | <1 |
| Administrative and support and waste management and remediation services | (D) | (D) | 301 | 267 | 1,051 | 1,108 | 259 | 340 | (D) | 305 | 66 | (D) | 588 | 598 | 12,347 | 14,540 |
| | N/A | N/A | 4.5 | 3.9 | 2.9 | 3.5 | 2.7 | 3.5 | N/A | 3.5 | 1.5 | N/A | 2.4 | 2.6 | 3.2 | 3.6 |
| Educational services | 621 | 458 | 34 | 47 | 161 | 242 | (D) | 49 | (D) | 27 | (D) | (D) | (D) | 584 | 3,645 | 4,106 |
| | 2.7 | 1.8 | <1 | <1 | <1 | <1 | N/A | <1 | N/A | <1 | N/A | N/A | N/A | 2.5 | <1 | 1 |
| Health care and social assistance | 1,939 | 2,405 | 265 | 286 | 1,293 | 1,469 | (D) | 470 | (D) | 397 | (D) | (D) | (D) | 2,454 | 28,965 | 30,657 |
| | 8.5 | 9.6 | 3.9 | 4.2 | 3.6 | 4.6 | N/A | 4.8 | N/A | 4.5 | N/A | N/A | N/A | 10.6 | 7.5 | 7.5 |
| Arts, entertainment, and recreation | 440 | 522 | 36 | 102 | 293 | (D) | 201 | 152 | 105 | 122 | 75 | 103 | 406 | (D) | 6,593 | 8,233 |
| | 1.9 | 2.1 | <1 | 1.5 | <1 | N/A | 2.1 | 1.5 | 1.3 | 1.4 | 1.7 | 2.2 | 1.7 | N/A | 1.7 | 2 |
| Accommodation and food services | 1,881 | 2,208 | 277 | 336 | 2,076 | 2,353 | 962 | 1,346 | 554 | 582 | 278 | 299 | 1,601 | 1,622 | 32,205 | 35,231 |
| | 8.3 | 8.8 | 4.1 | 4.9 | 5.7 | 7.3 | 10.0 | 13.7 | 6.8 | 6.6 | 6.5 | 6.4 | 6.6 | 7 | 8.4 | 8.6 |
| Other services | 882 | 996 | 274 | 244 | 1,583 | 1,457 | 411 | 364 | 354 | 400 | 169 | 187 | 1,229 | 1,095 | 17,074 | 17,518 |
| | 3.9 | 4 | 4.1 | 3.6 | 4.4 | 4.5 | 4.3 | 3.7 | 4.3 | 4.6 | 3.9 | 4 | 5 | 4.7 | 4.4 | 4.3 |
| Government and government enterprises | 8,008 | 7,939 | 1,579 | 1,521 | 4,587 | 4,775 | 2,207 | 1,924 | 1,545 | 1,694 | 769 | 738 | 6,145 | 5,657 | 75,053 | 73,911 |
| | 35.3 | 31.5 | 23.4 | 22.4 | 12.6 | 14.9 | 23.0 | 19.5 | 18.8 | 19.3 | 17.9 | 15.8 | 25.2 | 24.3 | 19.5 | 18.1 |

Sources: BEA 2010a, 2021a

(D) represents data not shown to avoid disclosure of confidential information; estimates are included in high-level totals.

(N/A) means data are not available, or no information was given.

## Table A-20 (Part 2). Wyoming Analysis Area Employment by Sector (2010 and 2021)

| Sector | Hot Spring County | | Johnson County | | Laramie County | | Lincoln County | | Natrona County | | Niobrara County | | Park County | | State of Wyoming | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 |
| Total employment (number of jobs) | 3,175 | 2,938 | 5,916 | 6,438 | 61,441 | 75,024 | 9,833 | 11,969 | 51,833 | 52,883 | 1,709 | 1,733 | 20,280 | 21,916 | 385,059 | 409,176 |
| Wage and salary employment | 2,270 | 2,028 | 3,539 | 3,463 | 48,730 | 52,739 | 6,496 | 7,293 | 40,075 | 38,830 | 1,024 | 967 | 14,086 | 14,337 | 290,013 | 284,326 |
| Proprietors employment | 905 | 910 | 2,377 | 2,975 | 12,711 | 22,285 | 3,337 | 4,676 | 11,758 | 14,053 | 685 | 766 | 6,194 | 7,579 | 95,046 | 124,850 |
| Farm proprietors employment | 163 | 171 | 293 | 325 | 898 | 1,055 | 525 | 575 | 358 | 357 | 208 | 220 | 737 | 810 | 10,216 | 10,847 |
| Nonfarm proprietors employment | 742 | 739 | 2,084 | 2,650 | 11,813 | 21,230 | 2,812 | 4,101 | 11,400 | 13,696 | 477 | 546 | 5,457 | 6,769 | 84,830 | 114,003 |
| Farm employment | 190 | 201 | 406 | 466 | 1,135 | 1,369 | 628 | 692 | 469 | 483 | 262 | 282 | 980 | 1,092 | 13,053 | 14,277 |
| Nonfarm employment | 2,985 | 2,737 | 5,510 | 5,972 | 60,306 | 73,655 | 9,205 | 11,277 | 51,364 | 52,400 | 1,447 | 1,451 | 19,300 | 20,824 | 372,006 | 394,899 |
| Private nonfarm employment | 2,365 | 2,113 | 4,451 | 4,945 | 42,777 | 56,103 | 7,261 | 9,312 | 45,091 | 46,244 | 983 | 993 | 15,605 | 17,282 | 296,953 | 320,988 |
| **By Industry (Number of Jobs/Percentage of Total Employment)** | | | | | | | | | | | | | | | | |
| Forestry, fishing, and related activities | (D) | (D) | 137 | 139 | (D) | (D) | 104 | 109 | (D) | (D) | (D) | (D) | 232 | 251 | 2,816 | 3,323 |
| | N/A | N/A | 2.3 | 2.2 | N/A | N/A | 1.1 | <1 | N/A | N/A | N/A | N/A | 1.1 | 1.1 | <1 | <1 |
| Mining (including quarrying and oil and gas extraction) | (D) | (D) | 420 | 276 | (D) | 683 | 820 | 654 | 4,820 | 2,434 | 100 | 101 | 866 | 526 | 30,919 | 18,824 |
| | N/A | N/A | 7.1 | 4.3 | N/A | <1 | 8.3 | 5.5 | 9.3 | 4.6 | 5.9 | 5.8 | 4.3 | 2.4 | 8 | 4.6 |
| Utilities | (D) | (D) | 16 | 23 | 143 | 184 | 202 | 169 | (D) | 150 | (D) | (D) | 78 | 60 | 2,586 | 2,551 |
| | N/A | N/A | <1 | <1 | <1 | <1 | 2.1 | 1.4 | N/A | <1 | N/A | N/A | <1 | <1 | <1 | <1 |
| Construction | 149 | 145 | 536 | 451 | 3,553 | 4,716 | 1,183 | 1,607 | 3,782 | 4,074 | 86 | (D) | 1,591 | 1,733 | 30,543 | 29,989 |
| | 4.7 | 4.9 | 9.1 | 7 | 5.8 | 6.3 | 12 | 13.4 | 7.3 | 7.7 | 5 | N/A | 7.8 | 7.9 | 7.9 | 7.3 |
| Manufacturing | 84 | 154 | 77 | 152 | 1,609 | 1,509 | 222 | 280 | 1,800 | 1,882 | (D) | (D) | 647 | 599 | 10,441 | 12,284 |
| | 2.6 | 5.2 | 1.3 | 2.4 | 2.6 | 2 | 2.3 | 2.3 | 3.5 | 3.6 | N/A | N/A | 3.2 | 2.7 | 2.7 | 3 |
| Wholesale trade | (D) | (D) | 101 | 121 | 1,008 | 1,298 | 118 | 139 | 2,591 | 2,141 | (D) | (D) | 337 | 440 | 9,387 | 8,547 |
| | N/A | N/A | 1.7 | 1.9 | 1.6 | 1.7 | 1.2 | 1.2 | 5 | 4 | N/A | N/A | 1.7 | 2 | 2.4 | 2.1 |
| Retail trade | 265 | (D) | 501 | 535 | 6,659 | 6,685 | 907 | 1,272 | 5,873 | 5,914 | (D) | (D) | 2,422 | 2,240 | 38,004 | 39,259 |
| | 8.3 | N/A | 8.5 | 8.3 | 10.8 | 8.9 | 9.2 | 10.6 | 11.3 | 11.2 | N/A | N/A | 11.9 | 10.2 | 9.9 | 9.6 |
| Transportation and warehousing | 113 | 98 | 166 | (D) | 3,468 | 4,960 | 304 | 295 | 1,373 | 2,482 | 91 | (D) | 382 | 471 | 14,094 | 16,124 |
| | 3.6 | 3.3 | 2.8 | N/A | 5.6 | 6.6 | 3.1 | 2.5 | 2.6 | 4.7 | 5.3 | N/A | 1.9 | 2.1 | 3.7 | 3.9 |

| Sector | Hot Spring County | | Johnson County | | Laramie County | | Lincoln County | | Natrona County | | Niobrara County | | Park County | | State of Wyoming | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 |
| Information | 50 | (D) | 53 | 72 | 1,242 | 1,071 | 134 | 143 | 588 | 421 | (D) | (D) | 253 | 278 | 4,701 | 4,197 |
| | 1.6 | N/A | <1 | 1.1 | 2 | 1.4 | 1.4 | 1.2 | 1.1 | <1 | N/A | N/A | 1.2 | 1.3 | 1.2 | 1 |
| Finance and insurance | 88 | 122 | 309 | 389 | 3,421 | 8,087 | 326 | 538 | 2,219 | 3,098 | (D) | 73 | 780 | 1,187 | 14,999 | 26,587 |
| | 2.8 | 4.2 | 5.2 | 6 | 5.6 | 10.8 | 3.3 | 4.5 | 4.3 | 5.9 | N/A | 4.2 | 3.8 | 5.4 | 3.9 | 6.5 |
| Real estate and rental and leasing | 94 | 125 | 465 | 743 | 2,916 | 4,987 | 521 | 922 | 2,735 | 3,448 | (D) | 69 | 906 | 1,474 | 19,797 | 27,667 |
| | 3 | 4.3 | 7.9 | 11.5 | 4.7 | 6.6 | 5.3 | 7.7 | 5.3 | 6.5 | N/A | 4 | 4.5 | 6.7 | 5.1 | 6.8 |
| Professional, scientific, and technical services | 101 | 111 | 240 | 351 | 2,706 | 3,505 | (D) | 560 | 2,373 | 2,406 | (D) | 61 | 901 | 1,071 | 16,595 | 19,159 |
| | 3.2 | 3.8 | 4.1 | 5.5 | 4.4 | 4.7 | N/A | 4.7 | 4.6 | 4.5 | N/A | 3.5 | 4.4 | 4.9 | 4.3 | 4.7 |
| Management of companies and enterprises | (D) | (D) | (D) | (D) | 198 | 612 | (D) | 70 | 171 | 171 | 0 | 0 | 97 | 76 | 1,242 | 2,192 |
| | N/A | N/A | N/A | N/A | <1 | <1 | N/A | <1 | <1 | <1 | 0 | 0 | <1 | <1 | <1 | <1 |
| Administrative and support and waste management and remediation services | (D) | (D) | (D) | 170 | 2,487 | 3,335 | 302 | 468 | 2,139 | 2,156 | (D) | 22 | 582 | 747 | 12,347 | 14,540 |
| | N/A | N/A | N/A | 2.6 | 4.0 | 4.4 | 3.1 | 3.9 | 4.1 | 4.1 | N/A | 1.3 | 2.9 | 3.4 | 3.2 | 3.6 |
| Educational services | 20 | (D) | (D) | 42 | 566 | 570 | 64 | 93 | 385 | (D) | (D) | (D) | 135 | 185 | 3,645 | 4,106 |
| | <1 | N/A | N/A | <1 | <1 | <1 | <1 | <1 | <1 | N/A | N/A | N/A | <1 | <1 | <1 | 1 |
| Health care and social assistance | 366 | (D) | (D) | 286 | 4,768 | 5,219 | 489 | 586 | 6,443 | 6,634 | (D) | (D) | 1,734 | 1,925 | 28,965 | 30,657 |
| | 11.5 | N/A | N/A | 4.4 | 7.8 | 7 | 5 | 4.9 | 12.4 | 12.5 | N/A | N/A | 8.6 | 8.8 | 7.5 | 7.5 |
| Arts, entertainment, and recreation | 88 | 89 | 150 | 191 | 768 | (D) | 128 | 155 | 872 | 1,094 | (D) | 8 | 590 | 730 | 6,593 | 8,233 |
| | 2.8 | 3.0 | 2.5 | 3 | 1.2 | N/A | 1.3 | 1.3 | 1.7 | 2.1 | N/A | <1 | 2.9 | 3.3 | 1.7 | 2 |
| Accommodation and food services | 321 | 278 | 553 | 567 | 4,195 | 4,626 | 559 | 677 | 3,760 | (D) | (D) | (D) | 2,180 | 2,326 | 32,205 | 35,231 |
| | 10.1 | 9.5 | 9.3 | 8.8 | 6.8 | 6.2 | 5.7 | 5.7 | 7.3 | N/A | N/A | N/A | 10.7 | 10.6 | 8.4 | 8.6 |
| Other services | 173 | (D) | 245 | 292 | 2,508 | 2,726 | 447 | 575 | 2,863 | 2,661 | 65 | (D) | 892 | 963 | 17,074 | 17,518 |
| | 5.4 | N/A | 4.1 | 4.5 | 4.1 | 3.6 | 4.5 | 4.8 | 5.5 | 5 | 3.8 | N/A | 4.4 | 4.4 | 4.4 | 4.3 |
| Government and government enterprises | 620 | 624 | 1,059 | 1,027 | 17,529 | 17,552 | 1,944 | 1,965 | 6,273 | 6,156 | 464 | 458 | 3,695 | 3,542 | 75,053 | 73,911 |
| | 19.5 | 21.2 | 17.9 | 16 | 28.5 | 23.4 | 19.8 | 16.4 | 12.1 | 11.6 | 27.2 | 26.4 | 18.2 | 16.2 | 19.5 | 18.1 |

Sources: BEA 2010a, 2021a

(D) represents data not shown to avoid disclosure of confidential information; estimates are included in high-level totals.

(N/A) means data are not available, or no information was given.

## Table A-20 (Part 3). Wyoming Analysis Area Employment by Sector (2010 and 2021)

| Sector | Platte County | | Sheridan County | | Sublette County | | Sweetwater County | | Uinta County | | Washakie County | | Weston County | | State of Wyoming | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 |
| Total employment (number of jobs) | 5,649 | 5,551 | 19,595 | 25,067 | 8,157 | 6,167 | 29,291 | 25,444 | 12,791 | 11,554 | 5,522 | 5,174 | 3,893 | 3,945 | 385,059 | 409,176 |
| Wage and salary employment | 3,827 | 3,668 | 13,791 | 14,397 | 5,974 | 3,923 | 25,071 | 20,921 | 9,978 | 8,373 | 4,193 | 3,727 | 2,521 | 2,465 | 290,013 | 284,326 |
| Proprietors employment | 1,822 | 1,883 | 5,804 | 10,670 | 2,183 | 2,244 | 4,220 | 4,523 | 2,813 | 3,181 | 1,329 | 1,447 | 1,372 | 1,480 | 95,046 | 124,850 |
| Farm proprietors employment | 452 | 451 | 603 | 657 | 304 | 309 | 225 | 236 | 305 | 300 | 170 | 192 | 231 | 251 | 10,216 | 10,847 |
| Nonfarm proprietors employment | 1,370 | 1,432 | 5,201 | 10,013 | 1,879 | 1,935 | 3,995 | 4,287 | 2,508 | 2,881 | 1,159 | 1,255 | 1,141 | 1,229 | 84,830 | 114,003 |
| Farm employment | 593 | 622 | 762 | 847 | 428 | 451 | 266 | 283 | 373 | 388 | 279 | 311 | 288 | 314 | 13,053 | 14,277 |
| Nonfarm employment | 5,056 | 4,929 | 18,833 | 24,220 | 7,729 | 5,716 | 29,025 | 25,161 | 12,418 | 11,166 | 5,243 | 4,863 | 3,605 | 3,631 | 372,006 | 394,899 |
| Private nonfarm employment | 4,012 | 3,920 | 15,250 | 20,525 | 6,607 | 4,642 | 24,205 | 20,656 | 10,138 | 8,963 | 4,292 | 4,010 | 2,757 | 2,791 | 296,953 | 320,988 |
| **By Industry (Number of Jobs/Percentage of Total Employment)** | | | | | | | | | | | | | | | | |
| Forestry, fishing, and related activities | (D) | 128 | 234 | 300 | 118 | (D) | (D) | (D) | 64 | 76 | (D) | (D) | 38 | 69 | 2,816 | 3,323 |
| | N/A | 2.3 | 1.2 | 1.2 | 1.4 | N/A | N/A | N/A | <1 | <1 | N/A | N/A | 1 | 1.7 | <1 | <1 |
| Mining (including quarrying and oil and gas extraction) | (D) | 117 | 677 | 284 | 1,907 | 575 | 5,788 | 3,448 | 946 | 238 | 195 | 134 | 341 | 339 | 30,919 | 18,824 |
| | N/A | 2.1 | 3.5 | 1.1 | 23.4 | 9.3 | 19.8 | 13.6 | 7.4 | 2.1 | 3.5 | 2.6 | 8.8 | 8.6 | <1 | 4.6 |
| Utilities | (D) | (D) | 67 | (D) | 36 | (D) | (D) | 425 | 97 | 141 | 46 | 44 | 33 | 15 | 2,586 | 2,551 |
| | N/A | N/A | <1 | N/A | <1 | N/A | N/A | 1.7 | <1 | 1.2 | <1 | <1 | <1 | <1 | <1 | <1 |
| Construction | 337 | 284 | 1,662 | 1,849 | 1,070 | 660 | 2,196 | 1,662 | 1,699 | 1,067 | 395 | 321 | 306 | (D) | 30,543 | 29,989 |
| | 6.0 | 5.1 | 8.5 | 7.4 | 13.1 | 10.7 | 7.5 | 6.5 | 13.3 | 9.2 | 7.2 | 6.2 | 7.9 | N/A | 7.9 | 7.3 |
| Manufacturing | 96 | 110 | 358 | 955 | 82 | 102 | 1,369 | 1,314 | 314 | 361 | 483 | 500 | 147 | (D) | 10,441 | 12,284 |
| | 1.7 | 2 | 1.8 | 3.8 | 1 | 1.7 | 4.7 | 5.2 | 2.5 | 3.1 | 8.7 | 9.7 | 3.8 | N/A | 2.7 | 3 |
| Wholesale trade | (D) | (D) | 426 | (D) | 72 | (D) | (D) | 656 | 304 | 173 | 128 | 166 | 50 | 33 | 9,387 | 8,547 |
| | N/A | N/A | 2.2 | N/A | <1 | N/A | N/A | 2.6 | 2.4 | 1.5 | 2.3 | 3.2 | 1.3 | <1 | 2.4 | 2.1 |
| Retail trade | 497 | 627 | 2,155 | 2,677 | 534 | 539 | 2,874 | 2,734 | 1,424 | 1,508 | 492 | 431 | 376 | 445 | 38,004 | 39,259 |
| | 8.8 | 11.3 | 11 | 10.7 | 6.5 | 8.7 | 9.8 | 10.7 | 11.1 | 13.1 | 8.9 | 8.3 | 9.7 | 11.3 | 9.9 | 9.6 |
| Transportation and warehousing | 299 | 225 | 725 | 696 | 339 | 152 | 1,650 | 1,294 | 460 | 482 | 183 | 198 | 169 | 166 | 14,094 | 16,124 |
| | 5.3 | 4.1 | 3.7 | 2.8 | 4.2 | 2.5 | 5.6 | 5.1 | 3.6 | 4.2 | 3.3 | 3.8 | 4.3 | 4.2 | 3.7 | 3.9 |

| Sector | Platte County | | Sheridan County | | Sublette County | | Sweetwater County | | Uinta County | | Washakie County | | Weston County | | State of Wyoming | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 |
| Information | 38 | 28 | 210 | 342 | 45 | 22 | 247 | 130 | 248 | 308 | 90 | 51 | 45 | 34 | 4,701 | 4,197 |
| | <1 | <1 | 1.1 | 1.4 | <1 | <1 | <1 | <1 | 1.9 | 2.7 | 1.6 | 1 | 1.2 | <1 | 1.2 | 1 |
| Finance and insurance | 234 | 216 | 913 | 2,314 | 127 | 181 | 710 | 809 | 408 | 469 | 184 | 190 | 166 | 160 | 14,999 | 26,587 |
| | 4.1 | 3.9 | 4.7 | 9.2 | 1.6 | 2.9 | 2.4 | 3.2 | 3.2 | 4.1 | 3.3 | 3.7 | 4.3 | 4.1 | 3.9 | 6.5 |
| Real estate and rental and leasing | 247 | 269 | 1,211 | 2,666 | 431 | 497 | 1,237 | 1,126 | 553 | 559 | 263 | 276 | 110 | 167 | 19,797 | 27,667 |
| | 4.4 | 4.8 | 6.2 | 10.6 | 5.3 | 8.1 | 4.2 | 4.4 | 4.3 | 4.8 | 4.8 | 5.3 | 2.8 | 4.2 | 5.1 | 6.8 |
| Professional, scientific, and technical services | 186 | 187 | 1,100 | 1,717 | 328 | 322 | 862 | 716 | 502 | 486 | 229 | 163 | 112 | 92 | 16,595 | 19,159 |
| | 3.3 | 3.4 | 5.6 | 6.8 | 4 | 5.2 | 2.9 | 2.8 | 3.9 | 4.2 | 4.1 | 3.2 | 2.9 | 2.3 | 4.3 | 4.7 |
| Management of companies and enterprises | 38 | (D) | 37 | 291 | (D) | 32 | 92 | 125 | 32 | 55 | (D) | (D) | (D) | 12 | 1,242 | 2,192 |
| | <1 | N/A | <1 | 1.2 | N/A | <1 | <1 | <1 | <1 | <1 | N/A | N/A | N/A | <1 | <1 | <1 |
| Administrative and support and waste management and remediation services | 134 | (D) | 575 | 695 | (D) | 240 | 742 | 813 | 295 | 241 | (D) | (D) | (D) | 106 | 12,347 | 14,540 |
| | 2.4 | N/A | 2.9 | 2.8 | N/A | 3.9 | 2.5 | 3.2 | 2.3 | 2.1 | N/A | N/A | N/A | 2.7 | 3.2 | 3.6 |
| Educational services | 27 | 32 | 167 | 237 | (D) | (D) | 124 | (D) | (D) | 81 | 37 | (D) | (D) | (D) | 3,645 | 4,106 |
| | <1 | <1 | <1 | <1 | N/A | N/A | <1 | N/A | N/A | <1 | <1 | N/A | N/A | N/A | <1 | 1 |
| Health care and social assistance | 383 | 367 | 1,725 | 1,694 | (D) | (D) | 1,283 | 1,532 | (D) | 1,259 | 630 | (D) | (D) | (D) | 28,965 | 30,657 |
| | 6.8 | 6.6 | 8.8 | 6.8 | N/A | N/A | 4.4 | 6 | N/A | 10.9 | 11.4 | N/A | N/A | N/A | 7.5 | 7.5 |
| Arts, entertainment, and recreation | 62 | (D) | 479 | 573 | 113 | 149 | 260 | 292 | 127 | 195 | 71 | 85 | (D) | (D) | 6,593 | 8,233 |
| | 1.1 | N/A | 2.4 | 2.3 | 1.4 | 2.4 | <1 | 1.1 | 1 | 1.7 | 1.3 | 1.6 | N/A | N/A | 1.7 | 2 |
| Accommodation and food services | 492 | 506 | 1,601 | 1,611 | 526 | 412 | 2,274 | 2,336 | 797 | 786 | 323 | 311 | (D) | (D) | 32,205 | 35,231 |
| | 8.7 | 9.1 | 8.2 | 6.4 | 6.4 | 6.7 | 7.8 | 9.2 | 6.2 | 6.8 | 5.8 | 6.0 | N/A | N/A | 8.4 | 8.6 |
| Other services | 229 | 228 | 928 | 1,147 | 297 | 273 | 1,159 | 1,064 | 498 | 478 | 278 | 291 | 193 | 179 | 17,074 | 17,518 |
| | 4.1 | 4.1 | 4.7 | 4.6 | 3.6 | 4.4 | 4 | 4.2 | 3.9 | 4.1 | 5 | 5.6 | 5.0 | 4.5 | 4.4 | 4.3 |
| Government and government enterprises | 1,044 | 1,009 | 3,583 | 3,695 | 1,122 | 1,074 | 4,820 | 4,505 | 2,280 | 2,203 | 951 | 853 | 848 | 840 | 75,053 | 73,911 |
| | 18.5 | 18.2 | 18.3 | 14.7 | 13.8 | 17.4 | 16.5 | 17.7 | 17.8 | 19.1 | 17.2 | 16.5 | 21.8 | 21.3 | 19.5 | 18.1 |

Sources: BEA 2010a, 2021a

(D) represents data not shown to avoid disclosure of confidential information; estimates are included in high-level totals.

(N/A) means data are not available, or no information was given.

## Table A-21 (Part 1). Wyoming Analysis Area Labor Income by Sector, 2010 and 2021 (2021$)

| Sector | Albany County | | Big Horn County | | Campbell County | | Carbon County | | Converse County | | Crook County | | Fremont County | | State of Wyoming | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 |
| Personal income (thousands of dollars) | 1,579,334 | 1,825,036 | 480,132 | 549,715 | 2,962,772 | 2,598,834 | 785,012 | 949,319 | 715,890 | 951,343 | 334,265 | 379,099 | 1,829,332 | 2,023,919 | 32,970,057 | 40,322,831 |
| Population (persons) | 36,427 | 37,608 | 11,662 | 11,632 | 46,263 | 46,401 | 15,843 | 14,649 | 13,821 | 13,672 | 7,109 | 7,315 | 40,196 | 39,336 | 564,405 | 578,803 |
| Per capita personal income (dollars) | 43,356 | 48,528 | 41,170 | 47,259 | 64,042 | 56,008 | 49,550 | 64,804 | 51,798 | 69,583 | 47,021 | 51,825 | 45,510 | 51,452 | 58,416 | 69,666 |
| Earnings by place of work (thousands of dollars) | 1,075,264 | 1,211,877 | 302,939 | 308,958 | 2,998,686 | 2,117,995 | 537,427 | 595,468 | 490,676 | 604,083 | 166,423 | 199,932 | 1,182,477 | 1,121,041 | 22,966,334 | 24,273,866 |
| Wages and salaries (thousands of dollars) | 759,714 | 817,565 | 204,151 | 210,258 | 2,073,561 | 1,476,323 | 366,059 | 408,856 | 331,215 | 373,264 | 112,554 | 134,317 | 819,610 | 744,960 | 15,489,828 | 15,426,455 |
| Supplement to wages and salaries | 226,619 | 267,802 | 59,919 | 67,046 | 448,214 | 368,010 | 113,199 | 145,520 | 87,348 | 105,142 | 32,042 | 38,242 | 220,093 | 229,065 | 3,957,129 | 4,219,422 |
| Proprietors' income | 88,932 | 126,510 | 38,870 | 31,654 | 476,911 | 273,662 | 58,169 | 41,092 | 72,113 | 125,677 | 21,827 | 27,373 | 142,773 | 147,016 | 3,519,377 | 4,627,989 |
| Farm earnings | 2,959 | 9,687 | 9,343 | 11,524 | -7,457 | 13,956 | 2,896 | 13,068 | -321 | 8,531 | -928 | 11,663 | 18,350 | 29,932 | 153,277 | 287,560 |
| Nonfarm earnings | 1,072,305 | 1,202,190 | 293,596 | 297,434 | 3,006,144 | 2,104,039 | 534,530 | 582,400 | 490,996 | 595,552 | 167,351 | 188,269 | 1,164,126 | 1,091,109 | 22,813,057 | 23,986,306 |
| Private nonfarm earnings | 547,808 | 699,885 | 195,492 | 194,129 | 2,638,794 | 1,735,833 | 376,157 | 440,323 | 384,982 | 455,151 | 119,300 | 138,714 | 753,408 | 691,056 | 17,237,710 | 18,281,004 |
| **By Industry (Earnings in Thousands of Dollars/Percentage of Nonfarm Earnings)** | | | | | | | | | | | | | | | | |
| Forestry, fishing, and related activities | 1,340 | 2,056 | (D) | 2,243 | 1,786 | (D) | (D) | 2,250 | 3,225 | 3,698 | 2,782 | 3,357 | 3,410 | (D) | 118,817 | 53,082 |
| | <1 | <1 | N/A | <1 | <1 | N/A | N/A | <1 | <1 | <1 | 1.7 | 1.8 | <1 | N/A | <1 | <1 |
| Mining (including quarrying and oil and gas extraction) | 3,600 | 7,076 | 50,106 | 35,778 | 1,230,257 | 565,972 | 34,387 | (D) | 120,693 | 141,535 | 22,538 | 28,149 | 100,882 | 56,028 | 3,627,912 | 2,091,152 |
| | <1 | <1 | 17.1 | 12.0 | 40.9 | 26.9 | 6.4 | N/A | 24.6 | 23.8 | 13.5 | 15 | 8.7 | 5.1 | 15.9 | 8.7 |
| Utilities | 4,008 | 4,856 | 2,226 | 3116 | 38,997 | 51,847 | 7,710 | 5,535 | (D) | (D) | (D) | (D) | 8,438 | 8,928 | 349,808 | 353,681 |
| | <1 | <1 | <1 | 1.0 | 1.3 | 2.5 | 1.4 | 1 | N/A | N/A | N/A | N/A | <1 | <1 | 1.5 | 1.5 |
| Construction | 58,382 | 67,869 | 24,690 | 30,345 | 351,563 | 176,775 | 56,482 | (D) | 63,747 | 51,653 | 17,227 | 23,189 | 99,779 | 74,540 | 2,223,256 | 1,976,951 |
| | 5.4 | 5.6 | 8.4 | 10.2 | 11.7 | 8.4 | 10.6 | N/A | 13.0 | 8.7 | 10.3 | 12.3 | 8.6 | 6.8 | 9.7 | 8.2 |
| Manufacturing | 22,532 | 34,699 | 14,051 | 23,983 | 55,119 | 47,233 | (D) | (D) | 5,590 | 10,991 | 11,893 | 18,661 | 14,492 | 22,121 | 752,057 | 978,307 |
| | 2.1 | 2.9 | 4.8 | 8.1 | 1.8 | 2.2 | N/A | N/A | 1.1 | 1.8 | 7.1 | 9.9 | 1.2 | 2 | 3.3 | 4.1 |
| Wholesale trade | 10,893 | 15,233 | 8,687 | 6,920 | 166,016 | 125,372 | 3,521 | 4,449 | (D) | (D) | (D) | 4,921 | 22,580 | 20,641 | 760,672 | 650,287 |
| | 1.0 | 1.3 | 3.0 | 2.3 | 5.5 | 6.9 | <1 | <1 | N/A | N/A | N/A | 2.6 | 1.9 | 1.9 | 3.3 | 2.7 |

| Sector | Albany County | | Big Horn County | | Campbell County | | Carbon County | | Converse County | | Crook County | | Fremont County | | State of Wyoming | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 |
| Retail trade | 65,928 | 81,550 | (D) | 10,098 | 123,461 | 135,153 | 35,353 | 32,537 | 25,156 | 20,138 | 9,173 | 8,797 | 89,792 | 82,450 | 1,343,277 | 1,454,718 |
| | 6.1 | 6.8 | N/A | 3.4 | 4.1 | 6.4 | 6.6 | 5.6 | 5.1 | 3.4 | 5.5 | 4.7 | 7.7 | 7.6 | 5.9 | 6.1 |
| Transportation and warehousing | 18,756 | 15,390 | 14,253 | 23,369 | 129,124 | 159,480 | 48,586 | 37,589 | 40,161 | 54,316 | 5,944 | (D) | 34,825 | 59,075 | 1,200,603 | 2,791,054 |
| | 1.7 | 1.3 | 4.9 | 7.9 | 4.3 | 7.6 | 9.1 | 6.5 | 8.2 | 9.1 | 3.6 | N/A | 3.0 | 5.4 | 5.3 | 11.6 |
| Information | 10,087 | 6,169 | 7,854 | 4,203 | 14,393 | 18,043 | 4,439 | 4,082 | 3,419 | 2,318 | (D) | (D) | 14,089 | 9,450 | 288,954 | 282,771 |
| | <1 | <1 | 2.7 | 1.4 | <1 | <1 | <1 | <1 | <1 | <1 | N/A | N/A | 1.2 | <1 | 1.3 | 1.2 |
| Finance and insurance | 39,254 | 44,140 | 7,503 | 8,321 | 36,001 | 42,962 | 11,220 | 3,672 | 7,357 | 10,288 | (D) | 330 | 24,762 | 25,124 | 934,962 | 842,124 |
| | 3.7 | 3.7 | 2.6 | 2.8 | 1.2 | 2 | 2.1 | <1 | 1.5 | 1.7 | N/A | <1 | 2.1 | 2.3 | 4.1 | 3.5 |
| Real estate and rental and leasing | 22,698 | 32,909 | 2,244 | 948 | 77,858 | 62,395 | 10,849 | 4,332 | 11,408 | 41,659 | (D) | 1,991 | 38,125 | 20,780 | 551,697 | 746,346 |
| | 2.1 | 2.7 | <1 | <1 | 2.6 | 3 | 2.0 | <1 | 2.3 | 7 | N/A | 1.1 | 3.3 | 1.9 | 2.4 | 3.1 |
| Professional, scientific, and technical services | 82,709 | 103,505 | (D) | (D) | 95,113 | 57,559 | 12,243 | 10,267 | 11,109 | (D) | 6,013 | 9,328 | 50,650 | 39,759 | 1,015,148 | 1,282,758 |
| | 7.7 | 8.6 | N/A | N/A | 3.2 | 2.7 | 2.3 | 1.8 | 2.3 | N/A | 3.6 | 5 | 4.4 | 3.6 | 4.4 | 5.3 |
| Management of companies and enterprises | (D) | (D) | (D) | (D) | 48,390 | 11,394 | 1,905 | 1,734 | (D) | (D) | 637 | (D) | 3,332 | 9,786 | 146,154 | 185,754 |
| | N/A | N/A | N/A | N/A | 1.6 | <1 | <1 | <1 | N/A | N/A | <1 | N/A | <1 | <1 | <1 | <1 |
| Administrative and support and waste management and remediation services | (D) | (D) | 8,123 | 10,458 | 32,809 | 45,706 | 7,273 | 11,883 | (D) | 17,265 | 2,451 | (D) | 14,053 | 16,210 | 388,126 | 635,097 |
| | N/A | N/A | 2.8 | 3.5 | 1.1 | 2.2 | 1.4 | 2 | N/A | 2.9 | 1.5 | N/A | 1.2 | 1.5 | 1.7 | 2.6 |
| Educational services | 23,952 | 16,287 | 306 | 448 | 3,806 | 9,019 | (D) | 470 | (D) | 163 | (D) | (D) | (D) | 24,178 | 98,393 | 131,633 |
| | 2.2 | 1.4 | <1 | <1 | <1 | <1 | N/A | <1 | N/A | <1 | N/A | N/A | N/A | 2.2 | <1 | <1 |
| Health care and social assistance | 97,467 | 140,243 | 7,981 | 8,928 | 87,518 | 78,163 | (D) | 19,636 | (D) | 20,062 | (D) | (D) | (D) | 127,601 | 1,725,003 | 1,790,081 |
| | 9.1 | 11.7 | 2.7 | 3.0 | 2.9 | 3.7 | N/A | 3.4 | N/A | 3.4 | N/A | N/A | N/A | 11.7 | 7.6 | 7.5 |
| Arts, entertainment, and recreation | 4,771 | 13,022 | 468 | 1,185 | 2,705 | (D) | 7,822 | 5,163 | 1,161 | 1,103 | 2,467 | 2,280 | 3,763 | (D) | 123,308 | 156,217 |
| | <1 | 1.1 | <1 | <1 | <1 | N/A | 1.5 | <1 | <1 | <1 | 1.5 | 1.2 | <1 | N/A | <1 | <1 |
| Accommodation and food services | 37,589 | 52,761 | 4,293 | 6,365 | 48,998 | 64,368 | 26,236 | 46,221 | 10,754 | 18,455 | 4,610 | 8,624 | 33,886 | 41,999 | 843,366 | 1,157,822 |
| | 3.5 | 4.4 | 1.5 | 2.1 | 1.6 | 3.1 | 4.9 | 7.9 | 2.2 | 3.1 | 2.8 | 4.6 | 2.9 | 3.8 | 3.7 | |
| Other services (except government and government enterprises) | 32,141 | 40,454 | 8,701 | 7,423 | 94,880 | 76,949 | 14,059 | 11,405 | 13,001 | 15,733 | 4,512 | 7,834 | 47,225 | 42,390 | 746,199 | 721,169 |
| | 3.0 | 3.4 | 3.0 | 2.5 | 3.2 | 3.7 | 2.6 | Feb-00 | 2.6 | 2.6 | 2.7 | 4.2 | 4.1 | 3.9 | 3.3 | 3.0 |

| Sector | Albany County | | Big Horn County | | Campbell County | | Carbon County | | Converse County | | Crook County | | Fremont County | | State of Wyoming | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 |
| Government and government enterprises | 524,497 | 502,305 | 98,105 | 103,305 | 367,350 | 368,206 | 158,374 | 142,077 | 106,014 | 140,401 | 48,051 | 49,555 | 410,719 | 400,053 | 5,575,347 | 5,705,302 |
| | 48.9 | 41.8 | 33.4 | 34.7 | 12.2 | 17.5 | 29.6 | 24.4 | 21.6 | 23.6 | 28.7 | 26.3 | 35.3 | 36.7 | 24.4 | 23.8 |

Sources: BEA 2010b, 2021b
Note: All percentages are rounded to the nearest tenth.
All 2010 dollar values were adjusted for inflation.
(D) represents data not shown to avoid disclosure of confidential information; estimates are included in high-level totals.
(N/A) means data are not available, or no information was given.

## Table A-21 (Part 2). Wyoming Analysis Area Labor Income by Sector, 2010 and 2021 (2021$)

| Sector | Hot Springs County | | Johnson County | | Laramie County | | Lincoln County | | Natrona County | | Niobrara County | | Park County | | State of Wyoming | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 |
| Personal income (thousands of dollars) | 231,738 | 362,323 | 408,724 | 528,539 | 5,005,701 | 5,915,191 | 771,940 | 1,248,380 | 4,776,439 | 5,582,770 | 115,681 | 131,156 | 1,464,635 | 1,985,442 | 32,970,057 | 40,322,831 |
| Population (persons) | 4,814 | 4,597 | 8,588 | 8,623 | 92,247 | 100,863 | 18,085 | 20,153 | 75,463 | 79,555 | 2,495 | 2,438 | 28,251 | 30,108 | 564,405 | 578,803 |
| Per capita personal income (dollars) | 48,139 | 78,817 | 47,593 | 61,294 | 54,263 | 58,646 | 42,684 | 61,945 | 63,295 | 70,175 | 46,366 | 53,797 | 51,844 | 65,944 | 58,416 | 69,666 |
| Earnings by place of work (thousands of dollars) | 136,309 | 259,279 | 216,311 | 259,435 | 3,596,383 | 4,266,191 | 451,191 | 651,002 | 3,590,795 | 3,981,649 | 72,616 | 83,248 | 975,208 | 995,735 | 22,966,334 | 24,273,866 |
| Wages and salaries (thousands of dollars) | 92,060 | 88,551 | 142,986 | 155,930 | 2,505,828 | 2,930,494 | 320,727 | 402,574 | 2,253,390 | 2,052,343 | 41,181 | 41,237 | 650,628 | 664,276 | 15,489,828 | 15,426,455 |
| Supplement to wages and salaries | 25,411 | 27,364 | 40,483 | 46,054 | 743,449 | 864,455 | 90,667 | 113,186 | 508,742 | 513,312 | 13,391 | 15,240 | 171,906 | 189,946 | 3,957,129 | 4,219,422 |
| Proprietors' income | 18,839 | 143,364 | 32,843 | 57,451 | 347,106 | 471,242 | 39,796 | 135,242 | 828,664 | 1,415,994 | 18,044 | 26,771 | 152,674 | 141,513 | 3,519,377 | 4,627,989 |
| Farm earnings | 2,642 | (315) | 674 | 11,649 | 41,297 | 29,628 | 3,776 | 8,746 | 1,654 | 3,753 | 3,077 | 7,835 | 13,825 | 20,910 | 153,277 | 287,560 |
| Nonfarm earnings | 133,667 | 259,594 | 215,638 | 247,786 | 3,555,086 | 4,236,563 | 447,416 | 642,256 | 3,589,141 | 3,977,896 | 69,540 | 75,413 | 961,383 | 974,825 | 22,813,057 | 23,986,306 |
| Private nonfarm earnings | 95,568 | 214,327 | 142,330 | 170,611 | 2,049,505 | 2,667,692 | 322,260 | 488,146 | 3,102,221 | 3,518,567 | 40,162 | 43,536 | 698,331 | 706,571 | 17,237,710 | 18,281,004 |
| **By Industry (Earnings in Thousands of Dollars/Percentage of Nonfarm Earnings)** | | | | | | | | | | | | | | | | |
| Forestry, fishing, and related activities | (D) | (D) | 3,301 | 2,802 | (D) | (D) | 1,693 | 1,059 | (D) | (D) | (D) | (D) | 4,696 | 3,520 | 118,817 | 53,082 |
| | N/A | N/A | 1.5 | 1.1 | N/A | N/A | <1 | <1 | N/A | N/A | N/A | N/A | <1 | <1 | <1 | <1 |

| Sector | Hot Springs County | | Johnson County | | Laramie County | | Lincoln County | | Natrona County | | Niobrara County | | Park County | | State of Wyoming | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 |
| Mining (including quarrying and oil and gas extraction) | (D) | (D) | 13,594 | 20,838 | (D) | 62,692 | 92,490 | 89,610 | 603,587 | 187,661 | 1,763 | 2,892 | 107,117 | 40,716 | 3,627,912 | 2,091,152 |
| | N/A | N/A | 6.3 | 8.4 | N/A | 1.5 | 20.7 | 14 | 16.8 | 4.7 | 2.5 | 3.8 | 11.1 | 4.2 | 15.9 | 8.7 |
| Utilities | (D) | (D) | 1,744 | 1,710 | 17,907 | 24,023 | 27,871 | 23,675 | (D) | 19,614 | (D) | (D) | 7,912 | 7,069 | 349,808 | 353,681 |
| | N/A | N/A | <1 | <1 | <1 | <1 | 6.2 | 3.7 | N/A | <1 | N/A | N/A | <1 | <1 | 1.5 | 1.5 |
| Construction | 8,329 | 6,700 | 30,347 | 18,197 | 208,038 | 359,054 | 60,537 | 103,263 | 398,088 | 277,455 | 4,850 | (D) | 96,662 | 93,259 | 2,223,256 | 1,976,951 |
| | 6.2 | 2.6 | 14.1 | 7.3 | 5.9 | 8.5 | 13.5 | 26.1 | 11.1 | 7 | 7.0 | N/A | 10.1 | 9.6 | 9.7 | 8.2 |
| Manufacturing | 3,516 | 5,258 | 1,543 | 4,282 | 125,896 | 122,226 | 8,506 | 11,274 | 127,448 | 148,974 | (D) | (D) | 29,191 | 29,934 | 752,057 | 978,307 |
| | 2.6 | 2.0 | <1 | 1.7 | 3.5 | 2.9 | 1.9 | 1.8 | 3.6 | 3.7 | N/A | N/A | 3.0 | 3.1 | 3.3 | 4.1 |
| Wholesale trade | (D) | (D) | 3,382 | 6,123 | 70,971 | 98,709 | 5,088 | 8,960 | 277,592 | 193,541 | (D) | (D) | 18,690 | 27,263 | 760,672 | 650,287 |
| | N/A | N/A | 1.6 | 2.5 | 2.0 | 2.3 | 1.1 | 1.4 | 7.7 | 4.9 | N/A | N/A | 1.9 | 2.8 | 3.3 | 2.7 |
| Retail trade | 6,343 | (D) | 11,449 | 31,423 | 237,855 | 271,123 | 23,118 | 37,238 | 237,868 | 237,018 | (D) | (D) | 75,212 | 72,228 | 1,343,277 | 1,454,718 |
| | 4.7 | N/A | 5.3 | 12.7 | 6.7 | 6.4 | 5.2 | 5.8 | 6.6 | 6 | N/A | N/A | 7.8 | 7.4 | 5.9 | 6.1 |
| Transportation and warehousing | 7,405 | 133,450 | 7,393 | (D) | 273,519 | 355,214 | 17,349 | 73,391 | 167,605 | 1,174,864 | 10,814 | (D) | 19,260 | 22,681 | 1,200,603 | 2,791,054 |
| | 5.5 | 51.4 | 3.4 | N/A | 7.7 | 8.4 | 3.9 | 11.4 | 4.7 | 29.5 | 15.6 | N/A | 2.0 | 2,3 | 5.3 | 11.6 |
| Information | 1,426 | (D) | 3,480 | 5,184 | 86,648 | 76,961 | 9,413 | 20,234 | 32,784 | 24,213 | (D) | (D) | 11,846 | 19,648 | 288,954 | 282,771 |
| | 1.1 | N/A | 1.6 | 2.1 | 2.4 | 1.8 | 2.1 | 3.2 | <1 | <1 | N/A | N/A | 1.2 | 2 | 1.3 | 1.2 |
| Finance and insurance | 2,488 | 2,870 | 10,290 | 11,248 | 132,333 | 176,659 | 8,465 | 13,842 | 106,224 | 109,817 | (D) | 1,283 | 27,733 | 34,479 | 934,962 | 842,124 |
| | 1.9 | 1.1 | 4.8 | 4.5 | 3.7 | 4.2 | 1.9 | 2.2 | 3.0 | 2.8 | N/A | 1.7 | 2.9 | 3.5 | 4.1 | 3.5 |
| Real estate and rental and leasing | 1,936 | 2,585 | 10,907 | 1,470 | 75,346 | 86,237 | 5,843 | 15,315 | 97,644 | 146,041 | (D) | 4,315 | 23,939 | 35,390 | 551,697 | 746,346 |
| | 1.4 | 1.0 | 5.1 | <1 | 2.1 | 2 | 1.3 | 2.4 | 2.7 | 3.7 | N/A | 5.7 | 2.5 | 3.6 | 2.4 | 3.1 |
| Professional, scientific, and technical services | 3,769 | 4,388 | 10,774 | 15,618 | 166,887 | 254,310 | (D) | 30,370 | 162,049 | 149,933 | (D) | 1,542 | 40,965 | 50,774 | 1,015,148 | 1,282,758 |
| | 2.8 | 1.7 | 5.0 | 6.3 | 4.7 | 6 | N/A | 4.7 | 4.5 | 3.8 | N/A | 2 | 4.3 | 5.2 | 4.4 | 5.3 |
| Management of companies and enterprises | (D) | (D) | (D) | (D) | 7,398 | 15,825 | (D) | (3,688) | 23,463 | 13,949 | 0 | N/A | 13,384 | 4,507 | 146,154 | 185,754 |
| | N/A | N/A | N/A | N/A | <1 | <1 | N/A | <-1 | <1 | <1 | <1 | N/A | 1.4 | <1 | <1 | <1 |
| Administrative and support and waste management and remediation services | (D) | (D) | (D) | 4,073 | 74,625 | 134,069 | 8,041 | 10,734 | 69,717 | 82,764 | (D) | 329 | 13,552 | 23,945 | 388,126 | 635,097 |
| | N/A | N/A | N/A | 1.6 | 2.1 | 3.2 | 1.8 | 1.7 | 1.9 | 2.1 | N/A | <1 | 1.4 | 2.5 | 1.7 | 2.6 |
| Educational services | 520 | (D) | (D) | 848 | 16,014 | 19,588 | 299 | 1,733 | 7,770 | (D) | (D) | (D) | 1,225 | 3,072 | 98,393 | 131,633 |
| | <1 | N/A | N/A | <1 | <1 | <1 | <1 | <1 | <1 | N/A | N/A | N/A | <1 | <1 | <1 | <1 |
| Health care and social assistance | 15,395 | (D) | (D) | 9,612 | 298,554 | 341,645 | 15,800 | 17,958 | 487,259 | 462,836 | (D) | (D) | 104,731 | 115,664 | 1,725,003 | 1,790,081 |
| | 11.5 | N/A | N/A | 3.9 | 8.4 | 8.1 | 3.5 | 5.3 | 13.6 | 11.6 | N/A | N/A | 10.9 | 11.9 | 7.6 | 7.5 |
| Arts, entertainment, and recreation | 1,267 | 2,044 | 1,885 | 1,922 | 8,921 | (D) | 713 | 1,901 | 15,936 | 18,788 | (D) | 102 | 11,456 | 13,029 | 123,308 | 156,217 |
| | <1 | <1 | <1 | <1 | <1 | N/A | <1 | <1 | <1 | <1 | N/A | <1 | 1.2 | 1.3 | <1 | <1 |

| Sector | Hot Springs County | | Johnson County | | Laramie County | | Lincoln County | | Natrona County | | Niobrara County | | Park County | | State of Wyoming | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 |
| Accommodation and food services | 6,235 | 6,117 | 11,896 | 13,538 | 100,220 | 137,908 | 8,107 | 15,643 | 98,013 | (D) | (D) | (D) | 58,033 | 70,854 | 843,366 | 1,157,822 |
| | 4.7 | 2.4 | 5.5 | 5.5 | 2.8 | 3.3 | 1.8 | 2.4 | 2.7 | N/A | N/A | N/A | 6.0 | 7.3 | 3.7 | |
| Other services (except government and government enterprises) | 4,582 | (D) | 7,774 | 10,462 | 99,637 | 115,354 | 11,727 | 15,634 | 164,556 | 125,235 | 3,529 | (D) | 32,729 | 38,539 | 746,199 | 721,169 |
| | 3.4 | N/A | 3.6 | 4.2 | 2.8 | 2.7 | 2.6 | 2.4 | 4.6 | 3.1 | 5.1 | N/A | 3.4 | 4 | 3.3 | 3.0 |
| Government and government enterprises | 38,100 | 45,267 | 73,308 | 77,175 | 1,505,581 | 1,568,871 | 125,156 | 154,110 | 486,920 | 459,329 | 29,378 | 31,877 | 263,051 | 268,254 | 5,575,347 | 5,705,302 |
| | 28.5 | 17.4 | 34.0 | 31.1 | 42.4 | 37 | 28.0 | 24 | 13.6 | 11.5 | 42.2 | 42.3 | 27.4 | 27.5 | 24.4 | 23.8 |

Sources: BEA 2010b, 2021b
Note: All percentages are rounded to the nearest tenth.
All 2010 dollar values were adjusted for inflation.
(D) represents data not shown to avoid disclosure of confidential information; estimates are included in high-level totals.
(N/A) means data are not available, or no information was given.

## Table A-21 (Part 3). Wyoming Analysis Area Labor Income by Sector, 2010 and 2021 (2021$)

| Sector | Platte County | | Sheridan County | | Sublette County | | Sweetwater County | | Uinta County | | Washakie County | | Weston County | | State of Wyoming | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 |
| Personal income (thousands of dollars) | 421,852 | 464,250 | 1,881,054 | 2,039,562 | 597,974 | 570,695 | 2,402,208 | 2,369,272 | 1,040,119 | 911,174 | 401,392 | 464,107 | 349,622 | 334,054 | 32,970,057 | 40,322,831 |
| Population (persons) | 8,666 | 8,699 | 29,151 | 31,646 | 10,232 | 8,697 | 43,567 | 41,614 | 21,096 | 20,635 | 8,528 | 7,705 | 7,200 | 6,745 | 564,405 | 578,803 |
| Per capita personal income (dollars) | 48,678 | 53,368 | 64,528 | 64,449 | 58,441 | 65,620 | 55,139 | 56,934 | 49,305 | 44,157 | 47,068 | 60,235 | 48,558 | 49,526 | 58,416 | 69,666 |
| Earnings by place of work (thousands of dollars) | 290,448 | 283,389 | 956,515 | 1,065,297 | 606,463 | 330,532 | 2,219,086 | 1,965,805 | 769,845 | 548,456 | 277,699 | 296,296 | 170,146 | 173,621 | 22,966,334 | 24,273,866 |
| Wages and salaries (thousands of dollars) | 190,102 | 180,252 | 659,317 | 723,159 | 421,100 | 217,269 | 1,635,167 | 1,268,626 | 544,702 | 379,837 | 189,348 | 177,335 | 110,613 | 112,175 | 15,489,828 | 15,426,455 |
| Supplement to wages and salaries | 59,725 | 59,726 | 176,516 | 205,644 | 88,668 | 60,779 | 379,521 | 337,973 | 137,577 | 114,916 | 52,911 | 52,868 | 35,651 | 39,979 | 3,957,129 | 4,219,422 |
| Proprietors' income | 40,622 | 43,411 | 120,683 | 136,494 | 96,696 | 52,484 | 204,398 | 359,206 | 87,566 | 53,703 | 35,440 | 66,093 | 23,882 | 21,467 | 3,519,377 | 4,627,989 |
| Farm earnings | 23,158 | 28,346 | 773 | 8,526 | 1,428 | 15,706 | -1,845 | 16,385 | 2,095 | 4,104 | 10,415 | 9,409 | -1,162 | 232 | 153,277 | 287,560 |

| Sector | Platte County | | Sheridan County | | Sublette County | | Sweetwater County | | Uinta County | | Washakie County | | Weston County | | State of Wyoming | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 |
| Nonfarm earnings | 267,290 | 255,043 | 955,743 | 1,056,771 | 605,036 | 314,826 | 2,220,930 | 1,949,420 | 767,750 | 544,352 | 267,284 | 286,887 | 171,308 | 173,389 | 22,813,057 | 23,986,306 |
| Private nonfarm earnings | 203,061 | 189,777 | 674,907 | 742,096 | 516,337 | 235,181 | 1,874,794 | 1,619,639 | 617,169 | 408,755 | 203,551 | 229,366 | 117,586 | 116,439 | 17,237,710 | 18,281,004 |
| **By Industry (Earnings in Thousands of Dollars/Percentage of Nonfarm Earnings)** | | | | | | | | | | | | | | | | |
| Forestry, fishing, and related activities | (D) | 2,585 | 10,387 | 6,073 | 3,491 | (D) | (D) | (D) | 831 | 922 | (D) | (D) | 1,066 | 1,465 | 118,817 | 53,082 |
| | N/A | 1 | 1.1 | <1 | <1 | N/A | N/A | N/A | <1 | <1 | N/A | N/A | <1 | <1 | <1 | <1 |
| Mining (including quarrying and oil and gas extraction) | (D) | 7,859 | 35,416 | 9,277 | 253,896 | 77,108 | 725,104 | 631,829 | 120,172 | 15,886 | 17,769 | 12,815 | 14,744 | 15,085 | 3,627,912 | 2,091,152 |
| | N/A | 3.1 | 3.7 | <1 | 42.0 | 24.5 | 32.6 | 32.4 | 15.7 | 2.9 | 6.6 | 4.5 | 8.6 | 8.7 | 15.9 | 8.7 |
| Utilities | (D) | (D) | 9,602 | (D) | 4,419 | (D) | (D) | 63,928 | 12,256 | 19,931 | 5,261 | 5,599 | 3,573 | 1,027 | 349,808 | 353,681 |
| | N/A | N/A | 1.0 | N/A | <1 | N/A | N/A | 3.3 | 1.6 | 3.7 | 2.0 | 2.0 | 2.1 | <1 | 1.5 | 1.5 |
| Construction | 23,697 | 11,374 | 105,509 | 101,735 | 86,419 | 33,168 | 191,143 | 110,189 | 145,312 | 63,539 | 21,410 | 18,328 | 21,628 | (D) | 2,223,256 | 1,976,951 |
| | 8.9 | 4.5 | 11.0 | 9.6 | 14.3 | 10.5 | 8.6 | 5.7 | 18.9 | 11.7 | 8.0 | 6.4 | 12.6 | N/A | 9.7 | 8.2 |
| Manufacturing | 2,767 | 3,497 | 17,997 | 51,664 | 3,131 | 4,382 | 164,324 | 174,385 | 22,460 | 20,953 | 34,372 | 35,898 | 14,735 | (D) | 752,057 | 978,307 |
| | 1.0 | 1.4 | 1.9 | 4.9 | <1 | 1.4 | 7.4 | 8.9 | 2.9 | 3.8 | 12.9 | 12.5 | 8.6 | N/A | 3.3 | 4.1 |
| Wholesale trade | (D) | (D) | 24,309 | (D) | 5,911 | (D) | (D) | 46,087 | 26,348 | 11,448 | 6,190 | 8,469 | 2,466 | 1,641 | 760,672 | 650,287 |
| | N/A | N/A | 2.5 | N/A | <1 | N/A | N/A | 2.4 | 3.4 | 2.1 | 2.3 | 3.0 | 1.4 | <1 | 3.3 | 2.7 |
| Retail trade | 12,715 | 17,302 | 70,364 | 82,908 | 20,356 | 15,901 | 99,369 | 100,691 | 39,701 | 42,755 | 16,771 | 13,839 | 14,314 | 10,034 | 1,343,277 | 1,454,718 |
| | 4.8 | 6.8 | 7.4 | 7.8 | 3.4 | 5.1 | 4.5 | 5.2 | 5.2 | 7.9 | 6.3 | 4.8 | 8.4 | 5.8 | 5.9 | 6.1 |
| Transportation and warehousing | 24,694 | 18,030 | 63,142 | 63,869 | 38,337 | 16,408 | 168,066 | 153,172 | 41,395 | 43,163 | 11,817 | 59,475 | 11,119 | 15,694 | 1,200,603 | 2,791,054 |
| | 9.2 | 7,1 | 6.6 | 6.0 | 6.3 | 5,2 | 7.6 | 7.9 | 5.4 | 7.9 | 4.4 | 20.7 | 6.5 | 9.1 | 5.3 | 11.6 |
| Information | 1,534 | 1,215 | 14,069 | 19,673 | 3,176 | 1,725 | 10,911 | 8,683 | 20,553 | 25,298 | 5,705 | 4,297 | 1,501 | 1,349 | 288,954 | 282,771 |
| | <1 | <1 | 1.5 | 1.9 | <1 | <1 | <1 | <1 | 2.7 | 4.6 | 2.1 | 1.5 | <1 | <1 | 1.3 | 1.2 |
| Finance and insurance | 9,939 | 8,392 | 32,384 | 42,136 | 8,777 | 7,794 | 35,824 | 29,912 | 11,653 | 14,408 | 10,012 | 6,155 | 4,023 | 5,410 | 934,962 | 842,124 |
| | 3.7 | 3.3 | 3.4 | 4.0 | 1.5 | 2.5 | 1.6 | 1.5 | 1.5 | 2.6 | 3.7 | 2.1 | 2.3 | 3.1 | 4.1 | 3.5 |
| Real estate and rental and leasing | 3,765 | 8,076 | 11,859 | 17,021 | 5,299 | 16,920 | 71,706 | 38,425 | 28,077 | 16,127 | 4,308 | 5,592 | 2,716 | 5,731 | 551,697 | 746,346 |
| | 1.4 | 3.2 | 1.2 | 1.6 | <1 | 5.4 | 3.2 | 2 | 3.7 | 3 | 1.6 | 1.9 | 1.6 | 3.3 | 2.4 | 3.1 |
| Professional, scientific, and technical services | 8,167 | 8,703 | 67,735 | 92,553 | 26,938 | 15,829 | 60,048 | 42,172 | 27,210 | 23,094 | 11,850 | 7,264 | 4,275 | 2,934 | 1,015,148 | 1,282,758 |
| | 3.1 | 3.4 | 7.1 | 8.8 | 4.5 | 5 | 2.7 | 2.2 | 3.5 | 4.2 | 4.4 | 2.5 | 2.5 | 1.7 | 4.4 | 5.3 |
| Management of companies and enterprises | 1,719 | (D) | 2,632 | 17,101 | (D) | 731 | 7,979 | 10,958 | 1,089 | 3,209 | (D) | (D) | (D) | 2,752 | 146,154 | 185,754 |
| | <1 | N/A | <1 | 1.6 | N/A | <1 | <1 | <1 | <1 | <1 | N/A | N/A | N/A | 1.6 | <1 | <1 |

| Sector | Platte County | | Sheridan County | | Sublette County | | Sweetwater County | | Uinta County | | Washakie County | | Weston County | | State of Wyoming | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 | 2010 | 2021 |
| Administrative and support and waste management and remediation services | 1,902 | (D) | 21,440 | 19,995 | (D) | 7,722 | 25,863 | 28,892 | 27,210 | 6,815 | (D) | (D) | (D) | 1,193 | 388,126 | 635,097 |
| | <1 | N/A | 2.2 | 1.9 | N/A | 2.5 | 1.2 | 1.5 | 3.5 | 1.3 | N/A | N/A | N/A | <1 | 1.7 | 2.6 |
| Educational services | 1,039 | 657 | 4,606 | 6,718 | (D) | (D) | 2,759 | (D) | (D) | 1,505 | 420 | (D) | (D) | (D) | 98,393 | 131,633 |
| | <1 | <1 | <1 | <1 | N/A | N/A | <1 | N/A | N/A | <1 | <1 | N/A | N/A | N/A | <1 | <1 |
| Health care and social assistance | 20,374 | 22,870 | 98,713 | 88,536 | (D) | (D) | 64,891 | 70,060 | (D) | 62,883 | 29,970 | (D) | (D) | (D) | 1,725,003 | 1,790,081 |
| | 7.6 | 9 | 10.3 | 8.4 | N/A | N/A | 2.9 | 3.6 | N/A | 11.6 | 11.2 | N/A | N/A | N/A | 7.6 | 7.5 |
| Arts, entertainment, and recreation | 585 | (D) | 7,204 | 8,501 | 2,362 | 1,771 | 2,685 | 3,996 | 4,399 | 5,154 | 736 | 738 | (D) | (D) | 123,308 | 156,217 |
| | <1 | N/A | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | N/A | N/A | <1 | <1 |
| Accommodation and food services | 8,602 | 11,211 | 34,782 | 44,704 | 18,512 | 10,275 | 53,690 | 56,674 | 16,136 | 18,670 | 5,466 | 6,198 | (D) | (D) | 843,366 | 1,157,822 |
| | 3.2 | 4.4 | 3.6 | 4.2 | 3.1 | 3.3 | 2.4 | 2.9 | 2.1 | 3.4 | 2.0 | 2.2 | N/A | N/A | 3.7 | |
| Other services (except government and government enterprises) | 5,868 | 7,938 | 42,757 | 40,474 | 12,317 | 8,185 | 61,355 | 45,603 | 15,906 | 12,995 | 8,445 | 8,466 | 4,627 | 4,192 | 746,199 | 721,169 |
| | 2.2 | 3.1 | 4.5 | 3.8 | 2.0 | 2.6 | 2.8 | 2.3 | 2.1 | 2.4 | 3.2 | 3.0 | 2.7 | 2.4 | 3.3 | 3.0 |
| Government and government enterprises | 64,229 | 65,266 | 280,836 | 314,675 | 88,699 | 79,645 | 346,137 | 329,781 | 150,581 | 135,597 | 63,733 | 57,521 | 53,723 | 56,950 | 5,575,347 | 5,705,302 |
| | 24.0 | 25.6 | 29.4 | 29.8 | 14.7 | 25.3 | 15.6 | 16.9 | 19.6 | 24.9 | 23.8 | 20.1 | 31.4 | 32.8 | 24.4 | 23.8 |

Sources: BEA 2010b, 2021b
Note: All percentages are rounded to the nearest tenth.
All 2010 dollar values were adjusted for inflation.
(D) represents data not shown to avoid disclosure of confidential information; estimates are included in high-level totals.
(N/A) means data are not available, or no information was given.

## Table A-22. Oil and Gas Production in the Planning Area (2018–2022)

| Geography | Resource | 2018 | 2019 | 2020 | 2021 | 2022 | Total Change 2018–2021 | Total % Change 2018–2021 | Average Annual % Change 2018–2021 |
|---|---|---|---|---|---|---|---|---|---|
| **Counties in Colorado** | | | | | | | | | |
| Garfield | Gas (mcf) | 168,815,925 | 163,668,642 | 176,841,498 | 173,542,982 | 156,875,661 | -11,940,264 | -7.1 | -1.8 |
| | Oil (bbl) | 474,360 | 487,635 | 448,937 | 418,925 | 374,488 | -99,872 | -21.1 | -5.3 |
| Jackson | Gas (mcf) | 136,382 | 124,275 | 84,196 | 83,237 | 76,810 | -59,572 | -43.7 | -10.9 |
| | Oil (bbl) | 85,168 | 118,431 | 143,135 | 64,644 | 64,634 | -20,534 | -24.1 | -6.0 |
| Mesa | Gas (mcf) | 21,531,788 | 20,434,827 | 16,439,760 | 14,092,619 | 12,301,551 | -9,230,237 | -42.9 | -10.7 |
| | Oil (bbl) | 41,536 | 45,858 | 33,663 | 21,939 | 18,535 | -23,001 | -55.4 | -13.8 |
| Moffat | Gas (mcf) | 8,928,791 | 8,384,288 | 7,735,211 | 7,310,794 | 6,380,251 | -2,548,540 | -28.5 | -7.1 |
| | Oil (bbl) | 191,421 | 204,745 | 156,472 | 148,797 | 125,107 | -66,314 | -34.6 | -8.7 |
| Rio Blanco | Gas (mcf) | 73,107,127 | 75,595,198 | 68,716,585 | 63,400,913 | 46,449,501 | -26,657,626 | -36.5 | -7.3 |
| | Oil (bbl) | 2,053,425 | 1,922,110 | 1,841,100 | 1,638,924 | 1,552,138 | -501,287 | -24.4 | -4.9 |
| Routt | Gas (mcf) | 5,235 | 7,091 | 5,843 | 4,948 | 1,366 | -3,869 | -73.9 | -18.5 |
| | Oil (bbl) | 10,194 | 6,529 | 3,806 | 5,978 | 168 | -10,026 | -98.4 | -24.6 |
| Total for Colorado | Gas (mcf) | 645,844,237 | 653,040,055 | 573,460,764 | 509,638,437 | 503,706,090 | -142,138,147 | -22.0 | -5.5 |
| | Oil (bbl) | 6,795,715 | 5,987,111 | 6,783,466 | 9,276,360 | 10,545,883 | 3,750,168 | 55.2 | 13.8 |
| **Counties in Idaho** | | | | | | | | | |
| Payette | Gas (mcf) | 83,248 | 25,151 | 11,465 | 23,139 | 5,529 | -77,719 | -93.4 | -23.3 |
| | Oil (bbl) | 1,361 | 213 | 164 | 437 | 117 | -1244 | -91.4 | -22.9 |
| Total for Idaho | Gas (mcf) | 83,248 | 25,151 | 11,465 | 23,139 | 5,529 | -77,719 | -93.4 | -23.3 |
| | Oil (bbl) | 1,361 | 213 | 164 | 437 | 117 | -1244 | -91.4 | -22.9 |
| **Counties in Montana** | | | | | | | | | |
| Blaine | Gas (mcf) | 864,652 | 829,467 | 782,354 | 721,387 | 699,293 | -165,359 | -19.1 | -4.8 |
| | Oil (bbl) | 36,719 | 47,554 | 36,872 | 45,720 | 43,303 | 6,584 | 17.9 | 4.5 |
| Carbon | Gas (mcf) | 1,257,138 | 1,209,202 | 1,162,085 | 1,018,238 | 951,055 | -306,083 | -24.3 | -6.1 |
| | Oil (bbl) | 367,321 | 370,660 | 318,095 | 300,569 | 318,185 | -49,136 | -13.4 | -3.3 |
| Carter | Oil (bbl) | 237,628 | 294,489 | 337,306 | 269,416 | 230,747 | -6,881 | -2.9 | -0.7 |
| Chouteau | Gas (mcf) | 81,905 | 91,633 | 75,511 | 76,930 | 70,918 | -10,987 | -13.4 | -3.4 |
| Custer | Gas (mcf) | 13,223 | 2,304 | 830 | 0 | 0 | -13223 | -100.0 | -25.0 |
| Dawson | Gas (mcf) | 70,025 | 56,092 | 49,453 | 44,994 | 37,069 | -32,956 | -47.1 | -11.8 |
| | Oil (bbl) | 168,708 | 156,707 | 141,186 | 127,750 | 127,142 | -41,566 | -24.6 | -6.2 |
| Fallon | Gas (mcf) | 2,671,750 | 2,486,694 | 2,306,560 | 2,180,034 | 2,068,248 | -603,502 | -22.6 | -5.6 |
| | Oil (bbl) | 1,294,613 | 1,326,391 | 1,175,874 | 1,100,311 | 1,021,878 | -272,735 | -21.1 | -5.3 |
| Fergus | Gas (mcf) | 7,780 | 7,536 | 8,142 | 7,640 | 7,212 | -568 | -7.3 | -1.8 |
| Garfield | Oil (bbl) | 1,387 | 1,200 | 1,174 | 1,386 | 1,118 | -269 | -19.4 | -4.8 |
| Musselshell | Oil (bbl) | 4,287 | 4,278 | 2,041 | 3,863 | 4,720 | 433 | 10.1 | 2.5 |
| Petroleum | Oil (bbl) | 5,691 | 7,429 | 7,976 | 8,447 | 8,155 | 2,464 | 43.3 | 10.8 |
| Phillips | Gas (mcf) | 4,834,733 | 4,520,784 | 4,385,377 | 4,064,755 | 3,791,391 | -1,043,342 | -21.6 | -5.4 |
| Powder River | Gas (mcf) | 8,593 | 1,544 | 5,024 | 8,023 | 9,425 | 832 | 9.7 | 2.4 |
| | Oil (bbl) | 232,625 | 284,416 | 333,421 | 263,231 | 225,571 | -7,054 | -3.0 | -0.8 |
| Prairie | Gas (mcf) | 23,438 | 22,627 | 22,956 | 15,996 | 16,765 | -6,673 | -28.5 | -7.1 |
| | Oil (bbl) | 80,331 | 73,863 | 64,818 | 54,740 | 58,148 | -22,183 | -27.6 | -6.9 |

| Geography | Resource | 2018 | 2019 | 2020 | 2021 | 2022 | Total Change 2018–2021 | Total % Change 2018–2021 | Average Annual % Change 2018–2021 |
|---|---|---|---|---|---|---|---|---|---|
| Roosevelt | Gas (mcf) | 151,644 | 308,691 | 185,485 | 184,724 | 190,079 | 38,435 | 25.3 | 6.3 |
| | Oil (bbl) | 135,809 | 260,642 | 91,450 | 105,588 | 79,170 | -56,639 | -41.7 | -10.4 |
| Rosebud | Gas (mcf) | 224 | 176 | 123 | 126 | 145 | -79 | -35.3 | -8.8 |
| | Oil (bbl) | 8,406 | 7,224 | 4,656 | 5,580 | 6,408 | -1,998 | -23.8 | -5.9 |
| Stillwater | Gas (mcf) | 0 | 0 | 211 | 0 | 0 | 0 | N/A | N/A |
| | Oil (bbl) | 0 | 1,919 | 4,248 | 4,945 | 5,617 | 5,617 | N/A | N/A |
| Valley | Gas (mcf) | 860,954 | 822,112 | 781,702 | 727,822 | 720,379 | -140,575 | -16.3 | -4.1 |
| Wibaux | Gas (mcf) | 85,421 | 82,162 | 77,331 | 66,721 | 55,597 | -29,824 | -34.9 | -8.7 |
| | Oil (bbl) | 70,848 | 64,257 | 57,158 | 47,709 | 51,594 | -19,254 | -27.2 | -6.8 |
| Total for Montana | Gas (mcf) | 11,723,676 | 11,212,307 | 10,528,418 | 10,558,446 | 9,949,936 | -1,773,740 | -15.1 | -3.8 |
| | Oil (bbl) | 2,997,351 | 3,283,460 | 2,884,167 | 3,806,513 | 3,094,413 | 97,062 | 3.2 | 0.8 |
| **Counties in Nevada** | | | | | | | | | |
| Eureka | Gas (mcf) | 0 | 0 | 8,848 | 4,177 | 2,246 | 2,246 | N/A | N/A |
| | Oil (bbl) | 27,416 | 25,039 | 37,834 | 29,209 | 22,050 | -5,366 | -19.6 | -4.9 |
| Nye | Gas (mcf) | 1,971 | 1,890 | 1,444 | 1,210 | 1,444 | -527 | -26.7 | -6.7 |
| | Oil (bbl) | 230,088 | 242,590 | 200,036 | 190,310 | 210,102 | -19,986 | -8.7 | -2.2 |
| Total for Nevada | Gas (mcf) | 1,971 | 1,890 | 10,292 | 5,387 | 3,690 | 1,719 | 87.2 | 21.8 |
| | Oil (bbl) | 257,504 | 267,629 | 237,870 | 219,519 | 232,152 | -25,352 | -9.8 | -2.5 |
| **Counties in North Dakota** | | | | | | | | | |
| Bowman | Gas (mcf) | 1,005,279 | 914,100 | 806,739 | 711,935 | 658,443 | -346,836 | -34.5 | -8.6 |
| | Oil (bbl) | 672,471 | 612,887 | 535,318 | 473,101 | 408,653 | -263,818 | -39.2 | -9.8 |
| Slope | Gas (mcf) | 63,522 | 66,106 | 66,604 | 49,884 | 48,958 | -14,564 | -22.9 | -5.7 |
| | Oil (bbl) | 269,232 | 246,114 | 219,249 | 198,141 | 177,084 | -92,148 | -34.2 | -8.6 |
| Total for North Dakota | Gas (mcf) | 67,387,123 | 87,503,485 | 82,522,902 | 117,326,062 | 118,788,527 | 51,401,404 | 76.3 | 19.1 |
| | Oil (bbl) | 34,642,345 | 45,284,989 | 39,147,046 | 49,431,810 | 43,063,872 | 8,421,527 | 24.3 | 6.1 |
| **Counties in South Dakota** | | | | | | | | | |
| Harding | Gas (mcf) | 1,029,792 | 949,527 | 836,796 | 623,974 | 477,212 | -552,580 | -53.7 | -13.4 |
| | Oil (bbl) | 112,641 | 103,748 | 84,699 | 80,738 | 76,882 | -35,759 | -31.7 | -7.9 |
| Total for South Dakota | Gas (mcf) | 1,029,792 | 949,527 | 836,796 | 625,804 | 489,482 | -540,310 | -52.5 | -13.1 |
| | Oil (bbl) | 119,826 | 110,211 | 102,873 | 122,760 | 121,517 | 1,691 | 1.4 | 0.4 |
| **Counties in Utah** | | | | | | | | | |
| Carbon | Gas (mcf) | 23,067,003 | 21,041,172 | 18,937,125 | 17,190,820 | 16,577,346 | -6,489,657 | -28.1 | -7.0 |
| | Oil (bbl) | 45,495 | 42,535 | 32,817 | 27,444 | 27,545 | -17,950 | -39.5 | -9.9 |
| Daggett | Gas (mcf) | 84,187 | 139,284 | 106,839 | 83,789 | 107,054 | 22,867 | 27.2 | 6.8 |
| | Oil (bbl) | 98 | 156 | 77 | 59 | 159 | 61 | 62.2 | 15.6 |
| Duchesne | Gas (mcf) | 3,045,131 | 2,646,461 | 2,139,287 | 2,088,342 | 2,219,987 | -825,144 | -27.1 | -6.8 |
| | Oil (bbl) | 1,818,645 | 1,694,119 | 1,222,840 | 1,270,112 | 1,104,720 | -713,925 | -39.3 | -9.8 |
| Emery | Gas (mcf) | 3,928,264 | 3,519,504 | 3,323,826 | 3,073,158 | 2,876,228 | -1,052,036 | -26.8 | -6.7 |
| | Oil (bbl) | 388 | 195 | 42 | 0 | 0 | -388 | -100.0 | -25.0 |
| Garfield | Gas (mcf) | 9,125 | 9,125 | 9,149 | 9,130 | 9,110 | -15 | -0.2 | 0.0 |
| | Oil (bbl) | 134,483 | 128,372 | 114,672 | 114,433 | 117,438 | -17,045 | -12.7 | -3.2 |
| Grand | Gas (mcf) | 2,421,198 | 2,105,987 | 1,899,479 | 2,056,840 | 2,271,259 | -149,939 | -6.2 | -1.5 |
| | Oil (bbl) | 251,971 | 205,600 | 145,680 | 128,347 | 112,901 | -139,070 | -55.2 | -13.8 |

| Geography | Resource | 2018 | 2019 | 2020 | 2021 | 2022 | Total Change 2018–2021 | Total % Change 2018–2021 | Average Annual % Change 2018–2021 |
|---|---|---|---|---|---|---|---|---|---|
| Sevier | Oil (bbl) | 1,019,618 | 1,006,886 | 847,871 | 713,215 | 773,283 | -246,335 | -24.2 | -6.0 |
| Summit | Gas (mcf) | 117,846 | 93,390 | 96,992 | 46,630 | 95,685 | -22,161 | -18.8 | -4.7 |
| | Oil (bbl) | 21,193 | 24,586 | 26,870 | 23,271 | 25,673 | 4,480 | 21.1 | 5.3 |
| Uintah | Gas (mcf) | 136,800,374 | 121,166,601 | 108,878,476 | 95,961,764 | 108,315,797 | -28,484,577 | -20.8 | -5.2 |
| | Oil (bbl) | 4,664,686 | 4,531,838 | 3,754,012 | 3,839,720 | 4,037,891 | -626,795 | -13.4 | -3.4 |
| Total for Utah | Gas (mcf) | 174,965,312 | 156,614,474 | 140,706,475 | 125,282,304 | 136,521,074 | -38,444,238 | -22.0 | -5.5 |
| | Oil (bbl) | 8,385,759 | 8,030,427 | 6,475,920 | 6,432,650 | 6,498,265 | -1,887,494 | -22.5 | -5.6 |
| **Counties in Wyoming** | | | | | | | | | |
| Albany | Gas (mcf) | 14,950 | 15,025 | 15,135 | 13,848 | 6,604 | -8,346 | -55.8 | -14.0 |
| | Oil (bbl) | 15,333 | 14,658 | 10,754 | 10,649 | 10,401 | -4,932 | -32.2 | -8.0 |
| Big Horn | Gas (mcf) | 1,091,804 | 1,031,400 | 904,863 | 927,484 | 955,285 | -136,519 | -12.5 | -3.1 |
| | Oil (bbl) | 382,763 | 361,753 | 314,347 | 320,020 | 328,119 | -54,644 | -14.3 | -3.6 |
| Campbell | Gas (mcf) | 43,554,645 | 48,179,446 | 51,642,550 | 61,781,289 | 57,191,324 | 13,636,679 | 31.3 | 7.8 |
| | Oil (bbl) | 7,933,229 | 9,946,503 | 11,104,597 | 12,243,877 | 11,611,174 | 3,677,945 | 46.4 | 11.6 |
| Carbon | Gas (mcf) | 47,358,004 | 44,100,224 | 45,332,285 | 44,354,752 | 43,412,574 | -3,945,430 | -8.3 | -2.1 |
| | Oil (bbl) | 657,660 | 741,237 | 822,043 | 621,275 | 553,983 | -103,677 | -15.8 | -3.9 |
| Converse | Gas (mcf) | 34,605,568 | 52,177,378 | 56,807,051 | 47,829,241 | 47,086,044 | 12,480,476 | 36.1 | 9.0 |
| | Oil (bbl) | 10,970,350 | 16,539,361 | 20,119,075 | 16,451,010 | 18,663,760 | 7,693,410 | 70.1 | 17.5 |
| Crook | Gas (mcf) | 13,360 | 14,145 | 12,464 | 14,813 | 16,512 | 3,152 | 23.6 | 5.9 |
| | Oil (bbl) | 457,386 | 437,362 | 387,185 | 370,512 | 371,229 | -86,157 | -18.8 | -4.7 |
| Fremont | Gas (mcf) | 95,418,980 | 53,264,043 | 49,457,952 | 65,461,223 | 64,818,059 | -30,600,921 | -32.1 | -8.0 |
| | Oil (bbl) | 947,383 | 680,455 | 646,066 | 637,948 | 739,073 | -208,310 | -22.0 | -5.5 |
| Hot Springs | Gas (mcf) | 137,350 | 102,196 | 88,040 | 96,364 | 114,076 | -23,274 | -16.9 | -4.2 |
| | Oil (bbl) | 1,483,612 | 1,409,973 | 1,179,922 | 1,156,024 | 1,251,114 | -232,498 | -15.7 | -3.9 |
| Johnson | Gas (mcf) | 66,320,139 | 54,518,516 | 46,148,684 | 39,036,452 | 36,122,406 | -30,197,733 | -45.5 | -11.4 |
| | Oil (bbl) | 744,724 | 747,606 | 737,607 | 668,518 | 1,026,392 | 281,668 | 37.8 | 9.5 |
| Laramie | Gas (mcf) | 7,665 | 50,471 | 848,389 | 552,481 | 619,683 | 612,018 | 7984.6 | 1996.1 |
| | Oil (bbl) | 19,733 | 81,816 | 951,511 | 476,680 | 418,675 | 398,942 | 2021.7 | 505.4 |
| Lincoln | Gas (mcf) | 26,583,364 | 24,204,762 | 21,328,885 | 20,982,928 | 19,792,662 | -6,790,702 | -25.5 | -6.4 |
| | Oil (bbl) | 207,948 | 163,835 | 145,784 | 145,169 | 144,655 | -63,293 | -30.4 | -7.6 |
| Natrona | Gas (mcf) | 12,574,138 | 11,351,451 | 9,813,790 | 8,691,303 | 8,020,970 | -4,553,168 | -36.2 | -9.1 |
| | Oil (bbl) | 4,667,301 | 4,617,234 | 4,038,843 | 3,975,358 | 4,126,573 | -540,728 | -11.6 | -2.9 |
| Niobrara | Gas (mcf) | 847,261 | 895,973 | 673,208 | 619,210 | 499,727 | -347,534 | -41.0 | -10.3 |
| | Oil (bbl) | 644,678 | 624,597 | 464,834 | 405,837 | 330,027 | -314,651 | -48.8 | -12.2 |
| Park | Gas (mcf) | 5,478,242 | 4,382,870 | 3,975,844 | 3,623,224 | 3,585,476 | -1,892,766 | -34.6 | -8.6 |
| | Oil (bbl) | 4,027,127 | 3,714,880 | 3,210,674 | 3,184,426 | 3,179,140 | -847,987 | -21.1 | -5.3 |
| Sheridan | Gas (mcf) | 437,535 | 335,901 | 334,603 | 328,396 | 266,342 | -171,193 | -39.1 | -9.8 |
| | Oil (bbl) | 8,320 | 8,476 | 4,333 | 6,085 | 5,494 | -2,826 | -34.0 | -8.5 |
| Sublette | Gas (mcf) | 932,058,189 | 855,753,773 | 808,536,137 | 693,662,320 | 597,977,293 | -334,080,896 | -35.8 | -9.0 |
| | Oil (bbl) | 5,988,517 | 5,331,804 | 4,619,948 | 3,616,580 | 3,057,080 | -2,931,437 | -49.0 | -12.2 |
| Sweetwater | Gas (mcf) | 119,915,957 | 119,221,592 | 111,043,960 | 103,914,323 | 92,278,961 | -27,636,996 | -23.0 | -5.8 |
| | Oil (bbl) | 2,407,547 | 2,444,697 | 2,166,473 | 1,971,001 | 1,546,744 | -860,803 | -35.8 | -8.9 |

| Geography | Resource | 2018 | 2019 | 2020 | 2021 | 2022 | Total Change 2018–2021 | Total % Change 2018–2021 | Average Annual % Change 2018–2021 |
|---|---|---|---|---|---|---|---|---|---|
| Uinta | Gas (mcf) | 37,405,372 | 29,774,763 | 20,886,651 | 25,811,560 | 25,597,185 | -11,808,187 | -31.6 | -7.9 |
| | Oil (bbl) | 368,590 | 283,328 | 224,551 | 216,094 | 272,348 | -96,242 | -26.1 | -6.5 |
| Washakie | Gas (mcf) | 492,955 | 445,767 | 366,548 | 360,485 | 283,888 | -209,067 | -42.4 | -10.6 |
| | Oil (bbl) | 381,760 | 337,295 | 273,303 | 297,359 | 285,885 | -95,875 | -25.1 | -6.3 |
| Weston | Gas (mcf) | 670,639 | 542,815 | 536,106 | 452,263 | 440,247 | -230,392 | -34.4 | -8.6 |
| | Oil (bbl) | 297,449 | 233,945 | 201,905 | 180,785 | 185,844 | -111,605 | -37.5 | -9.4 |
| Total for Wyoming | Gas (mcf) | 1,424,986,117 | 1,300,362,511 | 1,228,753,145 | 1,118,513,959 | 999,103,701 | -425,882,416 | -29.9 | -7.5 |
| | Oil (bbl) | 42,611,410 | 48,720,815 | 51,623,755 | 46,955,207 | 48,122,845 | 5,511,435 | 12.9 | 3.2 |

Source: ONRR 2023a

N/A = percent change not available due to no federal production reported in 2018

Note: Includes all planning area counties for which the ONRR reported data. Oregon did not have any federal oil or natural gas production from 2018 to 2022; although there was federal oil and gas production in California, the production occurred outside the socioeconomic analysis area. Therefore, the data are not included in this report.

**Table A-23. Federal Disbursements to States from Oil and Gas Extraction, Fiscal Years 2018–2022**

| State | 2018 ($) | 2019 ($) | 2020 ($) | 2021 ($) | 2022 ($) | Change 2018–2022 ($) | % Change 2018–2022 |
|---|---|---|---|---|---|---|---|
| California | 33,733,418 | 35,629,330 | 26,567,804 | 26,637,358 | 44,135,594 | 10,402,175 | 30.8 |
| Colorado | 90,731,614 | 93,569,410 | 49,300,376 | 84,806,140 | 136,322,179 | 45,590,565 | 50.2 |
| Idaho | 43,831 | 10,551 | 5,768 | 7,780 | 18,902 | (24,930) | -56.9 |
| Montana | 10,446,859 | 12,830,625 | 6,457,566 | 8,723,239 | 14,298,912 | 3,852,053 | 36.9 |
| Nevada | 1,622,879 | 1,314,070 | 1,412,847 | 1,041,347 | 1,500,239 | (122,640) | -7.6 |
| North Dakota | 54,339,456 | 97,431,552 | 69,185,135 | 86,414,115 | 171,499,877 | 117,160,422 | 215.6 |
| South Dakota | 585,923 | 479,962 | 321,446 | 329,973 | 488,020 | (97,904) | -16.7 |
| Utah | 57,120,180 | 48,998,347 | 41,006,715 | 44,405,383 | 81,006,213 | 23,886,032 | 41.8 |
| Wyoming | 355,777,987 | 458,184,527 | 285,683,930 | 319,770,982 | 615,497,307 | 259,719,320 | 73.0 |

Source: ONRR 2023b

Note: Oregon did not have any disbursements from oil and gas from 2018 to 2022. California received disbursements for federal oil and gas produced in the state; however, the minerals were produced outside the California socioeconomic analysis area. Therefore, California disbursements for federal oil and gas are not included in this report.

**Table A-24. Coal Production by County on Federal Land in the Planning Area, 2018–2022 (Tons)**

| State | County | 2018 | 2019 | 2020 | 2021 | 2022 |
|---|---|---|---|---|---|---|
| **Colorado** | | | | | | |
| Colorado | Moffat | 2,734,909 | 2,988,342 | 3,007,759 | 3,171,900 | 2,245,208 |
| | Rio Blanco | 3,078,343 | 2,613,317 | 2,633,240 | 1,607,398 | 2,337,295 |
| | Routt | 5,071 | 0 | 0 | 0 | 99,690 |
| | State total | 11,263,001 | 10,058,177 | 9,037,683 | 7,468,159 | 6,331,968 |
| **Montana** | | | | | | |
| Montana | Big Horn | 12,814,626 | 13,170,171 | 7,883,362 | 7,786,759 | 6,771,924 |
| | Musselshell | 697,866 | 127,434 | 1,153,580 | 1,219,867 | 4,058,944 |
| | Rosebud | 3,236,474 | 4,770,101 | 4,370,568 | 1,608,260 | 1,846,150 |
| | Treasure | 0 | 0 | 0 | 0 | 82,929 |
| | State total | 16,748,966 | 18,067,706 | 13,407,510 | 10,614,886 | 12,759,947 |
| **Utah** | | | | | | |
| Utah | Carbon | 2,031,923 | 429,899 | 6,955 | 2,139 | 0 |
| | Emery | 4,585,605 | 4,673,242 | 4,315,355 | 4,807,290 | 4,428,476 |
| | Kane | 0 | 0 | 389,045 | 477,326 | 374,490 |
| | San Pete | 600,517 | 2,808,857 | 3,841,998 | 2,974,409 | 2,133,365 |
| | Sevier | 4,465,926 | 5,052,775 | 3,689,079 | 3,034,303 | 3,340,267 |
| | State total | 11,683,971 | 12,964,773 | 12,242,432 | 11,295,467 | 10,276,598 |

| State | County | 2018 | 2019 | 2020 | 2021 | 2022 |
|---|---|---|---|---|---|---|
| | | | **Wyoming** | | | |
| Wyoming | Campbell | 245,923,603 | 243,201,182 | 200,958,516 | 214,305,800 | 230,040,175 |
| | Converse | 12,959,491 | 3,962,557 | 1,898,497 | 228,434 | 521,582 |
| | Lincoln | 820,532 | 804,080 | 7,501 | 39,292 | 0 |
| | Sweetwater | 3,852,935 | 4,136,899 | 3,719,805 | 3,540,231 | 2,460,751 |
| | State total | 263,556,561 | 252,104,718 | 206,584,319 | 218,113,757 | 233,022,508 |

Source: ONRR 2023
Note: Includes all planning area counties for which the ONRR reported data. California, Idaho, Nevada, Oregon, and South Dakota did not have any federal coal extraction from 2018 to 2022; while there was federal coal extraction in North Dakota, the production occurred outside the socioeconomic analysis area. Therefore, the data are not included in this report.

## Table A-25. Federal Disbursements to States from Coal Extraction

| State | 2018 ($) | 2019 ($) | 2020 ($) | 2021 ($) | 2022 ($) | Change 2018–2022 ($) | % Change 2018–2022 |
|---|---|---|---|---|---|---|---|
| Colorado | 11,293,401 | 14,554,781 | 4,222,405 | 9,280,605 | 11,696,818 | 403,417 | 4 |
| Montana | 15,776,378 | 17,917,119 | 13,828,372 | 10,814,390 | 22,458,386 | 6,682,009 | 42 |
| North Dakota | 1,107,203 | 779,083 | 1,302,045 | 748,514 | 1,126,624 | 19,421 | 2 |
| Utah | 19,140,579 | 21,572,041 | 11,182,695 | 10,412,387 | 10,038,842 | (9,101,737) | -48 |
| Wyoming | 193,570,054 | 173,656,249 | 148,076,661 | 161,375,517 | 196,538,917 | 2,968,862 | 2 |

Source: ONRR 2023b
Note: California, Idaho, Nevada, Oregon, and South Dakota did not have any disbursements from coal from 2018 to 2022. North Dakota received disbursements for federal coal extracted in the state; however, the minerals were extracted outside the North Dakota socioeconomic analysis area. Therefore, North Dakota disbursements for federal coal are not included in this report.

**Table A-26. Nonenergy Leasable Mineral Production by County on Federal Land in the Planning Area, 2018–2022 (Tons)**

| State | County | 2018 | 2019 | 2020 | 2021 | 2022 |
|---|---|---|---|---|---|---|
| **Colorado** | | | | | | |
| Colorado | Rio Blanco | 196,101 | 226,700 | 236,368 | 252,464 | 256,124 |
| | State total | 196,101 | 226,700 | 236,368 | 252,464 | 256,124 |
| **Idaho** | | | | | | |
| Idaho | Caribou | 3,870,843 | 3,878,800 | 4,752,151 | 5,325,240 | 4,782,074 |
| | State total | 3,870,843 | 3,878,800 | 4,752,151 | 5,325,240 | 4,782,074 |
| **Utah** | | | | | | |
| Utah | Carbon | 78,021 | 57,715 | 65,945 | 85,461 | 34,015 |
| | Emery | 88,415 | 76,057 | 69,179 | 90,361 | 73,301 |
| | Kane | 17,812 | 24,380 | 10,941 | 12,112 | 23,090 |
| | State total | 184,248 | 158,152 | 146,065 | 190,431 | 134,848 |
| **Wyoming** | | | | | | |
| Wyoming | Lincoln | 196,700 | 475,600 | 241,900 | 0 | 0 |
| | Sweetwater | 3,698,534 | 3,575,615 | 4,563,459 | 5,219,122 | 4,838,280 |
| | State total | 3,895,234 | 4,051,215 | 4,805,359 | 5,219,122 | 4,838,280 |

Source: ONRR 2023

Note: Includes all planning area counties for which the ONRR reported data. Montana, Nevada, Oregon, and South Dakota did not have any federal nonenergy mineral extraction from 2018 to 2022. Although there was federal nonenergy mineral extraction in California and North Dakota, the extraction occurred outside the socioeconomic analysis area. Therefore, the data are not included in this report.

**Table A-27. Federal Disbursements to States from Nonenergy Mineral Extraction**

| State | 2018 ($) | 2019 ($) | 2020 ($) | 2021 ($) | 2022 ($) | Change 2018–2022 ($) | % Change 2018–2022 |
|---|---|---|---|---|---|---|---|
| Colorado | 980,929 | 1,012,120 | 1,167,651 | 824,188 | 542,777 | (438,152) | -45 |
| Idaho | 4,237,741 | 3,529,543 | 4,656,285 | 4,380,755 | 5,101,091 | 863,350 | 20 |
| Utah | 738,527 | 1,374,179 | 921,871 | 748,658 | 1,227,146 | 488,620 | 66 |
| Wyoming | 16,131,318 | 25,736,670 | 18,948,857 | 9,794,050 | 8,402,061 | (7,729,258) | -48 |

Source: ONRR 2023b

Note: North Dakota, Oregon, and South Dakota did not have any disbursements from nonenergy minerals from 2018 to 2022. California received disbursements for federal nonenergy minerals extracted in the state; however, the minerals were extracted outside the California socioeconomic analysis area; therefore, California disbursements for federal nonenergy minerals are not included in this report. Montana and Nevada received small disbursements for rents, bonuses, and other distributions from nonenergy minerals, but there were no nonenergy minerals extracted from 2018 to 2022. Therefore, because these disbursements were not material and not likely to be impacted by the BLM's management decisions, they are not included in this report.

**Table A-28. State Policies for Distributions of Federal Mineral Revenue**

| State | State Expenditures | Local Distributions | Savings |
|---|---|---|---|
| California | California deposits royalties from federal mineral leasing into the State School Fund | N/A | N/A |
| Colorado | Fifty percent of bonus disbursements are allocated to the Higher Education Federal Mineral Lease Revenues Fund<br>Colorado allocates 48.3 percent of non-bonus disbursements (up to 104 percent of the previous year's transfer amount) to the state's Public School Fund. | Twenty percent of non-bonus revenue is allocated to federal lease districts, counties, and municipalities based on data, including the proportion of original lease payments and employees in the natural resource sectors.<br>Colorado distributes 1.7 percent of non-bonus disbursements to local school districts.<br>Twenty percent of non-bonus revenue is allocated as grants by the Colorado Department of Local Affairs to assist local governments' processes for planning, public engagement, or collaboration with federal land managers. | Ten percent of non-coal bonus disbursements are transferred to the Colorado Water Conservation Board.<br>Fifty percent of bonus disbursements are allocated into the Local Government Permanent Fund. |
| Montana | Seventy-five percent of disbursements are allocated to the state's General Fund. | Twenty-five percent of disbursements are allocated to the county of origin. | N/A |
| Nevada | The first $7 million of disbursements are deposited directly into the State Education Fund.<br>Spillover amounts are deposited into the Account for Revenue from the Lease of Federal Lands. Of these spillover disbursements, 43.75 percent are allocated to the State Education Fund. | Of the spillover disbursements deposited in the Account for Revenue from the Lease of Federal Lands, 56.25 percent are then allocated to the county of origin. | N/A |
| North Dakota | N/A | Fifty percent of disbursements are allocated to school districts.<br>Fifty percent of disbursements are allocated to the county of origin. | N/A |

| State | State Expenditures | Local Distributions | Savings |
|---|---|---|---|
| Utah | Utah allocates 2.25 percent of non-bonus disbursements to the Utah Geological Survey.<br>Utah allocates 2.25 percent of non-bonus disbursements to the Utah State University Water Research Lab.<br>Thirty percent of bonus payments in the Mineral Bonsu Account are allocated to the Wildland Fire Suppression Fund. | Forty percent of non-bonus disbursements are allocated to counties and special service districts.<br>Five percent of disbursements are allocated to special service districts through the Department of Workforce Services.<br>Disbursements are used to pay PILTs to local governments for state-owned lands.<br>Utah allocates 32.5 percent of non-bonus disbursements and spillover amounts and 70 percent of non-bonus disbursements to the Permanent Community Impact Fund and distributes them to socially and economically impacted areas. | N/A |
| Wyoming | Wyoming allocates $2 million of disbursements (of the first $200 million) to the state's General Fund for administration.<br>Of the coal bonus disbursements, 12.5 percent are allocated to the Highway Fund.<br>Ten percent of bonus disbursements are allocated to the Community College Commission, and unspent and spillover amounts are allocated to the School Capital Construction Account.<br>Of the non-bonus disbursements, 44.8 percent are allocated to the School Foundation Program Account as are 33 percent of the disbursements after the first $200 million.<br>Of the non-bonus disbursements, 6.75 percent are allocated to the University of Wyoming. | Forty percent of coal bonus disbursements and 2.7 percent of non-bonus disbursements are allocated to the School Capital Construction Account.<br>Wyoming allocates 37.5 percent of coal bonus disbursements and 3.75 percent of non-bonus disbursements to the Capital Construction Account.<br>Of the non-bonus disbursements, 31.375 percent are allocated to the Highway Fund.<br>Of the non-bonus disbursements, 9.375 percent are allocated to municipalities based on the general and school populations. | Wyoming allocates 66.6 percent of the disbursements after the first $200 million to the Budget Reserve Account.<br>Spillover amounts from the distributions to the School Foundation Program Account are allocated to the Common School Permanent Fund. |

Source: Headwaters Economics 2021

**Table A-29. State Taxes Assessed on Hard-Rock Mining Activities on Land Types, including Federal Lands (as of 2019)**

| State | Tax Name | Type of Mines or Minerals Assessed | Type of Tax | Tax Rate |
|---|---|---|---|---|
| Colorado | Severance tax—metallic minerals | Metallic minerals, all other minerals except molybdenum, oil, gas, coal, oil shale, rock, sand, gravel, stone products, earth minerals, limestone, carbon dioxide, and dolomite | Modified gross revenue | 2.25 percent of gross income above $19 million per year |
| | Severance tax—molybdenum | Molybdenum ore | Unit based | $0.05 per ton above 625,000 tons per calendar quarter |
| Idaho | Mining license tax | Gold, silver, copper, and lead | Net proceeds | 1 percent of net value of royalties paid or ore mined or extracted |
| Montana | Mining license tax—metal mine | Gold, silver, or any other metals or precious or semiprecious gems or stones | Net smelter returns | Percentage of gross value, less first $250,000, as follows:<br>For gold, silver, or any platinum group metal-processed concentrates shipped to a refinery, 1.6 percent of gross value minus $250,000;<br>For mineral concentrates shipped to smelter, mill, or reduction works, 1.81 percent of gross value minus $250,000 |
| | Mining license tax—micaceous mines | Vermiculite, perlite, kerrite, maconite, or any other micaceous minerals | Unit based | $0.05 per ton of concentrate mined, extracted, or produced |
| | Resource indemnity and groundwater assessment tax | Includes any precious stones or gems, gold, silver, copper, lead, uranium, vermiculite, limestone, or other nonrenewable, merchantable products | Metals—net smelter returns; selected minerals—gross revenue with reference price | Default rate: $25 plus 0.5 to 1 percent of gross value greater than $5,000;<br>For garnets: $25 plus 1 percent of gross value greater than $2,500;<br>For limestone: $25 plus 10 percent of gross value greater than $250;<br>For vermiculite: $25 plus 2 percent of gross value greater than $1,250 |

| State | Tax Name | Type of Mines or Minerals Assessed | Type of Tax | Tax Rate |
|---|---|---|---|---|
| Utah | Severance tax on metals and metalliferous minerals | Ore, metal, or other substance containing 57 listed minerals, including gold, iron, mercury, nickel, and uranium extracted from all lands; does not include gemstones, potash, sand and gravel, oil, gas, and coal, and others | Net proceeds | 2.6 percent of taxable value, which is the gross proceeds of sale (sale of yellowcake in the case of a sale of uranium concentrates) less $50,000 per year per mine and standard deduction |
| | Severance tax—beryllium | Beryllium | Other (cost based) | 2.6 percent of taxable value; taxable value is 125 percent of direct mining costs |
| Wyoming | Mining severance tax—uranium | Uranium | Modified net smelter returns | 4 percent of value of gross product, which is fair market value of minerals at mouth of mine, not including processing; fair market value is calculated by multiplying sales of yellowcake less royalties, ad valorem production taxes, and severance taxes; the result is multiplied by the industry factor |
| | Mining severance tax—other | Valuable deposits other than coal, oil and gas, trona, bentonite, uranium, and sand and gravel | Modified net smelter returns | 2 percent of the value of the gross product, which is fair market value of minerals at mouth of mine, not including any processing |

Source: GAO 2019

Note: California also charges taxes for hard-rock mining; however, there were no locatable mineral types on federal lands (see Table XX). Therefore, information on taxes in California were not included above. Nevada and Oregon only charge royalties for minerals extracted on state lands; therefore, data from Nevada and Oregon are not included above.

**Table A-30. Disbursements to States from Geothermal with a Federal Stake**

| State | 2018 ($) | 2019 ($) | 2020 ($) | 2021 ($) | 2022 ($) | Change 2018–2022 ($) | % Change 2018–2022 |
|---|---|---|---|---|---|---|---|
| Nevada | 3,854,581 | 5,665,406 | 6,483,864 | 5,680,458 | 8,185,231 | 4,330,649 | 112 |
| Utah | 538,739 | 491,491 | 528,661 | 716,894 | 1,247,237 | 708,498 | 132 |

Source: ONRR 2023b

Note: From 2018 to 2022, there was no geothermal production with a federal stake in Colorado, Idaho, Montana, North Dakota, Oregon, South Dakota, and Wyoming. Although there was federal oil and gas production and disbursements made to California, none of the production occurred in the socioeconomic analysis area. Therefore, only Nevada and Utah are included in the table above.

**Table A-31. California Environmental Justice Screening**

| Geographic Area | (Non-metro) Minority Population (%) | (Non-metro) Minority Population Meaningfully Greater Threshold? | Low-Income Populations (%) | Low-Income Population Threshold? | (Non-metro) American Indian and Alaska Native Population (%) | (Non-metro) American Indian and Alaska Native Population Threshold |
|---|---|---|---|---|---|---|
| **California** | **29.3** | **32.2%** | **29** | **29%** | **5.9** | **5.9%** |
| Lassen County | 36.0 | Yes | 35 | Yes | 4.4 | No |
| Modoc County | 23.0 | No | 41 | Yes | 5.6 | No |

Sources: US Environmental Protection Agency 2023; US Census Bureau 2023

**Table A-32. Colorado Environmental Justice Screening**

| Geographic Area | Minority Population (%) | Minority Population Meaningfully Greater Threshold? | Low-Income Populations (%) | Low-Income Population Threshold? | American Indian and Alaska Native Population (%) | American Indian and Alaska Native Threshold Population? |
|---|---|---|---|---|---|---|
| **Colorado** | **33.2** | **36.5%** | **23.6** | **23.6%** | **2.5** | **2.5%** |
| Eagle County | 35 | No | 24 | Yes | 0.2 | No |
| Garfield County | 34 | No | 25 | Yes | 1.7 | No |
| Grand County | 16 | No | 23 | Yes | 0.8 | No |
| Jackson County | 10 | No | 37 | Yes | 0.2 | No |
| Mesa County | 20 | No | 30 | Yes | 2.4 | No |
| Moffat County | 21 | No | 35 | Yes | 3.7 | Yes |
| Rio Blanco County | 17 | No | 32 | Yes | 5.0 | Yes |
| Routt County | 15 | No | 20 | No | 1.7 | No |

Source: US Environmental Protection Agency 2023; US Census Bureau 2023

## Table A-33. Idaho Environmental Justice Screening

| Geographic Area | Minority Population (%) | Minority Population Meets the Meaningfully Greater Threshold? | Low-Income Populations (%) | Low-Income Population Threshold? | American Indian and Alaska Native Population (%) | American Indian and Alaska Native Threshold Population? |
|---|---|---|---|---|---|---|
| **Idaho** | **19.4** | **21.3%** | **31.3** | **31.3%** | **2.6** | **2.6%** |
| Adams County | 9 | No | 33 | Yes | 4.8 | Yes |
| Bear Lake County | 8 | No | 35 | Yes | 1.2 | No |
| Bingham County | 27 | Yes | 36 | Yes | 7.4 | Yes |
| Blaine County | 28 | Yes | 28 | No | 1.6 | No |
| Bonneville County | 18 | No | 32 | Yes | 1.3 | No |
| Butte County | 9 | No | 41 | Yes | 2.0 | No |
| Camas County | 11 | No | 35 | Yes | 0.6 | No |
| Caribou County | 9 | No | 25 | No | 1.2 | No |
| Cassia County | 32 | Yes | 37 | Yes | 2.8 | Yes |
| Clark County | 51 | Yes | 41 | Yes | 4.8 | Yes |
| Custer County | 12 | No | 37 | Yes | 6.9 | Yes |
| Elmore County | 29 | Yes | 42 | Yes | 3.9 | Yes |
| Fremont County | 15 | No | 34 | Yes | 1.7 | No |
| Gem County | 15 | No | 31 | Yes | 2.4 | No |
| Gooding County | 34 | Yes | 40 | Yes | 2.2 | No |
| Jefferson County | 14 | No | 35 | Yes | 2.7 | Yes |
| Jerome County | 40 | Yes | 39 | Yes | 2.2 | No |
| Lemhi County | 7 | No | 37 | Yes | 3.6 | Yes |
| Lincoln County | 35 | Yes | 37 | Yes | 2.6 | Yes |
| Madison County | 12 | No | 47 | Yes | 0.7 | No |
| Minidoka County | 39 | Yes | 41 | Yes | 2.8 | Yes |
| Oneida County | 8 | No | 23 | No | 2.0 | No |
| Owyhee County | 31 | Yes | 37 | Yes | 4.6 | Yes |
| Payette County | 23 | Yes | 33 | Yes | 3.1 | Yes |
| Power County | 39 | Yes | 42 | Yes | 6.8 | Yes |
| Twin Falls County | 23 | Yes | 35 | Yes | 2.0 | No |
| Washington County | 22 | Yes | 46 | Yes | 2.7 | Yes |

Sources: US Environmental Protection Agency 2023; US Census Bureau 2023

## Table A-34. Montana Environmental Justice Screening

| Geographic Area | Minority Population (%) | Minority Population Meets the Meaningfully Greater Threshold? | Low-Income Populations (%) | Low-Income Population Threshold? | American Indian and Alaska Native Population (%) | American Indian and Alaska Native Threshold Population |
|---|---|---|---|---|---|---|
| **Montana** | **14.9** | **16.4%** | **31.1** | **31.1%** | **8.2** | **8.2%** |
| Beaverhead County | 11 | No | 38 | Yes | 1.6 | No |
| Big Horn County | 74 | Yes | 58 | Yes | 68.0 | Yes |
| Blaine County | 57 | Yes | 45 | Yes | 55.0 | Yes |
| Carbon County | 7 | No | 24 | No | 2.0 | No |
| Carter County | 4 | No | 42 | Yes | 1.6 | No |
| Chouteau County | 24 | Yes | 41 | Yes | 21.0 | Yes |
| Custer County | 9 | No | 30 | No | 3.2 | No |
| Dawson County | 8 | No | 25 | No | 2.7 | No |
| Fallon County | 7 | No | 31 | Yes | 5.5 | No |
| Fergus County | 7 | No | 34 | Yes | 2.4 | No |
| Garfield County | 1 | No | 34 | Yes | 0.6 | No |
| Madison County | 8 | No | 27 | No | 1.7 | No |
| McCone County | 11 | No | 24 | No | 4.8 | No |
| Musselshell County | 8 | No | 35 | Yes | 5.0 | No |
| Petroleum County | 6 | No | 40 | Yes | 0.0 | No |
| Phillips County | 17 | Yes | 34 | Yes | 13.0 | Yes |
| Powder River County | 30 | Yes | 31 | Yes | 3.9 | No |
| Prairie County | 3 | No | 50 | Yes | 0.1 | No |
| Roosevelt County | 67 | Yes | 54 | Yes | 65.0 | Yes |
| Rosebud County | 49 | Yes | 43 | Yes | 41.0 | Yes |
| Stillwater County | 8 | No | 23 | No | 2.3 | No |
| Sweet Grass County | 7 | No | 24 | No | 2.2 | No |
| Treasure County | 3 | No | 38 | Yes | 0.1 | No |
| Valley County | 15 | No | 33 | Yes | 11.2 | Yes |
| Wibaux County | 11 | No | 33 | Yes | 1.0 | No |
| Yellowstone County | 15 | No | 27 | No | 6.0 | No |

Sources: US Environmental Protection Agency 2023; US Census Bureau 2023

**Table A-35. Nevada Environmental Justice Screening**

| Geographic Area | (Non-metro) Minority Population (%) | (Non-metro) Minority Population Meets the Meaningfully Greater Threshold? | Low-Income Populations (%) | Low-Income Population Threshold? | American Indian and Alaska Native Population (%) | American Indian and Alaska Native Threshold Population |
|---|---|---|---|---|---|---|
| **Nevada** | **28.8** | **31.7%** | **31.2** | **31.2%** | **2.5** | **2.5%** |
| Churchill County | 28 | No | 26 | No | 6.0 | Yes |
| Elko County | 36 | Yes | 26 | No | 6.4 | Yes |
| Eureka County | 16 | No | 34 | Yes | 5.1 | Yes |
| Humboldt County | 31 | Yes | 31 | Yes | 5.3 | Yes |
| Lander County | 30 | Yes | 31 | Yes | 5.2 | Yes |
| Lincoln County | 16 | No | 32 | Yes | 3.2 | Yes |
| Nye County | 28 | No | 37 | Yes | 3.4 | Yes |
| Pershing County | 36 | Yes | 27 | No | 7.0 | Yes |
| Washoe County | 39 | Yes | 27 | No | 2.8 | Yes |
| White Pine County | 29 | Yes | 25 | No | 5.3 | Yes |

Sources: US Environmental Protection Agency 2023; US Census Bureau 2023

**Table A-36. North Dakota Environmental Justice Screening**

| Geographic Area | Minority Population (%) | Minority Population Meets the Meaningfully Greater Threshold? | Low-Income Populations (%) | Low-Income Population Threshold? | American Indian and Alaska Native Population (%) | American Indian and Alaska Native Threshold Population |
|---|---|---|---|---|---|---|
| **North Dakota** | **16.9** | **18.6%** | **25.2** | **25.2%** | **6.8** | **6.8%** |
| Bowman County | 8 | No | 19 | No | 4.3 | No |
| Slope County | 4 | No | 23 | No | 3.6 | No |

Sources: US Environmental Protection Agency 2023; US Census Bureau 2023

## Table A-37. Oregon Environmental Justice Screening

| Geographic Area | Minority Population (%) | Minority Population Meets the Meaningfully Greater Threshold? | Low-Income Populations (%) | Low-Income Population Threshold? | American Indian and Alaska Native Population (%) | American Indian and Alaska Native Threshold Population |
|---|---|---|---|---|---|---|
| **Oregon** | **25.9** | **28.5%** | **28.7** | **28.7%** | **3.3** | **3.3%** |
| Baker County | 10 | No | 38 | Yes | 2.8 | No |
| Crook County | 13 | No | 29 | Yes | 3.1 | No |
| Deschutes County | 14 | No | 25 | No | 1.9 | No |
| Grant County | 10 | No | 33 | Yes | 2.4 | No |
| Harney County | 14 | No | 46 | Yes | 6.1 | Yes |
| Lake County | 18 | No | 38 | Yes | 4.9 | Yes |
| Malheur County | 40 | Yes | 45 | Yes | 5.3 | Yes |
| Union County | 12 | No | 34 | Yes | 2.7 | No |

Sources: US Environmental Protection Agency 2023; US Census Bureau 2023

## Table A-38. South Dakota Environmental Justice Screening

| Geographic Area | Minority Population (%) | Minority Population Meets the Meaningfully Greater Threshold? | Low-Income Populations (%) | Low-Income Population Threshold? | American Indian and Alaska Native Population (%) | American Indian and Alaska Native Threshold Population |
|---|---|---|---|---|---|---|
| **South Dakota** | **19.2** | **21.1%** | **29.0** | **29.0%** | **10.4** | **10.4%** |
| Butte County | 11 | No | 35 | Yes | 4.8 | No |
| Harding County | 11 | No | 24 | No | 8.7 | No |

Source: US Environmental Protection Agency 2023; US Census Bureau 2023

## Table A-39. Utah Environmental Justice Screening

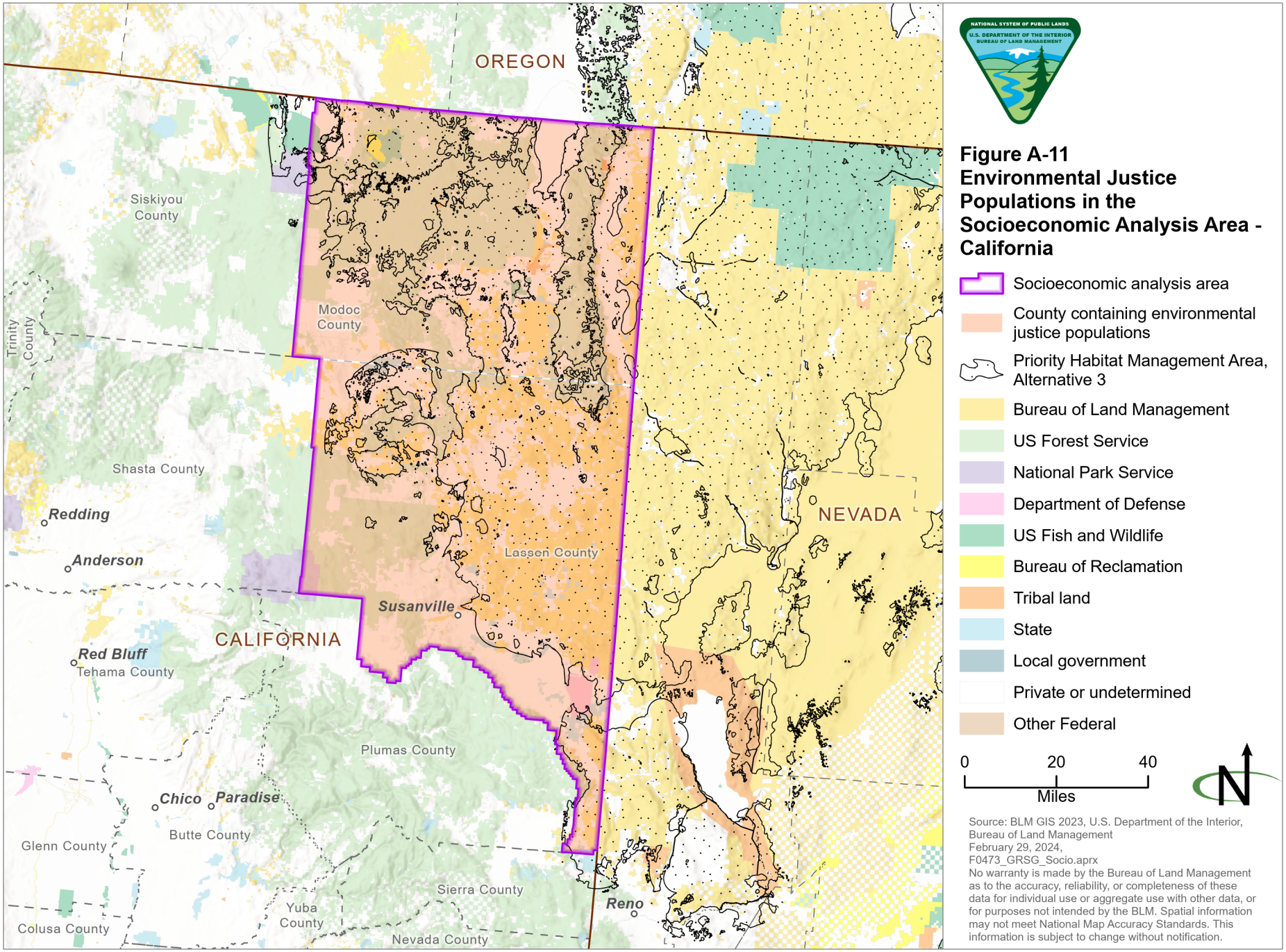
| Geographic Area | Minority Population (%) | Minority Population Meets the Meaningfully Greater Threshold? | Low-Income Populations (%) | Low-Income Population Threshold? | American Indian and Alaska Native Population (%) | American Indian and Alaska Native Threshold Population |
|---|---|---|---|---|---|---|
| **Utah** | **22.7** | **25.0%** | **24.7** | **24.7%** | **2.0** | **2.0%** |
| Beaver County | 16 | No | 23 | No | 1.3 | No |
| Box Elder County | 13 | No | 26 | Yes | 1.3 | No |
| Cache County | 17 | No | 35 | Yes | 1.8 | No |
| Carbon County | 18 | No | 38 | Yes | 1.8 | No |
| Daggett County | 8 | No | 20 | No | 3.9 | Yes |
| Duchesne County | 16 | No | 34 | Yes | 5.5 | Yes |
| Emery County | 10 | No | 32 | Yes | 2.4 | Yes |
| Garfield County | 12 | No | 40 | Yes | 4.6 | Yes |
| Grand County | 19 | No | 43 | Yes | 4.9 | Yes |
| Iron County | 15 | No | 39 | Yes | 2.6 | Yes |
| Juab County | 9 | No | 28 | Yes | 2.7 | Yes |
| Kane County | 10 | No | 31 | Yes | 5.1 | Yes |
| Millard County | 17 | No | 27 | Yes | 1.7 | No |
| Morgan County | 7 | No | 12 | No | 0.4 | No |
| Piute County | 6 | No | 53 | Yes | 0.0 | No |
| Rich County | 12 | No | 30 | Yes | 2.8 | Yes |
| Sanpete County | 14 | No | 36 | Yes | 1.5 | No |
| Sevier County | 9 | No | 34 | Yes | 1.5 | No |
| Summit County | 16 | No | 14 | No | 1.4 | No |
| Tooele County | 19 | No | 22 | No | 1.6 | No |
| Uintah County | 19 | No | 37 | Yes | 8.4 | Yes |
| Wasatch County | 17 | No | 16 | No | 0.5 | No |
| Wayne County | 8 | No | 33 | Yes | 1.7 | No |

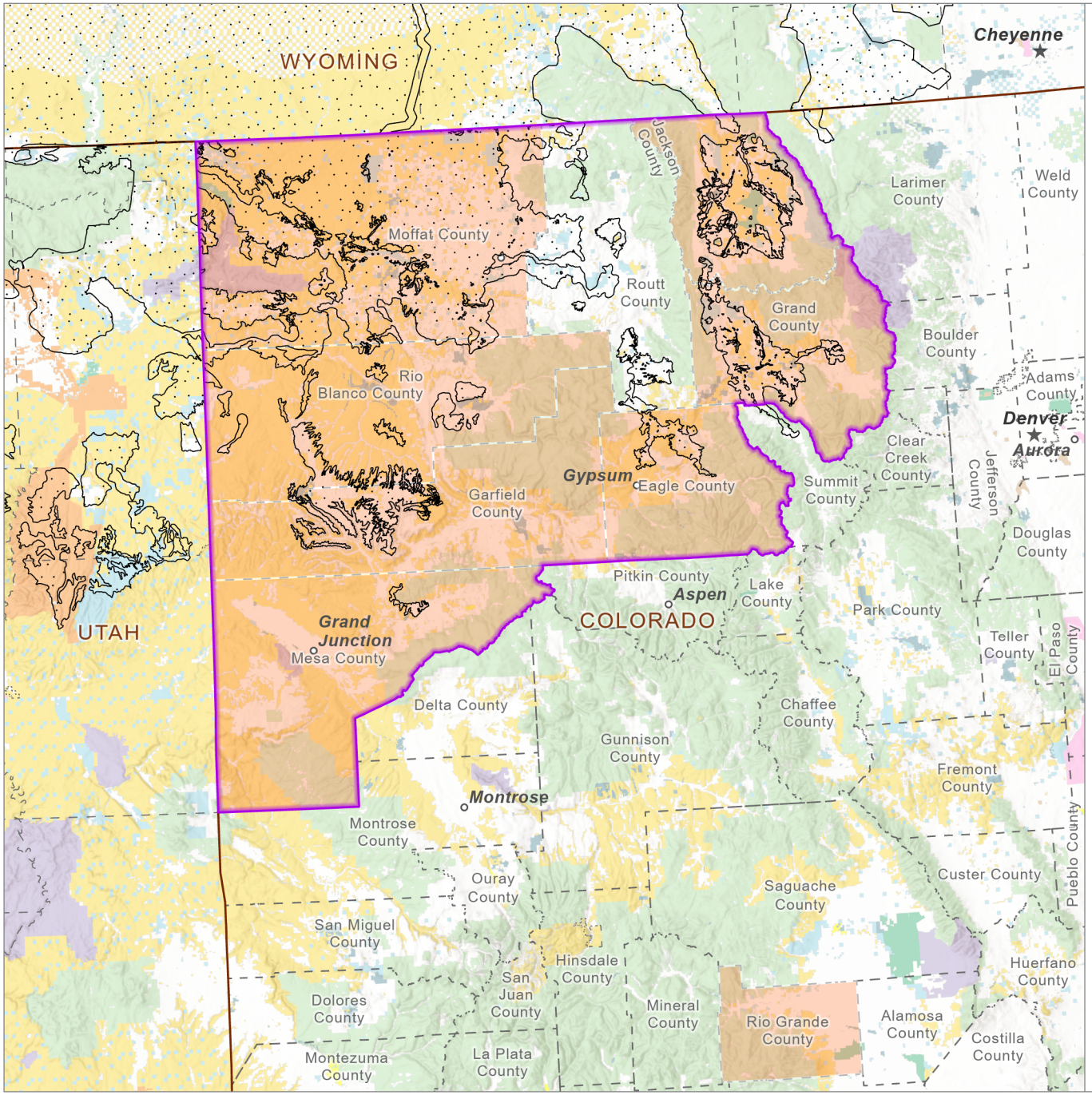
Source: US Environmental Protection Agency 2023; US Census Bureau 2023

## Table A-40. Wyoming Environmental Justice Screening

| Geographic Area | Minority Population (%) | Minority Population Meets the Meaningfully Greater Threshold? | Low-Income Populations (%) | Low-Income Population Threshold? | American Indian and Alaska Native Population (%) | American Indian and Alaska Native Threshold Population |
|---|---|---|---|---|---|---|
| **Wyoming** | **16** | **17.6%** | **26.5** | **26.5%** | **3.7** | **3.7%** |
| Albany County | 19 | Yes | 39 | Yes | 1.9 | No |
| Big Horn County | 13 | No | 32 | Yes | 2.2 | No |
| Campbell County | 13 | No | 22 | No | 2.6 | No |
| Carbon County | 23 | Yes | 34 | Yes | 3.1 | No |
| Converse County | 12 | No | 21 | No | 2.6 | No |
| Crook County | 7 | No | 21 | No | 2.0 | No |
| Fremont County | 31 | Yes | 36 | Yes | 23.6 | Yes |
| Hot Springs County | 8 | No | 34 | Yes | 3.4 | No |
| Johnson County | 10 | No | 31 | Yes | 3.3 | No |
| Laramie County | 23 | Yes | 23 | No | 2.2 | No |
| Lincoln County | 8 | No | 20 | No | 1.9 | No |
| Natrona County | 14 | No | 27 | Yes | 2.1 | No |
| Niobrara County | 13 | No | 42 | Yes | 3.5 | No |
| Park County | 10 | No | 26 | Yes | 2.4 | No |
| Platte County | 15 | No | 29 | Yes | 1.5 | No |
| Sheridan County | 9 | No | 25 | No | 2.0 | No |
| Sublette County | 10 | No | 19 | No | 0.7 | No |
| Sweetwater County | 22 | Yes | 22 | No | 2.1 | No |
| Uinta County | 13 | No | 27 | Yes | 3.3 | No |
| Washakie County | 18 | Yes | 25 | No | 2.5 | No |
| Weston County | 12 | No | 27 | Yes | 4.2 | Yes |

Source: US Environmental Protection Agency 2023; US Census Bureau 2023


OREGON
Siskiyou County
Modoc County
Trinity County
Shasta County
Redding
Anderson
Lassen County
Susanville
NEVADA
CALIFORNIA
Red Bluff
Tehama County
Plumas County
Chico
Paradise
Butte County
Glenn County
Sierra County
Yuba County
Reno
Colusa County
Nevada County
NATIONAL SYSTEM OF PUBLIC LANDS
U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
Figure A-11
Environmental Justice Populations in the Socioeconomic Analysis Area - California
Socioeconomic analysis area
County containing environmental justice populations
Priority Habitat Management Area, Alternative 3
Bureau of Land Management
US Forest Service
National Park Service
Department of Defense
US Fish and Wildlife
Bureau of Reclamation
Tribal land
State
Local government
Private or undetermined
Other Federal
0
20
40
Miles
N
Source: BLM GIS 2023, U.S. Department of the Interior, Bureau of Land Management
February 29, 2024,
F0473_GRSG_Socio.aprx
No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data, or for purposes not intended by the BLM. Spatial information may not meet National Map Accuracy Standards. This information is subject to change without notification.




NATIONAL SYSTEM OF PUBLIC LANDS
U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

## Figure A-12
## Environmental Justice Populations in the Socioeconomic Analysis Area - Colorado

- Socioeconomic analysis area
- County containing environmental justice populations
- Priority Habitat Management Area, Alternative 3
- Bureau of Land Management
- US Forest Service
- National Park Service
- Department of Defense
- US Fish and Wildlife
- Bureau of Reclamation
- Tribal land
- State
- Local government
- Private or undetermined
- Other Federal

0 30 60
Miles

N

Source: BLM GIS 2023, U.S. Department of the Interior, Bureau of Land Management
February 29, 2024,
F0473_GRSG_Socio.aprx
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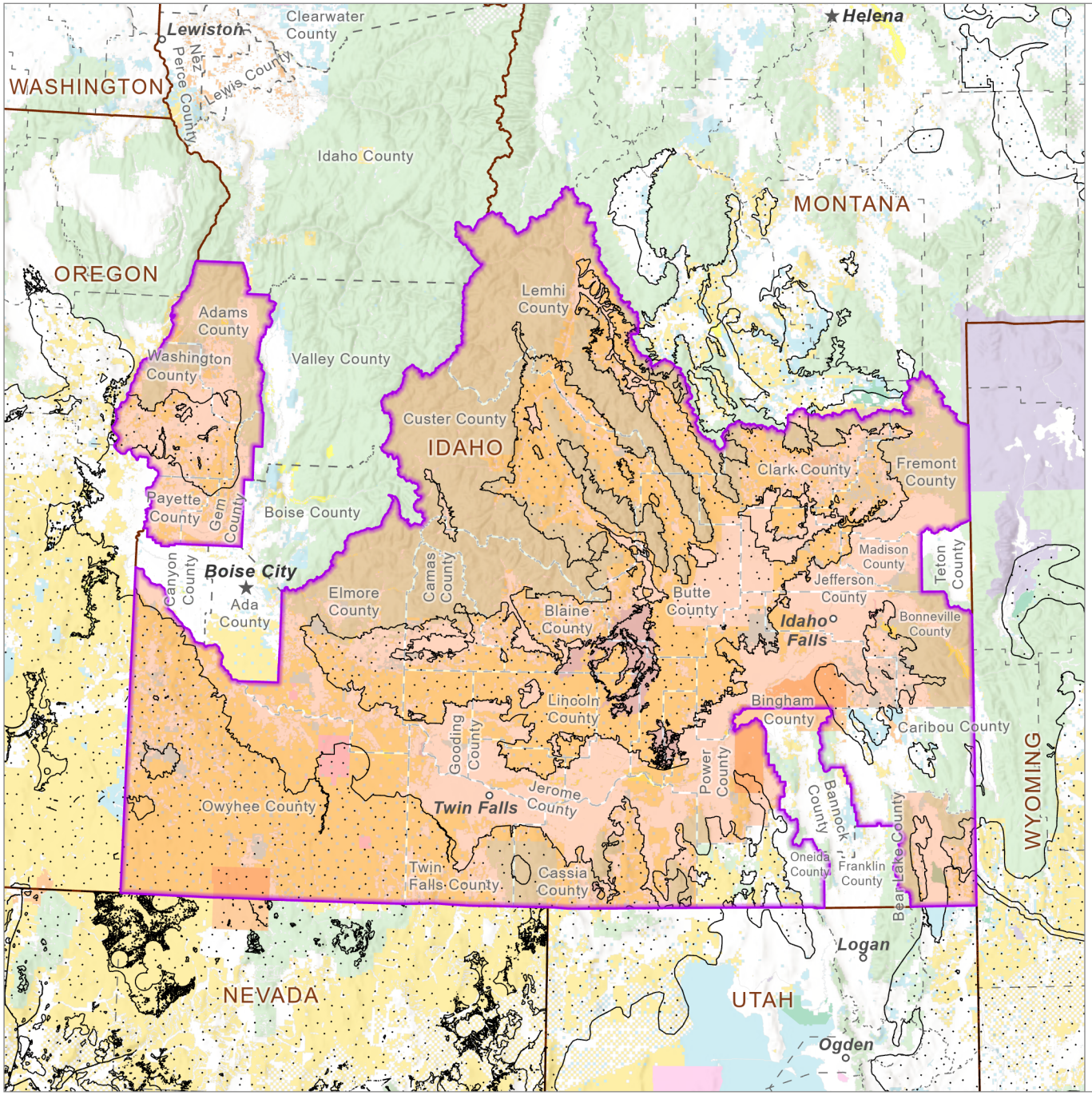



**Figure A-13**
**Environmental Justice Populations in the Socioeconomic Analysis Area - Idaho**

- Socioeconomic analysis area
- County containing environmental justice populations
- Priority Habitat Management Area, Alternative 3
- Bureau of Land Management
- US Forest Service
- National Park Service
- Department of Defense
- US Fish and Wildlife
- Bureau of Reclamation
- Tribal land
- State
- Local government
- Private or undetermined
- Other Federal

0 40 80
Miles

Source: BLM GIS 2023, U.S. Department of the Interior, Bureau of Land Management
February 29, 2024,
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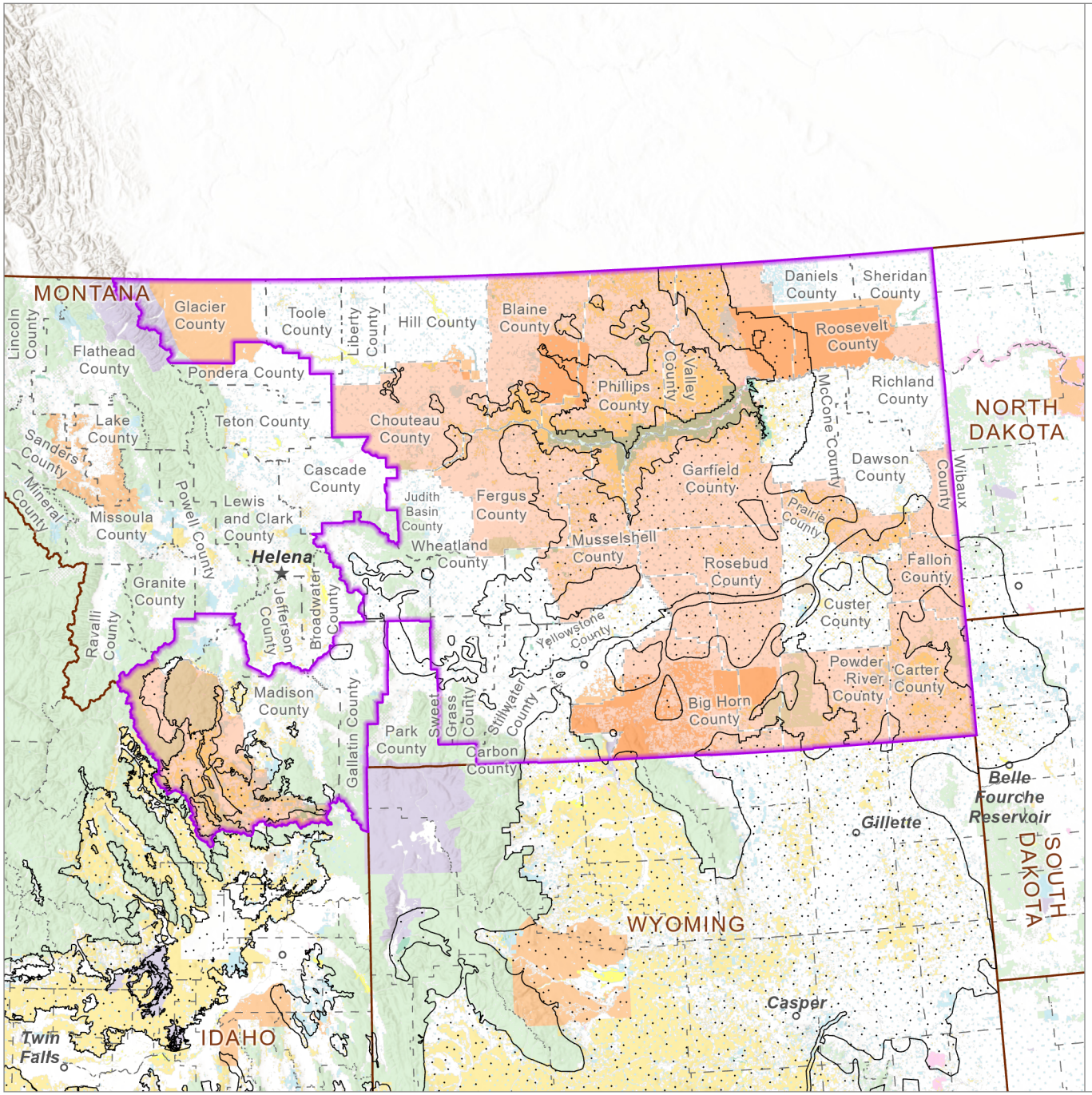



**Figure A-14**
**Environmental Justice Populations in the Socioeconomic Analysis Area - Montana**

- Socioeconomic analysis area
- County containing environmental justice populations
- Priority Habitat Management Area, Alternative 3
- Bureau of Land Management
- US Forest Service
- National Park Service
- Department of Defense
- US Fish and Wildlife
- Bureau of Reclamation
- Tribal land
- State
- Local government
- Private or undetermined
- Other Federal

0 60 120
Miles

Source: BLM GIS 2023, U.S. Department of the Interior, Bureau of Land Management
February 29, 2024,
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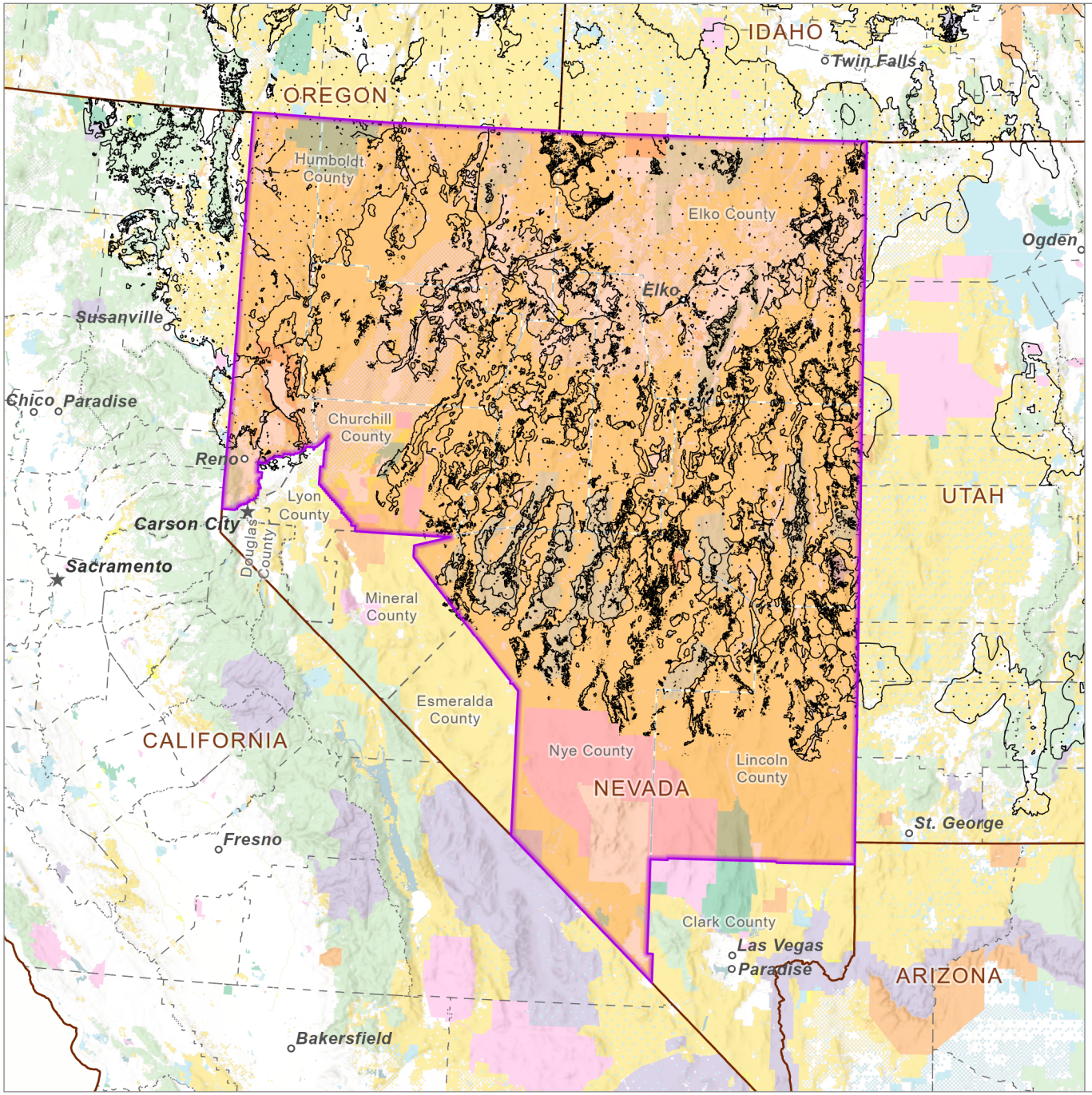


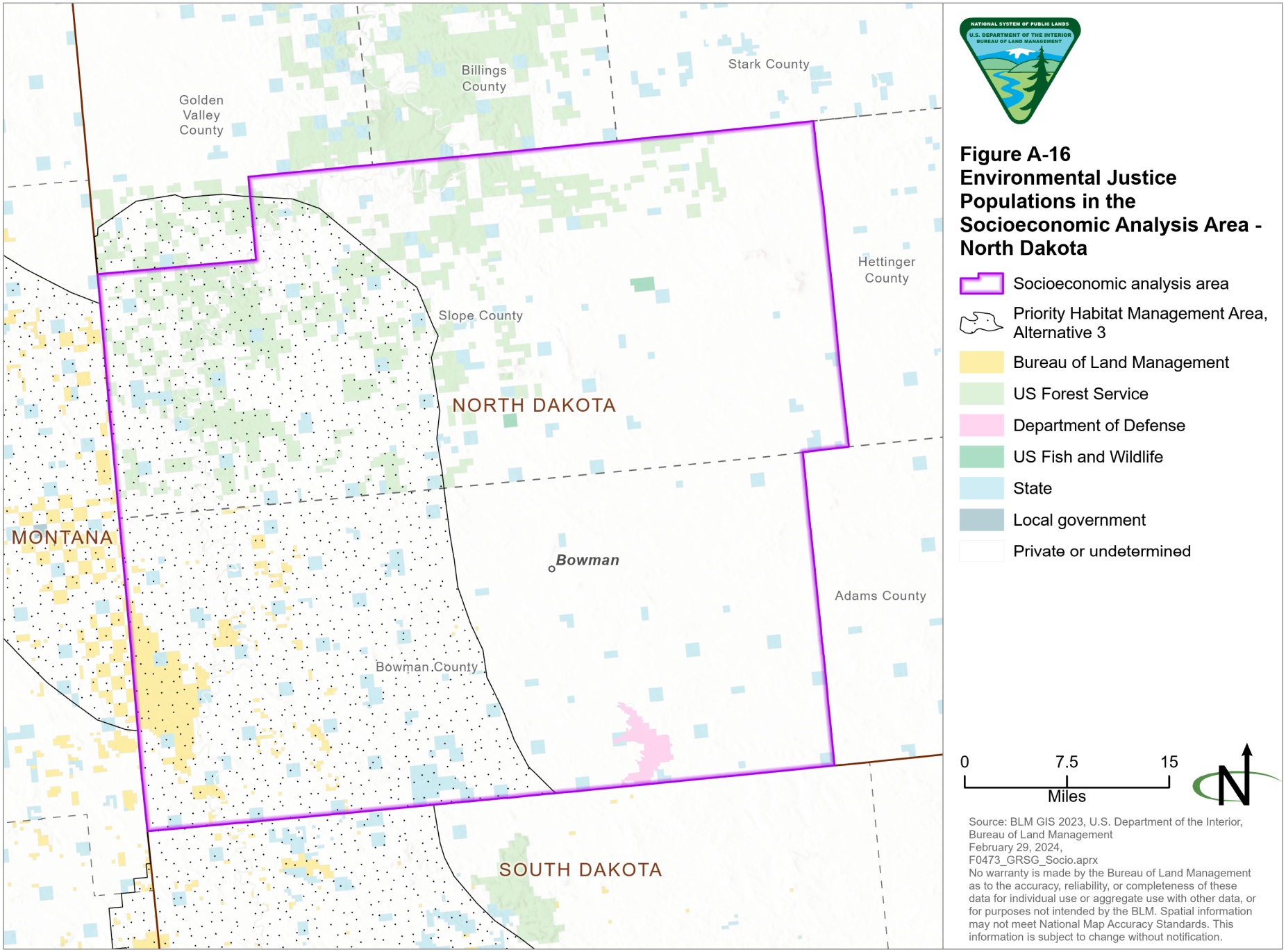

**Figure A-15**
**Environmental Justice Populations in the Socioeconomic Analysis Area - Nevada**

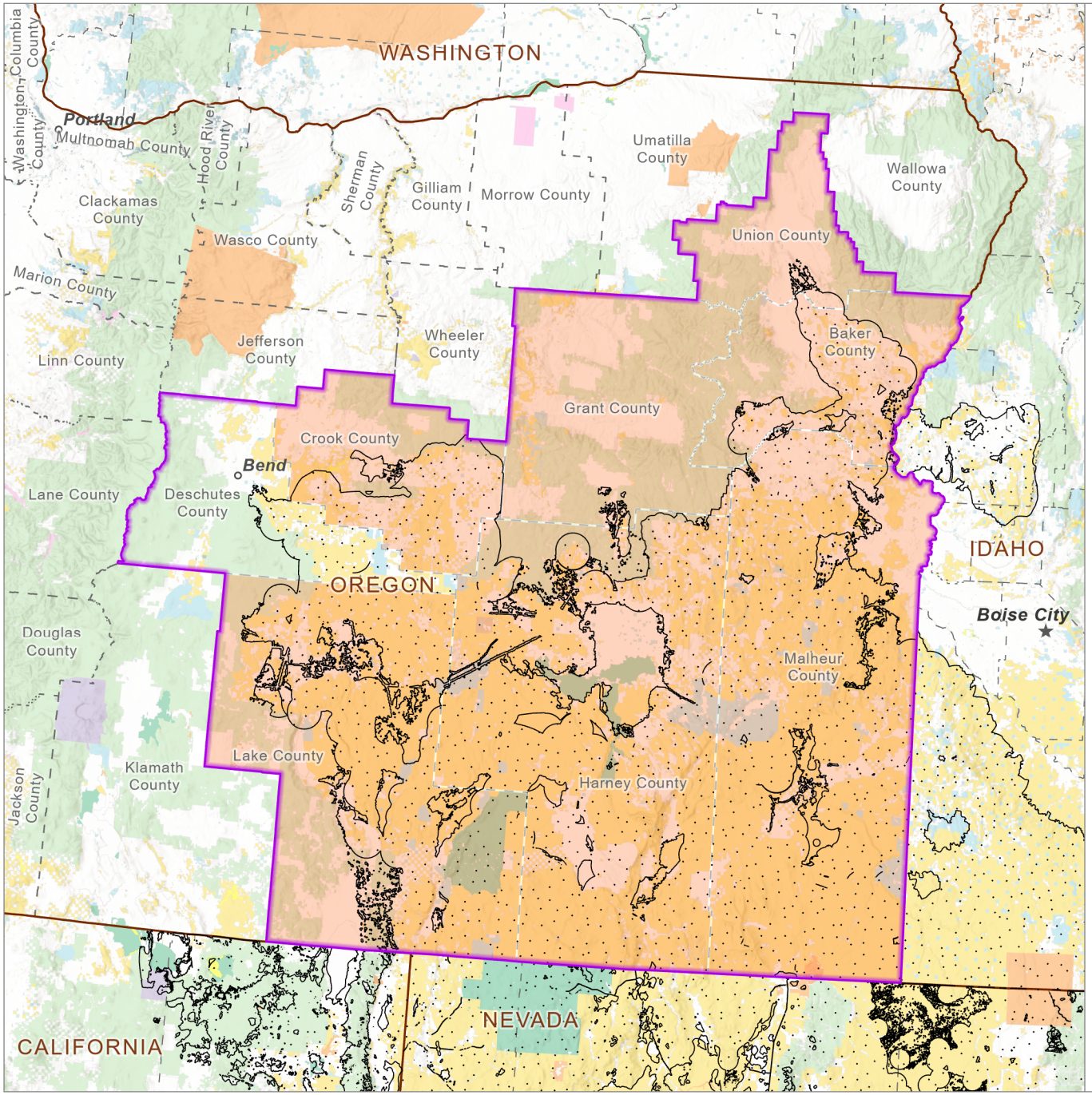
- Socioeconomic analysis area
- County containing environmental justice populations
- Priority Habitat Management Area, Alternative 3
- Bureau of Land Management
- US Forest Service
- National Park Service
- Department of Defense
- US Fish and Wildlife
- Bureau of Reclamation
- Tribal land
- State
- Local government
- Private or undetermined
- Other Federal

0 50 100
Miles

N

Source: BLM GIS 2023, U.S. Department of the Interior, Bureau of Land Management
February 29, 2024,
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Billings County
Stark County
Golden Valley County
Hettinger County
Slope County
NORTH DAKOTA
MONTANA
Bowman
Adams County
Bowman County
SOUTH DAKOTA
Figure A-16
Environmental Justice Populations in the Socioeconomic Analysis Area - North Dakota
Socioeconomic analysis area
Priority Habitat Management Area, Alternative 3
Bureau of Land Management
US Forest Service
Department of Defense
US Fish and Wildlife
State
Local government
Private or undetermined
0
7.5
15
Miles
N
Source: BLM GIS 2023, U.S. Department of the Interior, Bureau of Land Management
February 29, 2024,
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NATIONAL SYSTEM OF PUBLIC LANDS
U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

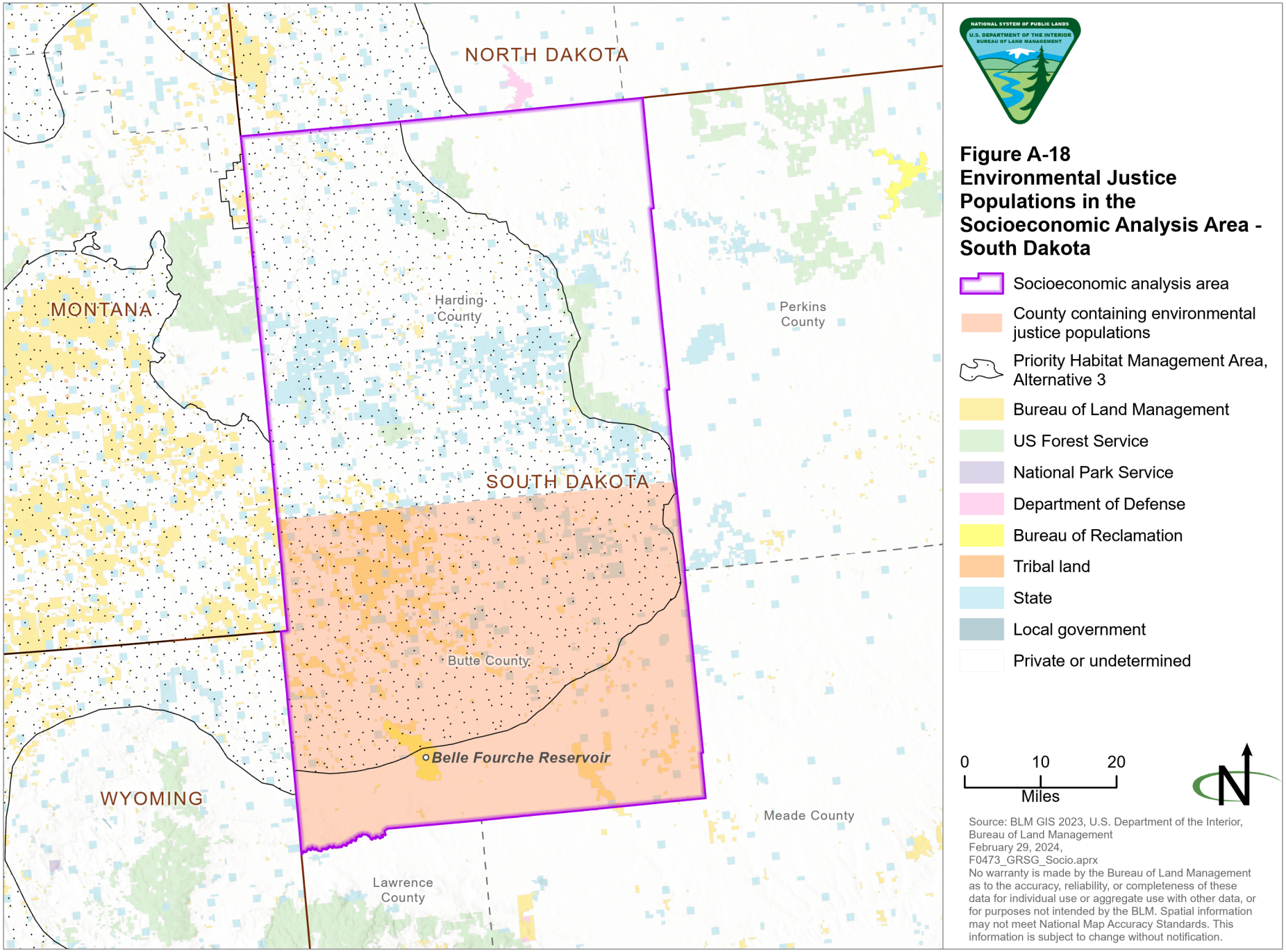
**Figure A-17**
**Environmental Justice Populations in the Socioeconomic Analysis Area - Oregon**

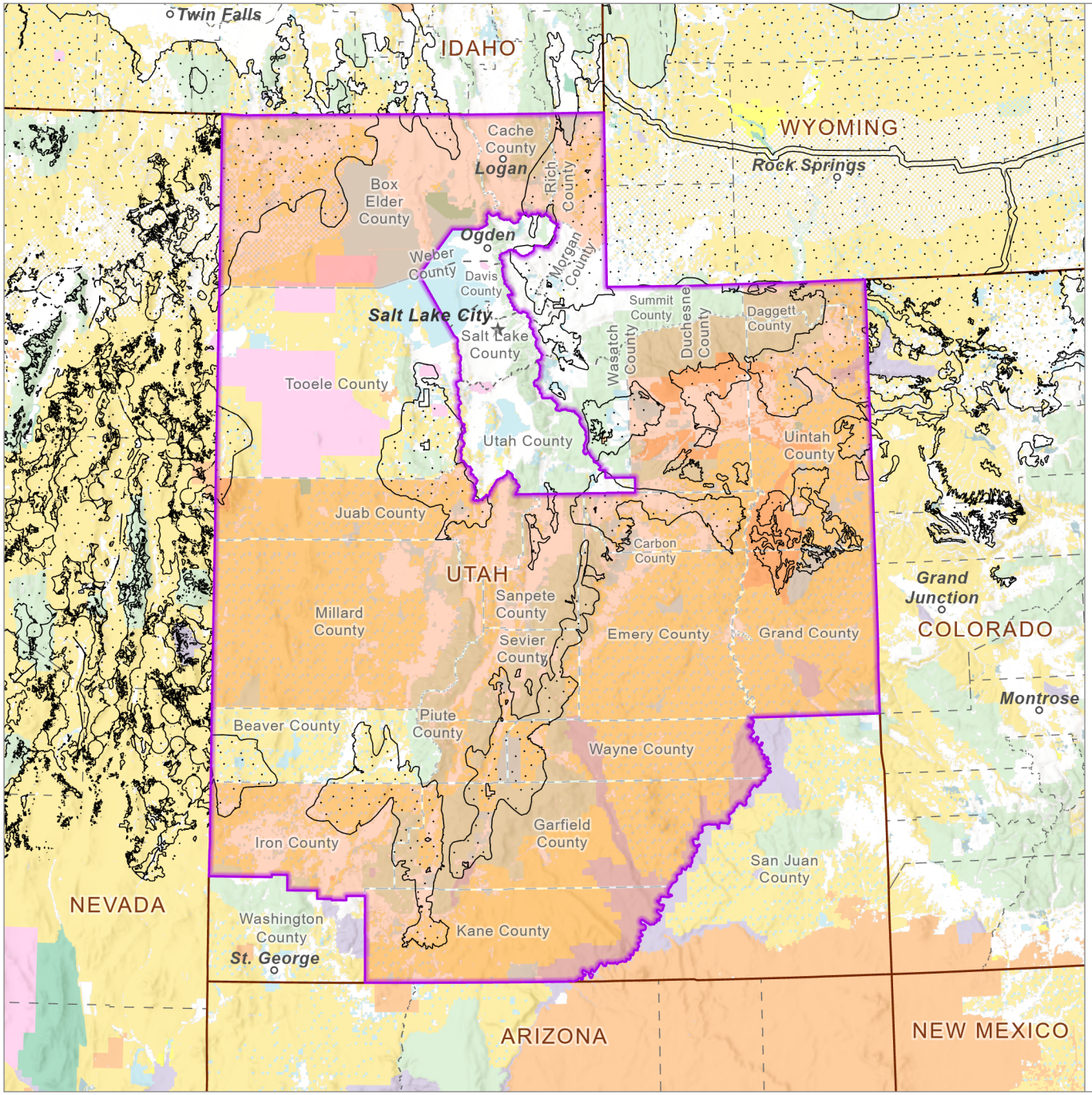
- Socioeconomic analysis area
- County containing environmental justice populations
- Priority Habitat Management Area, Alternative 3
- Bureau of Land Management
- US Forest Service
- National Park Service
- Department of Defense
- US Fish and Wildlife
- Bureau of Reclamation
- Tribal land
- State
- Local government
- Private or undetermined
- Other Federal

0 30 60
Miles

N

Source: BLM GIS 2023, U.S. Department of the Interior, Bureau of Land Management
February 29, 2024,
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NORTH DAKOTA
MONTANA
SOUTH DAKOTA
WYOMING
Harding County
Perkins County
Butte County
Belle Fourche Reservoir
Meade County
Lawrence County
NATIONAL SYSTEM OF PUBLIC LANDS
U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
Figure A-18
Environmental Justice Populations in the Socioeconomic Analysis Area - South Dakota
Socioeconomic analysis area
County containing environmental justice populations
Priority Habitat Management Area, Alternative 3
Bureau of Land Management
US Forest Service
National Park Service
Department of Defense
Bureau of Reclamation
Tribal land
State
Local government
Private or undetermined
0
10
20
Miles
N
Source: BLM GIS 2023, U.S. Department of the Interior, Bureau of Land Management
February 29, 2024,
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## Figure A-19
## Environmental Justice Populations in the Socioeconomic Analysis Area - Utah

- Socioeconomic analysis area
- County containing environmental justice populations
- Priority Habitat Management Area, Alternative 3
- Bureau of Land Management
- US Forest Service
- National Park Service
- Department of Defense
- US Fish and Wildlife
- Bureau of Reclamation
- Tribal land
- State
- Local government
- Private or undetermined
- Other Federal

0 40 80
Miles

Source: BLM GIS 2023, U.S. Department of the Interior, Bureau of Land Management
February 29, 2024,
F0473_GRSG_Socio.aprx
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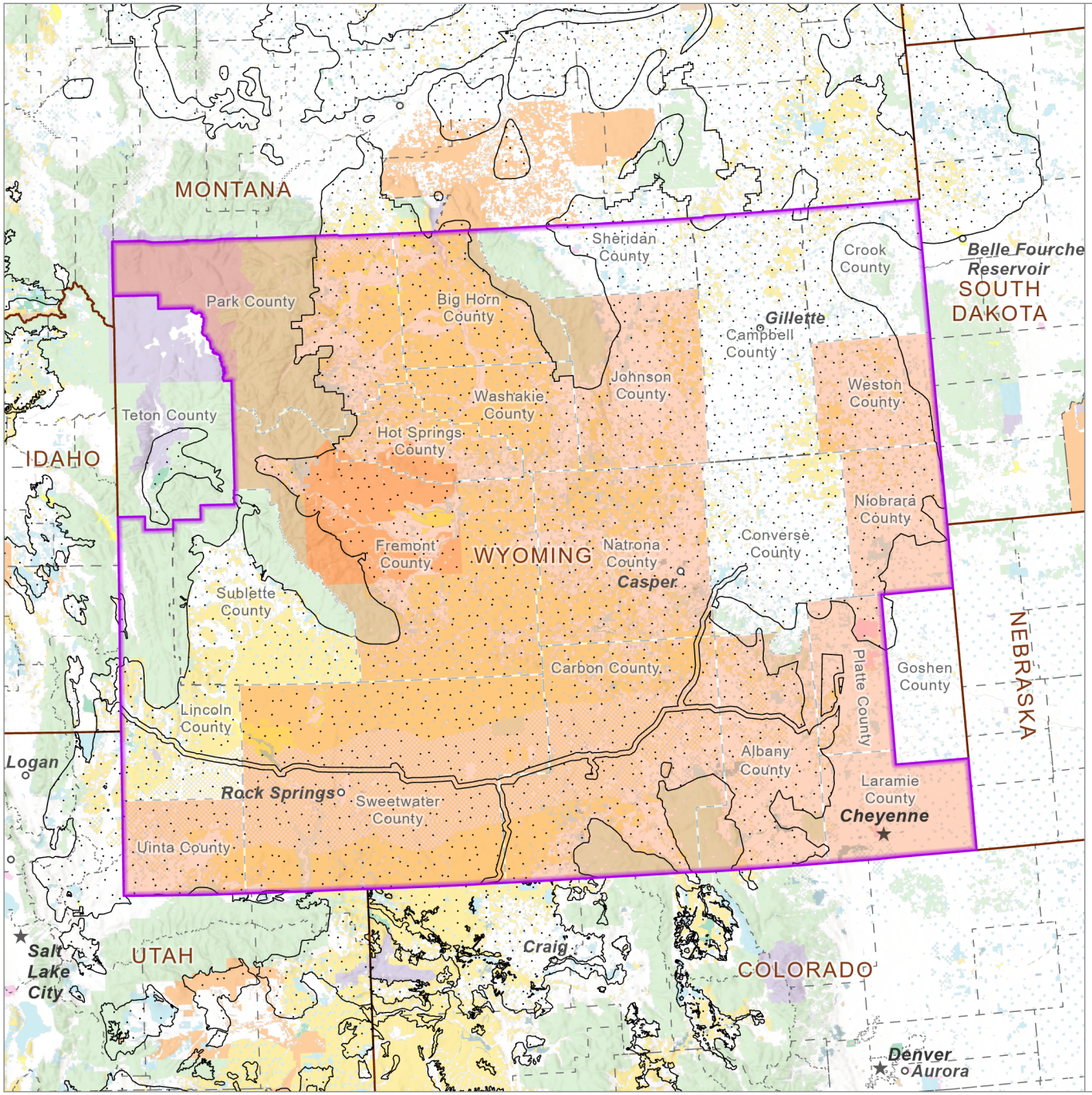



**Figure A-20**
**Environmental Justice Populations in the Socioeconomic Analysis Area - Wyoming**

- Socioeconomic analysis area
- County containing environmental justice populations
- Priority Habitat Management Area, Alternative 3
- Bureau of Land Management
- US Forest Service
- National Park Service
- Department of Defense
- US Fish and Wildlife
- Bureau of Reclamation
- Tribal land
- State
- Local government
- Private or undetermined
- Other Federal

0 50 100
Miles

Source: BLM GIS 2023, U.S. Department of the Interior, Bureau of Land Management
February 29, 2024,
F0473_GRSG_Socio.aprx
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# Appendix 14

## Cumulative Effects Supporting Information

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# Appendix 14. Cumulative Effects Supporting Information

A cumulative impact on the environment is one that results from the incremental impact of the given alternative when added to other past, present, and reasonably foreseeable actions, regardless of what agency (federal or nonfederal) or person undertakes such actions. Cumulative impacts can result from actions that have individually minor impacts, but when taken collectively over time, their combined effects may be significant. The cumulative impacts resulting from the implementation of the alternatives in this RMPA/EIS may be influenced by other actions, as well as activities and conditions on other public and private lands, including those beyond the planning area boundary. As a result, the sum of the effects of these incremental impacts involves determinations that often are complex, limited by the availability of information, and, to some degree, subjective.

Because of the programmatic nature of an RMPA/EIS and cumulative impacts assessment, the analysis tends to be broad and generalized. This allows BLM to examine the impacts that could occur from a reasonably foreseeable management scenario, combined with other reasonably foreseeable activities or projects; consequently, this assessment is primarily qualitative for most resources because of a lack of detailed project-scaled information at the planning stage. A quantitative comparison of geospatial management decisions on public lands across the greater sage-grouse (GRSG) range is presented in **Section 14.3** below.

The cumulative effects analysis in Chapter 4 and supported by the information in this appendix assesses the magnitude of cumulative impacts by comparing the environment in its baseline condition with the expected impacts of the alternatives and other actions in the same geographic area. The magnitude of an impact is determined through a comparison of anticipated conditions against the baseline, as depicted in the affected environment, or the long-term resilience of a resource or social system.

The following factors were considered in cumulative impact assessment:

- Federal, Tribal, nonfederal, and private actions
- Potential for combined impacts or combined interaction between impacts
- Potential for impacts across political and administrative boundaries
- Other spatial and temporal characteristics of each affected resource
- Comparative scale of cumulative impacts across alternatives

## 14.1 State and Local Conservation Plans and Efforts

This RMPA is considering changes to GRSG habitat management on public lands and provides direction for if and/or how future developments may occur. This RMPA is limited to planning-level decisions; in other words, it does not authorize any specific project but establishes the conditions under which future actions would be considered in GRSG habitat on public lands. Because of the nature of this decision, the greatest equivalent corresponding actions to consider in cumulative impacts is from actions of a similar scale. The most critical of these types of actions/plans are state GRSG plans, executive orders, statures, and related conservation efforts. Across the landscape, the BLM's RMPAs for public lands will be added to the management from the State plans/efforts. States have legal jurisdiction for managing GRSG populations, as well as having permitting authority over several types of potentially impactful land uses both on non-BLM-

administered lands (e.g., oil and gas development on private lands), as well as for some uses on public lands (e.g., locatable mineral mines). Because of this, the State plans/efforts have the greatest potential for a similarly scaled cumulative effect then combined with the BLM's ARMPAs.

In addition to the State plans, many counties and conservation districts also include GRSG management in their local plans. There is substantial variability in the level of detail and regulatory nature of the decision in these plans across the GRSG range. This includes providing recommendations for GRSG habitat management on public lands and may also include specific management for land uses for which the county has permitting authority.

Each state with GRSG has developed a specific approach for conserving those populations and providing or recommending management of uses that could impact GRSG and their habitat. The following sections summarize each state's plan and related efforts.

### 14.1.1 Colorado

**Colorado GRSG Conservation Plan, EO 2015-004, Greater Sage Grouse Stewardship Action Plan, SB 19-181.** GRSG habitat conservation in Colorado spans across federal, state, local and private management. In 2008, the State of Colorado published the Colorado Greater Sage-Grouse Conservation Plan (CCP) which built on local conservation plans developed by local working groups. The CCP provides an extensive literature review of GRSG in Colorado and overarching conservation strategy to support conservation of the species and avoid or minimize impacts. The CCP contains voluntary management guidelines that may be applied across land ownerships and many land uses (Colorado Greater Sage-grouse Steering Committee, 2008). Implementation of the CCP guidelines is not mandatory.

Through implementation of the CCP, the State of Colorado has funded and completed over 146,000 acres of habitat treatments in GRSG habitat and supported numerous conservation easements (Conservation Efforts Database).

In 2015 Colorado's governor issued Executive Order 2015-004 to strengthen the CCP. Under the order, the state oil and gas permitting agency would evaluate its existing wildlife siting rules for potential improvement and consult with Colorado Parks and Wildlife when considering actions that impact GRSG or GRSG habitat. The order also prioritized the completion of the Colorado Habitat Exchange, a voluntary compensatory mitigation program. The Colorado Habitat Exchange has not been fully implemented largely due to changing market conditions that devalued the credit/debit system. There are no other statewide mitigation exchanges or banks in place.

Oil and gas operations in Colorado, regardless of ownership, are subject to the rules and regulations overseen by the Colorado Energy & Carbon Management Commission (ECMC, formerly Oil and Gas Conservation Commission). In 2019, Colorado Senate Bill 19-181 was signed into law, amending the Oil and Gas Conservation Act. SB 19-181 ensures that oil and gas development including flowline operations in Colorado are regulated in a manner that protects public health, safety, welfare, the environment and wildlife resources (§34-60-101 et seq.). Subsequent approved rulemaking for SB 19-181 included substantial updates to the 300 Series (consultations), 400 Series (Noise & Lighting Requirements), and 1200 Series regulations, which dictate the protection of wildlife resources. The 1200 Series regulations require wildlife mitigation plans for new or amended oil and gas locations, or for previously permitted locations that would cause the density of oil and gas locations to exceed 1 per square mile in PHMA. The wildlife mitigation plans must have written concurrence from CPW. New ground disturbance within 1 mile of GRSG lek sites, among other high priority habitats, is precluded except under certain circumstances outlined in the regulations. Any direct

and/or indirect impacts resulting from development triggers compensatory mitigation requirements (monetary fees or operator-completed projects) which are intended to provide a conservation benefit for the population(s) impacted. Mitigation under the SB 19-181 is enforceable by ECMC but is limited to oil and gas development and flowline operations.

State trust land represents approximately 10 percent of the GRSG habitat in Colorado. In 2016 the State Land Board issued the Greater Sage Grouse Stewardship Action Plan (SAP) for an original term of 4 years and re-issued the SAP in 2020 for an additional 5 years. The SAP describes the current uses of the state trust lands, the quality of these lands for GRSG habitat, sets prescriptions for both surface and mineral ownership, and clarifies GRSG habitat mitigation and adaptive management (Colorado State Land Board, 2016). Some management actions described in the SAP are required to hold leases on state trust lands, such as a set of required and voluntary grazing best management practices. In coordination with CPW, the State Land Board applies stipulations to fluid mineral leases including no surface occupancy in PHMA, no surface occupancy within 2 miles of a lek in GHMA, and timing limitations in all designated habitat. The State Land Board also applies the 3 percent disturbance cap and the average of one facility per 640-acre density cap described in the BLM 2015 ARMPA. To date, the State Land Board has foregone 6 oil and gas, 1 solid mineral, 3 solar, and 9 wind energy leases to conform with the SAP (Annual Stewardship Report, 2023). The State Land Board has implemented $82,000 worth of habitat enhancement projects associated with the SAP since 2016 (Colorado State Land Board, 2023).

### 14.1.2 Idaho

**Policy for GRSG Management in Idaho and EO 2022-03**. With Executive Order 2022-003 "Adopting Idaho's 2021 Sage-Grouse Management Plan and Idaho Sage-Steppe Mitigation Process," the State of Idaho updated its GRSG management plan. The State plan guides GRSG management and provides recommendations across all ownerships. The State plan identifies policy direction and recommendations for GRSG conservation and management on federal lands and actions with a federal nexus within the Sage-grouse Management Area. The State plan may also apply to management of State Endowment Lands (a decision by the Idaho Board of Land Commissioners); it is non-binding on private lands.

The objectives of the Idaho Plan are to: (1) implement policy mechanisms to conserve and manage GRSG habitats, populations, and connectivity; (2) monitor habitat and population trends; and (3) use adaptive regulatory triggers to prevent further loss and stabilize habitats and populations in PHMA and IHMA.

The State plan focuses on management and direction for large-scale anthropogenic disturbance, as well as priorities for habitat management and restoration. Under the State plan, habitat disturbance from wildfire and fuels management, maintenance and operation activities by utility companies, and infrastructure related to homes or small-scale agricultural businesses are exempt from restrictions for large-scale anthropogenic disturbance.

Idaho's GRSG management is based on the three-tiered approach to Habitat Management Areas (HMA), ranging from Priority, Important, and General HMA (i.e. PHMA, IHMA, and GHMA) in terms of habitat quality, breeding bird densities, and connectivity. Guidance for management from the most to least restrictive also follows this order. The State plan focuses on conserving primarily PHMA, followed by IHMA. This 3-tiered HMA approach facilitates multiple-use activities in lower quality habitats, e.g. disturbed or fragmented, in GHMA.

Executive Order 2022-03 also adopted the Idaho Sage-Steppe Mitigation Principles that guide compensatory mitigation, albeit voluntary. The overall strategy is to primarily avoid, then minimize impacts to GRSG, and

lastly, to mitigate for unavoidable impacts. Mitigation efforts would focus on increasing the resiliency and productivity of GRSG populations and habitats, particularly in PHMA and IHMA. The State will work with federal land management agencies and project proponents to use the Habitat Quantification Tool (HQT) to measure and quantify the impact of new anthropogenic disturbance on GRSG, and, if needed, provide mitigation recommendations.

BLM Idaho has a Memorandum of Understanding (MOU ID SO-2022-09: Idaho Greater Sage-grouse Implementation Team) with several partner federal and state agencies to develop conservation strategies and make recommendations pertaining to adaptive management, review of new anthropogenic disturbance, and mitigation. The State makes recommendations on mitigation largely based on the Idaho Sage-steppe Mitigation Principles document and results from the HQT. The Implementation Team review proposals for new anthropogenic disturbance and makes recommendations to the BLM Authorizing Officer.

The State of Idaho has several ongoing efforts that contribute to GRSG conservation:

- **Sage-Grouse Actions Team** (SGAT) is comprised of representatives from state and federal agencies and NGOs who collaborate on habitat restoration efforts. It is overseen by the Idaho Governor's Office of Species Conservation. The SGAT specifically targets work on invasives, juniper removal, wet meadow and riparian restoration, wildfire prevention (e.g., strategic fuel breaks, wildland fire engine fill stations), and wildfire rehabilitation. Annual funding annually is typically a mix of state or federal funds. Each winter project proposals from agencies and individual landowners are evaluated. Projects have been funded since 2016. In 2022, through the SGAT, approximately 8,000 acres of habitat were treated, leks monitored, and funding assistance for GRSG coordinator positions. Many on-the-ground projects have been completed to-date, including those complementing efforts by various agencies or landowners in Idaho.
- Idaho **Cheatgrass Challenge** (CC) is a multiagency partnership lead by the Natural Resource Conservation Service (NRCS) whose focus is to proactively maintain healthy landscapes, free of invasive annuals grasses (IAG) (cheatgrass, medusahead wildrye, ventenata and other invasive weeds), reduce IAG distribution in transitional areas, and mitigate the adverse effects in areas they dominate. The CC was formed in 2018 and consists of representatives from multiple federal and state agencies, as well as Pheasants Forever and the Idaho Rangeland Conservation Partnership. Projects are funded annually. A review team evaluates the applications based in factors such as treatment effectiveness, collaboration across landownerships, and leveraging of funding and in-kind efforts.

### 14.1.3 California

**GRSG Conservation Plan for northeastern California (NV/CA Sub-region).** The State of California has not developed a plan or established a mitigation strategy for GRSG. In lieu of a state mitigation strategy in California, the BLM coordinates with the Sagebrush Ecosystem Technical Team (SETT) on site-specific projects which require mitigation. The SETT runs a "table-top" analysis established in the Conservation Credit System (CCS; State of Nevada, 2022) to determine the impacts of the site-specific projects. The BLM uses this information to determine the necessary mitigation measures required to off-set impacts to GRSG and their habitat and remain consistent with mitigation measures applied on lands in Nevada.

In November of 2022, a petition was submitted to the California Fish and Game Commission (Commission) requesting the Commission list GRSG as threatened or endangered under the California Endangered Species

Act (CESA). Based on the information contained in the petition and other relevant information, it was determined that there was sufficient information to indicate the petitioned action may be warranted. A one-year status review of GRSG by the California Department of Fish and Wildlife (CDFW) commenced in June of 2023. During the review period, GRSG will receive the same protections as a CESA-listed species throughout California.

On California BLM-managed lands in Nevada, the California BLM utilizes the Nevada Greater Sage-grouse Conservation Plan (State of Nevada, 2019), CCS and abides by the State of Nevada's Regulations (2022 Nevada Revised Statutes (NRS) Chapter 232-State Departments NRS 232.162) regarding GRSG mitigation, which applies to lands in GRSG habitat across all land ownership. See the "GRSG Conservation Plan for Nevada" below for additional information on the State of Nevada's GRSG conservation plan, CCS and mitigation strategy.

Additional ongoing efforts that contribute to GRSG conservation in California include the Buffalo Skedaddle Working Group. The group is named after a GRSG Population Management Unit (PMU) which is managed by the Eagle Lake and Applegate Field Offices. The group has been working for over a decade addressing ways to conserve habitats that are important for GRSG within the Buffalo Skedaddle PMU. The working group consists of wildlife biologists, rangeland management specialists, ecologists, private landowners, and permittees. The group represent the BLM, CDFW, Nevada Department of Wildlife, US Fish and Wildlife Service, Forest Service, Natural Resources Conservation Service, and the ranching community.

The group has been focused on implementing the conservation goals and habitat restoration targets established in the 2006 Buffalo Skedaddle Conservation Plan (currently under revision). The group works on projects focused on the habitat needs of GRSG including all seasonal habitats, wildfire rehabilitation, riparian restoration and protection, fuels reduction, control of invasive species and several multi-year research projects in conjunction with USGS, CDFW, NDOW and universities. The Plan includes strategies to manage uses such as livestock and wild horse and burro in ways that benefit GRSG and its habitat. It also recognizes the critical connection of public and private lands and the essential partnership among the land managing agencies and landowners.

### 14.1.4 Nevada

**GRSG Conservation Plan for Nevada.** On March 30, 2012, Governor Brian Sandoval fortified Nevada's commitment to GRSG conservation, by issuing Executive Order 2012-09, which established the Governor's Greater Sage-grouse Advisory Committee (Advisory Committee) with a directive to provide updated recommendations for GRSG conservation in Nevada to preclude the need for listing GRSG under the Endangered Species Act (ESA) and provide a GRSG alternative in the Nevada BLM/ USFS Land Use Plan (or Resource Management Plan) revision process. Those efforts resulted in the Strategic Plan for Conservation of Greater Sage-Grouse in Nevada (2012 State Plan), completed on July 31, 2012, which consisted of a list of primary threats to GRSG in Nevada and recommendations to the Governor on strategies and actions to conserve GRSG in Nevada.

One of the main recommendations of the 2012 State Plan was the creation of the Sagebrush Ecosystem Program (SEP), which would consist of the Sagebrush Ecosystem Council (SEC) and the Sagebrush Ecosystem Technical Team (SETT). The SEC was originally established under Executive Order 2012-19, on November 19, 2012, and later codified under Nevada Revised Statutes Chapter 232.162. The SETT began work on February 11, 2013. On April 22, 2013, the SEC directed the SETT to further develop the recommendation in the 2012 State Plan into a more comprehensive and detailed strategy. The SEC considered proposed

revisions over a series of meetings starting in July 2013. The result of those efforts was the 2014 Nevada Greater Sage-grouse Conservation Plan (State Plan).

The State Plan, as updated in 2019, is based on available scientific information and stakeholder input to apply a GRSG conservation plan specific to Nevada. This is meant to be a "working document" that will be updated as new science emerges and lessons are learned through implementation of the State Plan, using an adaptive management framework.

In addition to the State Plan, the SEP developed the Nevada Sage-grouse Strategic Action Plan (SAP). The State Plan provides broad goals, objectives, and management actions to ameliorate the primary threats to GRSG in Nevada. The SAP is a companion document to the State Plan and goes into greater detail identifying areas in which to focus conservation efforts to achieve the broad goals and objectives outlined in the State Plan. The SAP identifies funding sources to implement the management actions recommended in the State Plan. The SAP also identifies where the primary threats to GRSG habitat are located across the landscape and provides specific guidance on how to ameliorate these threats based on local area conditions, resistance and resilience regimes, and ecological site descriptions. The SAP helps guide how and where the management efforts identified in the State Plan are prioritized to achieve landscape-scale conservation of GRSG and the sagebrush (*Artemisia* spp.) ecosystem.

**Nevada Conservation Credit System.** Administered by the Sagebrush Ecosystem Technical Team (SETT), the Nevada Conservation Credit System (CCS) is an approach to GRSG habitat protection that provides for fully compensating habitat impacts from man-made disturbances by long-term enhancement and protection of habitat to result in an overall benefit for the species, while allowing for anthropogenic disturbances that support the Nevada economy. The CCS was developed to meet requirements established by Nevada Revised Statutes Chapter 232.162 to fulfill compensatory mitigation requirements for anthropogenic disturbances to GRSG habitat on public lands in Nevada. The use of the CCS to offset impacts to GRSG became mandatory in Nevada with the adoption of Nevada Administrative Code 232.400-232.480 in 2019. The CCS is used to offset impacts from anthropogenic disturbances through habitat enhancement and protection that results in a net conservation benefit for GRSG habitat in Nevada. The CCS quantifies verified functional habitat value in the form of credits and quantifies the verified functional habitat value of impacts, both direct and indirect, in the form of debits.

The CCS fulfills the November 3, 2015, Presidential Memorandum: *Mitigating Impacts on Natural Resources from Development and Encouraging Related Private Investment* directive to ensure that federal policies are clear, work similarly across agencies, and are implemented consistently. The CCS meets the objective of encouraging private investment to achieve public natural resource conservation as an innovative way to finance successful stewardship and restoration projects that demonstrate a measurable net conservation gain of sagebrush habitat in Nevada.

The CCS is designed to accommodate private land credits in the system and the State Plan currently allows for credits to be generated on public land. However, procedures and instructions have not been adopted for federal agency engagement with the CCS to verify and enroll credits on public land.

### 14.1.5 Montana

**Montana GRSG Habitat Conservation Program and EO 12-2015.** In Montana, the GRSGS Conservation strategy is overseen by the Montana Sage-Grouse Oversight Team and the Sage-grouse Habitat Conservation Program, working to implement Executive Order 12-2015 and the Greater Sage-grouse Stewardship Act. Executive Order 12-2015 establishes specific requirements and limitations on

development, being most restrictive in core areas near leks and less restrictive in general habitat and connectivity areas. Other components establish general practices that apply to everyone. The EO applies to all state agencies and all programs and activities of state government, including permitting programs, grant programs, and internal agency programs.

The MT Habitat Conservation Program facilitates implementation by consulting with permit applicants and project proponents to help applicants avoid negative impacts of development through minimization of impacts and address compensatory mitigation for impacts that can't be avoided or minimized. The mitigation hierarchy is applied by first working to avoid impacts and core area, then minimization through onsite practices, and as a last resort, compensatory mitigation to replace lost habitat. The Program will make recommendations to the applicant and the permitting agency.

While the MT HCP provides advice, and is not a regulatory entity, compliance with the EO is achieved through the issuing of state permits, grants or technical assistance, which contain requirements. In cases where exceptions or waivers to the EO are requested, these are decided by the Montana Sage Grouse Oversight Team. Implementation is mandatory for state agencies and federal agencies have committed to align their work to the approach, consistent with "all hands, all lands."

The compensatory mitigation aspects of the Montana Sage-Grouse Conservation Strategy are established through a Montana Sage Grouse Oversight Team (MSGOT) approved, Montana Mitigation System Policy Guidance Document for Greater Sage-Grouse and the Habitat Quantification Tool Technical Manual (HQT). The HQT and mitigation policy took effect January 12, 2019. The System draws on findings and science from the U.S. Fish and Wildlife Service's (USFWS) Conservation Objectives Report (COT), the 2015 USFWS Not Warranted Finding, and the recommendations of the Montana Greater Sage-Grouse Habitat Conservation Advisory Council. The approach relies on best available science, should incorporate new information, and is based on deliberations of the Montana Mitigation Stakeholders Team (Stakeholders Team). The HQT calculates the functional acres lost on a debit project and gained on a credit project. Functional acres are based on the quality and quantity of affected habitat. The policy guidance document applies multipliers for development projects to incentivize voluntary conservation and consistency with the Montana Sage-Grouse Habitat Conservation Plan or specific provisions of federal land use plans.

The Montana Policy Guidance defines the processes and information necessary to create, buy, or sell mitigation credits suitable for meeting sage grouse mitigation requirements within the State of Montana. The HQT calculates the functional acres lost on a debit project and gained on a credit project. Functional acres are based on the quality and quantity of affected habitat.

In 2005, Montana Fish Wildlife and Parks (FWP), released the Management Plan and Conservation Strategy for Sage-grouse in Montana, a product crafted in partnership with other key entities. The plan describes GRSG habitat, population dynamics, and provides a framework for developing local working groups. Overall, the plan outlines the envisioned approach for conservation and enhancement of sage-grouse habitats. This plan, along with newer science and information was used as key information in the development of the MT GRSG Conservation Strategy.

Montana FWP also manages the Upland Game Bird Enhancement Program which provides funds for various conservation actions including management changes, restoration projects, and easements. In addition, the department provides technical assistance to aid in the development and application of GRSG related conservation projects from federal, local, and non-profit partner organization programs.

### 14.1.6 North Dakota

**Management Plan and Conservation Strategies for GRSG in North Dakota.** The State of North Dakota Game and Fish Department released the Management Plan and Conservation Strategies for Greater Sage-Grouse in North Dakota in 2014. The plan provides recommendations on how to meet objectives from the FWS COT Report (2013). While the plan does not regulate development in sage-grouse habitat, it provides a framework for habitat conservation efforts across the varied ownership in ND GRSG habitat. The plan recommends a conservation hierarchy, starting with avoidance, and where that is not possible, minimization and mitigation.

In addition, the ND Game and Fish Department runs a Private Land Initiative program, that includes programs such as Conservation Reserve Cost Sharing, Working Lands, and Habitat Plots. These initiatives fund various conservation actions, including ones in GRSG habitats.

### 14.1.7 South Dakota

**South Dakota GRSG Action Plan 2022-2026.** GRSG are listed as a species of greatest conservation need in the 2014 South Dakota Wildlife Action Plan. Habitat areas, management approaches, population dynamics, and additional management options were part of the Sage-grouse Management Plan for South Dakota 2014 – 2018. The management plan was updated in 2022 with the release of Management of Greater Sage-Grouse in South Dakota. Information from the management plan was used to craft the South Dakota Greater Sage-Grouse Action Plan (2022-2026) which was released in early 2022. The plan recommends three priorities: core area mapping; habitat management; and collaboration. While the plan is not regulatory, it does provide both internal guidance to SD Game Fish & Parks and identifies the need for collaboration, establishment of good faith efforts, and environmental review to facilitate the common interest of GRSG conservation.

Additional contributions by the state for GRSG conservation are focused on providing capacity for collaborative habitat-related programs. SD GFP contributes funding to multiple partner efforts that overlap and work to leverage federal, state, and additional funding sources to apply restoration, enhancement, and protection actions to GRSG habitats in South Dakota.

### 14.1.8 Oregon

**Oregon Sage-Grouse Action Plan and EO 15-18.** The State of Oregon is in the process of updating its Oregon Sage-Grouse Conservation Assessment and Strategy. Oregon Department of Fish and Wildlife (ODFW) first developed a plan for the conservation and management of GRSG in Oregon in 2005. This document, the Greater Sage-Grouse Conservation Assessment and Strategy for Oregon (or "CAAS"), was last updated in 2011. The 2011 update to the CAAS included a process for defining and delineating the most important sage-grouse habitats in Oregon. These "Priority Areas for Conservation" (PACs) are necessary to conserve 90% of Oregon's GRSG population and include both core and low-density habitats. ODFW updated the GRSG habitat designation maps, and consequently the Oregon Fish and Wildlife Commission approved them in December 2023, which was not in time incorporation into the BLM's Draft analysis; it will be incorporated into the Final EIS.

The State plan implements direction from State EO 15-18 (September 15, 2015). ODFW Greater Sage-Grouse Conservation Strategy (Oregon Administrative Rules OAR 635-140-0000 – 0025) rules identify GRSG habitat, target population objectives, and mitigation hierarchy with specific information regarding mitigation. The State's Land and Conservation Development Commission (LCDC) also enacted OAR 660-

023-0115 for GRSG conservation, which is the regulatory rule. All state agencies that carry out, fund, or permit actions within GRSG habitat were required to adopt OAR-660-023-0115.

Oregon has a Sage-grouse Mitigation Program, which is a product of Oregon's GRSG conservation efforts and addresses the threat of increasing development pressure in GRSG habitat. Proposed development projects in GRSG habitat that require a county or state permit, which includes private lands, and are identified as a conflicting use (e.g., any non-agriculture development over 5 acres), as outlined in OAR 660-023-0115(7), must coordinate with the Mitigation Program to ensure the Mitigation Hierarchy outlined in both OAR 660-023-0115 and OAR 635-140-0025 has been achieved. "Compensatory mitigation" is the third step in the mitigation hierarchy and means the replacement or enhancement of the function of habitat capable of supporting GRSG in greater numbers than predicted to be impacted by a development. ODFW operates a Habitat Quantification Tool (HQT), which was developed to measure projected outcomes of both new development and habitat restoration projects and to help target siting of credit and debit projects in the most beneficial locations for GRSG .

In 2012, the Oregon Sage-grouse Conservation Partnership (SageCon) was convened at the request of the Governor's office to formulate an "all lands, all threats" approach to GRSG conservation. This effort was to address both USFWS' GRSG listing decision in 2015 and support long-term community sustainability in central and eastern Oregon. SageCon continues to convene the partners involved in Oregon's sagebrush rangelands. The ODFW 2011 Conservation and Assessment Strategy and the 2015 Oregon Sage-grouse Action Plan identified Local Implementation Teams (LITs) for 5 geographic areas to be the hub of locally-led collaboration to achieve coordinated and supported implementation of strategic conservation actions on-the-ground. These LITs and other local entities work closely with BLM district and field offices to coordinate cross-jurisdictional activities to benefit GRSG habitat.

Additionally, private landowners are able to make a long-term commitment through CCAA's. Voluntary conservation agreements through Sage-Grouse Candidate Conservation Agreements with Assurances (CCAAs) are designed to support the ecological integrity and uplift of Oregon's privately owned sagebrush habitats. In these 30-year agreements between US Fish & Wildlife Service and a local entity (Soil & Water Conservation District or Watershed Council), enrolled properties are assessed for risks to sage-grouse and their habitat, and actions are identified to address those threats. Implementation funds can then be applied for from USDA NRCS and the Oregon Watershed Enhancement Board (OWEB).

### 14.1.9 Utah

**Utah Conservation Plan for GRSG (January 2019) and EO/2015/002.** The State of Utah updated its Conservation Plan for Greater Sage-Grouse in 2019. The plan implements direction from State EO 2015/002. The State plan identifies 11 Sage-Grouse Management Areas that encompass more than 90 percent of Utah's breeding GRSG populations. The plan notes that GRSG habitats outside the SGMAs are not required for long-term conservation of the species. The State's EO and associated plan combines voluntary and incentive-based programs on private, local government, State Trust lands, and state lands– with reasonable and cooperative regulatory programs on federally managed lands. The EO mandated that all relevant State agencies participate in the implementation of the Plan. State agencies have developed MOUs with the Utah Division of Wildlife Resources and Public Lands Policy Coordinating Office. Those agreements set agency-specific directives related to the implementation of the executive order and the Plan.

The State of Utah also has a Compensatory Mitigation Program that was established, in part, by the Utah Legislature, Utah Administrative Rule (Compensatory Mitigation Program), and the State's Plan. The program includes rules, definitions and mechanisms for developing and tracking mitigation credits and debits. During

project coordination, the Plan recommends that the regulatory entity or project proponent voluntarily implement the compensatory mitigation. The Program is administered by Utah's Department of Natural Resources, and recommends that for every one acre of functional GRSG habitat permanently disturbed, four acres of functional habitats or corridors should be created, restored and/or preserved.

Since 1996, the State has coordinated with Utah State University to facilitate local working group meetings in communities with occupied GRSG habitat. These groups have developed local GRSG conservation plans and meet regularly to coordinate and shape the state and national policies that directly affect them.

### 14.1.10 Wyoming

**Greater Sage-grouse Core Area Protection Executive Order (2019-3).** The State of Wyoming manages GRSG through Executive Order as the State's primary regulatory mechanism to conserve GRSG. The Executive Order establishes a conservation framework implemented at the scale of the State with the goal of precluding the need to list GRSG as threatened or endangered under the Endangered Species Act (ESA). Governor Freudenthal signed the first GRSG Core Area Protection Executive Order (SGEO) in 2008 (SGEO 2008-2) which was updated in 2010 (SGEO 2010-4). Each successive administration has updated and signed a new SGEO (Governor Mead SGEO 2011-5 and 2015-4; Governor Gordon SGEO 2019-3).

Wyoming's SGEO 2019-3 coordinates GRSG conservation actions across jurisdictional boundaries (i.e., "all lands approach"). The SGEO mandates that agencies and departments of the State of Wyoming follow, consistent with statutory authority, the procedures outlined in the SGEO. On private lands incorporated into the strategy, only those activities which state agencies are required by state or federal law to review or approve are subject to the SGEO. Core population areas, connectivity areas and winter concentration areas identified as distinct habitat designations in the SGEO encompass approximately 15 million acres of GRSG habitat and 84% of the GRSG breeding population in the State. The SGEO recognizes and supports enrollment and expanded coverage of voluntary conservation programs such as USFWS's Candidate Conservation Agreements with Assurances (CCAA) and NRCS's Sage-Grouse Initiative (SGI). A statewide umbrella CCAA designed to promote conservation measures that reduce or remove threats to GRSG and to increase landowner participation by streamlining the CCAA enrollment process has been in effect in Wyoming since 2013. The State has distributed >$100M (since inception of the GRSG core area protection strategy) for on-the-ground projects, research and monitoring specific to GRSG conservation; these funds have generally been funneled through the Wyoming Wildlife and Natural Resource Trust (WWNRT) or the GRSG Local Working Groups (LWG).

The conservation framework established in the SGEO follows an avoidance, minimization, and compensatory mitigation (where appropriate) approach to GRSG conservation. Compensatory mitigation is required by statute for activities requiring a state permit that do not comply with the stipulations of the SGEO. The State's compensatory mitigation framework details the biological, replacement, durability, and additionality requirements for a parcel of land to be considered as a GRSG "conservation credit." The mitigation framework additionally defines "restoration credits" as a means of incentivizing the restoration of GRSG habitats that have been lost or severely impacted. Debit requirements for activities that exceed thresholds in core population areas are established by disturbance type and range from 5 to 10 debits per acre or per type. Currently, a single GRSG mitigation bank on Pathfinder Ranches (Sweetwater River Conservancy) is functional in Wyoming, although several additional GRSG mitigation bank proposals are under consideration by the State.

## 14.2 RANGEWIDE IMPACTS FROM PAST, PRESENT, AND REASONABLY FORESEEABLE ACTIONS

Beyond the state and local plans, there are other actions that have occurred in GRSG habitat in the past, are currently taking place or being considered, and activities which may be reasonably foreseeable. **Table 14-1** represents many of these actions across the entire range for GRSG, which are separated by state.

As noted in section 14.1, those actions that are at a similar level of decision-making to this ARMPA are most likely to have a cumulative impact with the actions considered in the alternatives. Most prominently, this includes U.S. Forest Service GRSG plan amendments from 2015, as well as any other changes to those plans currently being considered. Other efforts with similar levels of decisions include other BLM planning efforts that affect similar geographic areas or land uses as what is being considered in this RMPA effort.

In addition to the various planning efforts, there are a variety of actions being considered within the planning area. There are also a wide variety of actions the BLM considered during implementation of the RMPs. The intent of **Table 14-1** and the related cumulative impacts analyses is not to analyze every potential future land use in GRSG habitat. Each action conducted on public lands must go through its own analysis, including consideration of the direct, indirect, and cumulative effects associated with that project. As the level of decision-making gets more specific, the level of analysis correspondingly gets more specific, as the level of uncertainty or speculation is reduced.

It is also critical to note that all actions authorized on public lands must document conformance with RMP goals, objectives, and decisions. Any project identified below that occurs on public lands – or any other action that may occur that is not noted in the table – must align with the direction in the current land use plans (if authorized before completion of this effort), or with the direction associated with whatever decision comes from this effort (if authorized after a decision is made in this effort). Additionally, any proposed action that includes state or county permits must also be in conformance with those plans. As such, the intent of **Table 14-1** and the corresponding analyses is not to present or analyze every potential project that may occur, or even all those listed in the table, as some of those projects would not be in conformance with some of the alternatives being considered. The effect of the management of the alternatives and their impacts direct, indirect, and cumulative on GRSG and its habitat, the various land uses, and corresponding effects to socioeconomics are described in **Chapter 4**.

**Table 14-1. Past, Present, and Reasonably Foreseeable Actions**

| Project Type | Project Location - State(s) | Project, Plan or Action | Description | Project Status |
|---|---|---|---|---|
| **Multi-State** | | | | |
| Lands and Realty | California, Colorado, Idaho, Montana, Nevada, Oregon, Utah, Wyoming | West-wide energy corridors (Section 368 energy corridors) | In accordance with Section 368(a) of the Energy Policy Act of 2005, the BLM designated 5,000 miles of energy corridors for potential placement of future oil, natural gas and hydrogen pipelines, and electricity transmission and distribution infrastructure. The BLM is currently conducting a amendment effort that is considering adjustments to some of the corridors. | Ongoing and Proposed changes to some corridors |
| Lands and Realty | California, Colorado, Idaho, Montana, Nevada, Oregon, Utah, Wyoming | Solar Programmatic EIS | The BLM is considering updates to its 2012 Western Solar Plan and is considering expanding its solar planning to include five additional states: Idaho, Montana, Oregon, Washington, and Wyoming | Proposed |

| Project Type | Project Location - State(s) | Project, Plan or Action | Description | Project Status |
|---|---|---|---|---|
| Federal Resource Management / Land Use Plans | Utah, Wyoming | Ashley National Forest Forest Plan Revision | Forest Plan revision for the Ashley National Forest includes areas that were amended as part of the 2015 Forest Service GRSG Plan Amendment ROD. The amended plan will affect the land uses that are allowable in the Ashley National Forest, including those that could affect GRSG habitat. | Proposed |
| Multiple | All (except Dakotas and Washington) | 21 Restoration Landscapes | Work in Restoration Landscapes will coordinate and sequence different types of investments and treatments from across the BLM – including fuels, rangelands, wildlife, forestry, aquatics and recreation. | Proposed |
| Locatable Minerals | California, Idaho, Montana, Nevada, Oregon, Utah, Wyoming | SFA Withdrawal Project | The BLM is considering withdrawal from location and entry under the Mining Act of 1872 for Sagebrush Focal Areas (SFAs) from the 2015 GRSG plans. This EIS is providing the additional and more specific analyses prior to a final decision of whether to withdraw some, none, or all of the SFAs. | Proposed |
| Lands and Realty | Idaho, Wyoming | Gateway West 230/500 Transmission Line Project | Project jointly proposed by Rocky Mountain Power and Idaho Power to build and operate approximately 1,000 miles of new high-voltage transmission lines. | Ongoing |
| Vegetation | All | Vegetation Treatments Using Herbicides | The BLM is reviewing, for potential approval and addition to its list of approved herbicides, 7 active ingredients including Indaziflam, Aminocyclopyrachlor, Clethodym, and Flumioxazin, among others. | Proposed |
| Lands and Realty | Montana, North Dakota, Wyoming, Utah, Colorado, Nebraska, Arizona | Sentinel (Ground Based Strategic Deterrent (GBSD)) Program Deployment and Minuteman III Decommissioning and Disposal | The Department of the Air Force (DAF) issued a Record of Decision (ROD) in May 2023 to document its decision to implement actions to deploy the Sentinel (formerly known as the Ground Based Strategic Deterrent [GBSD]) intercontinental ballistic missile (ICBM) system and to decommission and dispose of the Minuteman III (MMIII) ICBM system. The ROD includes establishing approximately 3,126 miles of new utility corridors throughout the F.E. Warren AFB, Malmstrom AFB, and Minot AFB missile fields in Colorado, Nebraska, North Dakota, Montana, and Wyoming, for which the government would acquire the necessary property easements/ROWs. The new corridors would supplement the existing utility connections. Sentinel maintenance, training, storage, testing and support actions will occur also at Hill AFB, Utah; Utah Test and Training Range, Utah; Camp Guernsey, Wyoming; and Camp Navajo, Arizona. | Proposed |
| Lands and Realty | Wyoming, Colorado, Utah | Energy Gateway South Transmission Line | 650-mile 500 kV transmission line. Begins in south central Wyoming, crosses Utah diagonally from northeast to southwest, and ends in Mona, Utah. Includes GRSG mitigation. | Construction Activities Underway, GRSG mitigation planning |

| Project Type | Project Location - State(s) | Project, Plan or Action | Description | Project Status |
|---|---|---|---|---|
| Lands and Realty | Wyoming, Colorado, Utah, Nevada | TransWest Express | 725-mile 600 kV transmission line. Begins in south-central Wyoming, crosses Utah diagonally from northeast to southwest, and ends south of Las Vegas | Construction Activities Underway, GRSG mitigation planning |
| Lands and Realty | Idaho, Oregon | Boardman to Hemingway Project | The Boardman to Hemingway Transmission Line Project is a 500 kilovolt (kV) transmission line, beginning at a substation near Boardman, Oregon, and extending south and east to the existing Hemingway Substation near Melba, Idaho, a distance of approximately 300 miles. The transmission line will provide additional electrical capacity between the Pacific Northwest region and the Intermountain region of southwestern Idaho. | Ongoing |
| Vegetation | Idaho, Oregon, Nevada, northeastern California, Utah, and eastern Washington | Programmatic EIS for Fuel Breaks in the Great Basin | This programmatic environmental impact statement (PEIS) evaluates creating and maintaining a system of fuel breaks in the Great Basin region. The project area, covering nearly 224 million acres, includes portions of California, Idaho, Nevada, Oregon, Utah, and Washington. The fuel breaks would be placed along a subset of available linear features, such as roads and rights-of-way (ROWs) on Bureau of Land Management (BLM)-administered lands within sagebrush communities; these potential treatment areas cover approximately 38 million acres within the project area boundary. | Ongoing |
| Vegetation | Idaho, Oregon, Nevada, northeastern California, Utah, and eastern Washington | Programmatic EIS for Fuels Reduction and Rangeland Restoration in the Great Basin | This landscape scale Programmatic Environmental Impact Statements (EIS) to analyzes potential effects of reducing fuel loading and restoring rangeland productivity within the Great Basin Region (Idaho, Oregon, Nevada, northern California, Utah, and eastern Washington) in order to protect and conserve the sagebrush-steppe ecosystem from loss as a result of wildfires. | Ongoing |

| Project Type | Project Location - State(s) | Project, Plan or Action | Description | Project Status |
|---|---|---|---|---|
| Lands and Realty | Nevada, Utah | Cross-Tie kV Transmission Project | The Project proposed by TransCanyon, LLC (TransCanyon) includes a 214-mile, single-circuit, 1,500-megawatt, 500-kilovolt (kV), high voltage alternating current (HVAC) overhead transmission line that would be located on BLM-managed public land, USDA Forest Service National Forest System Land, state land, and private land in Beaver, Juab, and Millard Counties, Utah; and White Pine County, Nevada. The proposed route would cross a total of 137 miles in Utah and 77 miles in Nevada. Approximately 165 miles, or 77 percent, of the proposed route would be on BLM-managed public land, approximately 9 miles (4 percent) on National Forest System Land, approximately 11 miles (5 percent) on state land, and the remaining approximately 29 miles (14 percent) on privately owned land. TransCanyon would obtain these land rights through ROW grants from the BLM, a SUP from the USDA Forest Service, and easements or fee purchases for non-Federal lands. | Proposed |
| Lands and Realty | Idaho, Nevada, Utah | Southwest Intertie Project (SWIP) | Idaho Power Company proposes to construct and operate a 500kV transmission line from their Midpoint Substation near Shoshone, Idaho to a new proposed substation in the Dry Lake Valley northeast of Las Vegas, Nevada. A crosstie route would also be constructed from the Ely, Nevada area to a point near Delta, Utah. New substations would be required near Ely, Las Vegas, and Delta, and a series of compensation stations would be needed midway between the Midpoint Substation and Ely, Nevada, and between Ely and Dry Lake. New microwave facilities would be required on the route from Midpoint to Dry Lake. | Ongoing |
| Wildfires and Fuels Management | Idaho, Oregon | Tri-state Fuel Breaks Project | The Tri-state Fuel Breaks Project includes a system of roadside fuel breaks (987 miles; approx. 435 miles in Idaho and 550 miles in Oregon) that reduce fuel loading along established roads to improve suppression coordination and response across a 3.6-million-acre project area spanning the southeastern corner of Oregon and southwestern corner of Idaho and connect to existing fuel breaks within northern Nevada. | Ongoing |

| Project Type | Project Location - State(s) | Project, Plan or Action | Description | Project Status |
|---|---|---|---|---|
| **Northwest Colorado** | | | | |
| Federal Resource Management / Land Use Plans | Colorado | Big Game RMP Amendment | The BLM will consider whether to incorporate new or changed oil and gas management decisions in existing land use plans, such as limits on high-density development, including facility and route density limitations, and other lease stipulations that would incorporate conservation measures for important big game habitat areas in Colorado. | Ongoing |
| Federal Resource Management / Land Use Plans | Colorado | Gunnison Sage-Grouse RMP Amendment | The BLM is preparing an Environmental Impact Statement to determine whether to amend the land use plans of BLM field offices, national monuments, and national conservation areas containing occupied and unoccupied habitat for the threatened Gunnison sage-grouse (*Centrocercus minimus*) as identified by the U.S. Fish and Wildlife Service in the 2020 Final Recovery Plan. | Ongoing |
| Federal Resource Management / Land Use Plans | Colorado | Colorado River Valley Field Office and Grand Junction Field Office Supplemental EIS | The purpose of this supplemental EIS is to broaden the range of alternatives in the 2015 CRVFO and GJFO Approved RMPs with respect to the lands that are allocated as open or closed for oil and gas leasing. The purpose is also to provide additional air quality analysis for the fluid mineral management alternatives considered in the 2014 CRVFO Final EIS and the 2015 GJFO Final EIS and in this supplemental EIS. | Ongoing |
| Lands and Realty | Colorado | Blue Valley Land Exchange | Proposed exchange of 1,652 acres of federal lands in the Kremmling Field Office for 2,005 acres of nonfederal lands in Grand and Summit Counties, Colorado. A Notice of Decision approving the Blue Valley Land Exchange was issued in January 2023, followed by a 45-day protest period. KFO is in the process of protest response. | Ongoing |
| Lands and Realty | Colorado | Wolf Creek Reservoir EIS/ RMP Amendment | Rio Blanco Water Conservancy District (RBWCD) filed an application for a right-of-way (ROW) for "White River Regional Water Supply Project" and specifically for the Wolf Creek Reservoir. RBWCD obtained a conditional water right decree for 66,720 acre-feet for use in a proposed reservoir location. The majority of the project would occur on public land managed by the BLM. Other affected property includes the Middle Wolf Creek State Trust Land parcel and a private parcel owned by RBWCD. | Proposed |
| Lands and Realty | Colorado | Axial Basin Solar Development | Private land within LSFO. Axial Basin Solar LLC, a subsidiary of juwi, inc., is developing the Axial Basin Solar Project in Moffat County, Colorado. The utility-scale solar development is expected to be sited on 3,500 acres of private land. | Proposed |

| Project Type | Project Location - State(s) | Project, Plan or Action | Description | Project Status |
|---|---|---|---|---|
| Lands and Realty | Colorado | Big Cat Solar Development | Big Cat Solar LLC a subsidiary of Apex Clean Energy Holdings LLC is proposing a 200MWac solar photovoltaic generation facility for up to 200 MW of battery energy storage and ancillary facilities on approximately 2,793 acres of public lands in the Grand Junction Field Office. The project would include a project substation and a line tap to the existing 230 kV generation interconnection transmission line running through the project area. | Proposed |
| Lands and Realty | Colorado | Book Cliffs Solar Development | Book Cliffs Solar Farm LLC a subsidiary of Scout Clean Energy LLC is proposing a 210 MW solar photovoltaic generation facility for up to 210 MW of photovoltaic module arrays, collection system, a control house and a collector substation on approximately 2,621 acres of public land in the Grand Junction Field Office. The project would utilize the existing 230 kV generation transmission line running through the project area. | Proposed |
| Lands and Realty | Colorado | Nannie Blaine Solar PV Park (State of Colorado land) | SolarGen is proposing the Nannie Blaine Solar PV Park which is a 48 MW photovoltaic array on 151 acres of State of Colorado lands located north of I-70 and just east of the Grand Junction Motor Speedway. | Proposed |
| Lands and Realty | Colorado | Xcel 6670 Rebuild | Xcel is proposing a rebuild of the 6670 Rifle-Ute to DeBeque 69 kilovolt (kV) Transmission Line (6670 transmission line) located in Mesa and Garfield Counties, Colorado. Transmission line 6670 is planned to continue to be operated at 69 kV but will be designed to accommodate 115 kV for future needs. The existing 30 to 50-foot-wide permanent right-of-way (ROW) would be widened to 75 feet to accommodate design upgrades. | Proposed |
| Wild Horse and Burro | Colorado | Piceance-East Douglas Herd Management Area Horse Gather (2024) | The White River Field Office plans to conduct a gather in the Piceance-East Douglas Herd Area in 2024. The Appropriate Management Level (AML) for the HMA is between 135-235 horses. | Proposed |
| Wild Horse and Burro | Colorado | Little Book Cliffs Herd Management Area Horse Gather (2024) | The Grand Junction Field Office plans to conduct a gather in the Little Book Cliffs Herd Management Area in 2024. The Appropriate Management Level (AML) for the HMA is between 90-150 wild horses. The last gather in the Little Book Cliffs occurred in 2018, during which 96 horses were gathered and 41 were returned to the range. | Proposed |
| Wildfires and Fuels Management | Colorado | GRSG habitat burned 2018-2022 | A total of 66,647 acres of GRSG habitat in CO burned between 2018 and 2022. Of those, 26,412 acres were on BLM land. | Complete |

| Project Type | Project Location - State(s) | Project, Plan or Action | Description | Project Status |
|---|---|---|---|---|
| Wildfires and Fuels Management | Colorado | Northwest Colorado Programmatic Vegetation Treatment Environmental Assessment (2017) | The plan takes a programmatic approach to vegetation treatments and installation of erosion/stabilization structures to work towards the vegetation management goals of the GJFO, KFO, WRFO, CRVFO, and LSFO RMPs to promote healthy, productive, and diverse vegetation communities. | Complete |
| Wildfires and Fuels Management | Colorado | Conducting Mechanical Vegetation Treatments During Drought Conditions (2020) | This plan analyzed the consequences of conducting mechanical vegetation treatments during drought conditions in GJFO, KFO, WRFO, CRVFO, and LSFO. | Complete |
| Vegetation and GRSG Habitat Management | Colorado | Conducting Mechanical Vegetation Treatments During Drought Conditions (2021) | This plan analyzed the consequences of conducting mechanical vegetation treatments during drought conditions in GJFO, KFO, WRFO, CRVFO, and LSFO. | Complete |
| Vegetation and GRSG Habitat Management | Colorado | Programmatic Environmental Assessment for Vegetation Treatments and Installation of Stabilization/Erosion Control Structures in Northwest Colorado (2017) | This programmatic EA evaluated vegetation treatments and erosion control structures in the WRFO, KFO, LSFO, CRVFO, and GJFO. | Complete |
| Recreation | Colorado | South Sand Wash Open OHV Area Recreation Area Management Plan | The BLM is working with Craig Chamber of Commerce to develop a recreation management plan for the Sand Wash Basin Special Recreation Management Area. The plan will identify the types and locations of improvements needed to provide for OHV recreation opportunities within the SRMA. | Ongoing |
| **Idaho** | | | | |
| Energy and Mining | Idaho | Husky I North Dry Ridge Phosphate Mine | The Husky I North Dry Ridge Phosphate Mine is an approximately 1,146-acre open pit phosphate mine in Caribou County, Idaho. The mine occurs on lands managed by the National Forest Service, Caribou-Targhee National Forest. Mining operations will occur over an estimated 13 years and total project duration with reclamation is 15 years. | Ongoing |
| Energy and Mining | Idaho | Caldwell Canyon Mine | The Caldwell Canyon Mine is an approximately 1,530-acre open pit phosphate mine in Caribou County, Idaho. Mine facilities (ore stockpile, tipple, water management infrastructure, offices) are located in the previously inactive Dry Valley Mine (East Caldwell Area) in Dry Valley. Mining operations will be conducted over an estimated 40-year period using a pit panel mining method. | Ongoing |
| Energy and Mining | Idaho | Rasmussen Valley Mine EIS | The Rasmussen Valley Mine is an approximately 540-acre open pit phosphate mine in Caribou County, Idaho. The life of mining activities is 5 years and total project duration with reclamation is 7 years. | Ongoing |

| Project Type | Project Location - State(s) | Project, Plan or Action | Description | Project Status |
|---|---|---|---|---|
| Energy and Mining | Idaho | East Smoky Panel Mine Project | The East Smoky Panel Mine is an approximately 850-acre open pit phosphate mine in Caribou County, Idaho. The life of mining activities is up to 12 years and total project duration with reclamation approximately 15 years. | Ongoing |
| Energy and Mining | Idaho | Dairy Syncline Mine Project EIS | The Dairy Syncline Mine is an approximately 2,830-acres open pit phosphate mine in Caribou County, Idaho. The life of the mining activities is approximately 30 years. | Ongoing |
| Energy and Mining | Idaho | Smoky Canyon Mine Panels F and G Lease and Mine Modification Project | The existing Smoky Canyon Mine, located in Caribou County, Idaho, was authorized in 1982. Mining operations began in Panel A in 1984 and have continued ever since using standard open pit techniques in seven mine panels (Panels A-G). Mining operations are complete in Panels A, C, D, and E, and mining activities associated with Panel F and G were initiated in 2008 and are ongoing. Lease and mine modifications for Panels F and G mining and reclamation were approved in a 2015 Record of Decision. | Ongoing |
| Lands and Realty | Idaho | Lava Ridge Wind Project | The proposed Lava Ridge Wind Project could consist of up to 400 wind turbines and associated infrastructure, with an estimated generation capacity of 1,000 megawatts or more. The project area spans 197,474 acres and all project components would be sited within a series of approximately one-half mile wide corridors (approx. 84,385 acres). The project infrastructure proposed within the corridors is estimated to have a 2,374-acre footprint and a total disturbance area of 9,114 acres. | Proposed |
| Vegetation and GRSG Habitat Management | Idaho | Bruneau-Owyhee Sage-Grouse Habitat Project | The BLM is removing encroaching Western juniper to improve and maintain sagebrush-steppe habitat on about 726,000 acres within a 1.67 million-acre area of Owyhee County. | Ongoing |
| **Nevada and Northeast California** | | | | |
| Energy and Mining | Eureka County, Nevada | Gibellini Vanadium Project | The Project consists of construction and operation of an open pit mine, rock disposal area, crushing facilities and stockpile, heap leach pad, process facility, process and make-up water ponds, borrow areas, mine and access roads, water and power supply lines, ancillary facilities, and continued exploration activities on public lands within the Project area in Eureka County, Nevada. The mine life consists of 1.5 years of construction, 7 years of operation, 4 years of active reclamation and closure, and up to 30 years of post-closure monitoring. | Approved |

| Project Type | Project Location - State(s) | Project, Plan or Action | Description | Project Status |
|---|---|---|---|---|
| Energy and Mining | Lander and Eureka Counties, Nevada | Goldrush Mine Project | The Goldrush Mine Plan of Operations boundary encompasses approximately 19,895 acres, of which 772 acres are on private land controlled by NGM and 19,123 acres of public lands administered by the BLM Mount Lewis Field Office and BLM Elko District, Tuscarora Field Office. The Goldrush Mine includes approximately 1,717.4 acres of new proposed disturbance and approximately 1,036.8 acres of existing/authorized and reclassified disturbance, for a total disturbance of approximately 2,754.2 acres. The underground mining and surface support activities for the Goldrush Mine include a materials handling system for transporting ore and waste rock from the underground workings to the surface and transporting aggregate and supplies to the underground workings and surface backfill plant; a dewatering system (including wells, pipelines, and pipeline corridors); a water treatment plant (WTP); rapid infiltration basins (RIBs); a multi-use shop; contact water pipeline; ventilation raises; a backfill aggregate paste plant and crusher; a shotcrete/cemented rock fill (CRF) plant; two new power lines (a 120-kilovolt (kV) power line with two switching stations, and a 13.8-kilovolt (kV) power line); new ancillary surface facilities (including bulk material storage, access roads, power supply, stormwater controls, laydown and parking areas, lighting, growth media stockpiles, dewatering and monitoring wells, gravel pit expansion, potable water and septic systems, dry facilities (i.e., change rooms), service boreholes for electrical and fuel delivery, fire suppression system, water truck refill stations, emergency helipads, fencing, and modular information technology (IT) and communications buildings); dual use of existing facilities within the nearby Cortez Mine Plan boundary; and continued surface and underground exploration activities. The Goldrush Mine would operate 24 hours per day, 365 days per year for approximately 24 years. | Approved |

| Project Type | Project Location - State(s) | Project, Plan or Action | Description | Project Status |
|---|---|---|---|---|
| Energy and Mining | Elko County, Nevada | South Railroad Valley Gold Mine | The Project is an open-pit gold mine operation that will include the following major components: • Four open pits; • Three waste rock disposal facilities (WRDFs); • Ore crushing and conveying system; • Lime and cement silos and ore agglomeration facility; • Ore stockpiles; • Clay stockpile; • Growth media stockpiles; • On-Site Power Plant and Sub-Station; • A limestone quarry area; • A heap leach facility (HLF) with solution channels, associated process solution tanks, and ponds; • Water Supply and Dewatering System; • Stormwater diversion ditches and stormwater sediment basins; • Water Treatment Plant Processing facilities comprised of pumps and pipelines, adsorption desorption and recovery (ADR) plant, refinery, and an assay laboratory; • Access and haul roads; • Ancillary facilities that include the following: ready line; maintenance area; reagent and fuel storage; storage and laydown yards; explosive magazines; meteorological station; warehouse; truck maintenance shop; truck wash; offices, warehouse and workshop, change/lunch facilities; administration/security building; and solid and hazardous waste management facilities; • Exploration in the vicinity of the open pits to better define and expand the ore body; and • Reclamation and closure, including the development of evapotranspiration (ET) cells. GSV proposes to mine approximately 52.1 million tons of heap leach ore and 159 million tons of waste rock (for a maximum total of 211 million tons of material). The material (both ore and waste) will be extracted from the open pits using conventional open pit mining methods of drilling, blasting, loading, and hauling. In addition to the construction of operating facilities, proposed exploration activities within the Project Area are estimated to disturb up to 150 acres. | Proposed (NEPA underway) |
| Energy and Mining | White Pine County, Nevada | Bald Mountain Mine, Juniper Expansion Project | The Juniper Project would modify and expand operations on BLM-administered lands within the North Operations Area (NOA) of the existing Bald Mountain Mine, resulting in approximately 3,969 acres of new surface disturbance and extension of the NOA mine life by 11 years. | Proposed (NEPA underway) |

| Project Type | Project Location - State(s) | Project, Plan or Action | Description | Project Status |
|---|---|---|---|---|
| Energy and Mining | Lander and Eureka, Counties, Nevada | Ormat Crescent Valley Geothermal Development Project | The proposed Crescent Valley Geothermal Project considers the construction, operation, maintenance and eventual reclamation of a geothermal energy production facility and associated transmission line totaling approximately 2,040 acres on public and privately leased lands. The transmission line would support an approximate 30-megawatt net rated geothermal power generating facility, operated by Ormat Nevada, Inc. | Proposed (NEPA underway) |
| Energy and Mining | Elko County, Nevada | Long Canyon Mine Project | The Project will be located in the Pequop Mountains and Goshute Valley, in Elko County, Nevada, approximately 75 miles east of Elko, Nevada. The Project will be an open-pit gold mine. | Proposed |
| Lands and Realty | Washoe, Lyon, Storey, Churchill, Mineral, Nye, Esmeralda, and Clark Counties, Nevada | Reno to Las Vegas Fiber Optic Project | The proposed buried fiber optic project would be located within existing highway rights-of-way that predominantly follow U.S. Highways 50 and 95; Nevada State Highways 160, 839, and 439; and County-maintained roads from Reno to Las Vegas. | Proposed (NEPA underway) |
| Energy and Mining | White Pine County, Nevada | White Pine Pumped Storage Hydroelectric Power Project | A 1,000 megawatt energy storage project under development in White Pine County, Nevada. The project facilities include two reservoirs, underground generation equipment, and a new transmission line. One of the reservoirs will be in the Duck Creek Range, and the other in the Steptoe Valley near Highway 93. Energy for pumping, and power generated by the project, will be delivered through a new 25-mile-long transmission line connecting the project with the Robinson Summit Substation. The remainder of the facilities will consist of access roads to the reservoirs, a transmission switch-station, and the entrance to the access tunnels. | Proposed |
| Lands and Realty | Eureka, White Pine, Lander, Churchill, and Lyon Counties, Nevada | Greenlink North Transmission Project | The Bureau of Land Management (BLM) Nevada Renewable Energy Coordination Office is evaluating two SF-299 applications [one application for a permanent right-of-way (ROW), one application for a short-term ROW] submitted by NV Energy for Transportation and Utility Systems and Facilities on Federal Lands. The proposed Greenlink North Project would span approximately 235 miles from Ely, Nevada to Yerington, Nevada through White Pine, Eureka, Lander, Churchill, and Lyon Counties and would involve construction of the following components: • Robinson Summit 525/345-kV Substation Expansion • New Lander 525/230-kV Collector Station. • New Fort Churchill-Robinson Summit 525-kV Transmission Line. • Fort Churchill 525/345-kV Substation Expansion. | Proposed (NEPA underway) |

| Project Type | Project Location - State(s) | Project, Plan or Action | Description | Project Status |
|---|---|---|---|---|
| Lands and Realty | Clark, Nye, Esmeralda, Mineral, Lyon, Storey, and Washoe Counties, Nevada | Greenlink West Transmission Project | The Greenlink West Project would be a system of new 525-kilovolt (kV), 345-kV, 230-kV, and 120-kV electric transmission facilities on private, state, and federal lands. The project will run from North Las Vegas to Reno. | Proposed (NEPA underway) |
| Energy and Mining | Humboldt County, Nevada | Thacker Pass Lithium | The proposed project consists of an open pit lithium mine, processing facilities, and continued exploration of adjacent lands located in northern Humboldt County, Nevada, approximately 17 miles northwest of Orovada, 53 miles north-northwest of Winnemucca, and 20 miles south of the Oregon state border. The proposed project will have a life expectancy of approximately 41 years. | Ongoing |
| Federal Resource Management Plans | Nevada, California | Greater Sage-Grouse Bi-State Distinct Population Segment | The approved Nevada California Greater Sage Grouse Distinct Population Segment Land Use Plan Amendment (LUPA) and Record of Decision (ROD) amends the Carson City Field Office Consolidated Resource Management Plan (RMP) and the Tonopah Field Office RMP. The BLM was a cooperating agency on the United States Forest Service (USFS) led planning effort and the LUPA was developed using a collaborative planning process that included input from the Nevada Department of Wildlife and the United States Fish and Wildlife Service. The LUPA/ ROD adds goals, objectives, action, and best management practices specifically designed to conserve, enhance, and/or restore habitats to provide for the long-term viability of the Greater Sage Grouse Bi-State Distinct Population Segment (BSSG). The LUPA provides direction at the land use plan level to include regulatory mechanisms for the management and conservation of BSSG habitats within the BLM Carson City and Battle Mountain Districts to support the BSSG population management objectives within the states of Nevada and California. | Ongoing |
| Mining and Energy | Washoe and Churchill Counties, Nevada | Juniper Geothermal Development Project | The Project proposes to include the construction and operation of up to two geothermal power production facilities, geothermal fluid production and injection wells and well pads, access roads, geothermal fluid pipelines, and ancillary support facilities. Electrical power generated at this facility would be sold on the commercial market. | Proposed |
| Mining and Energy | Pershing County, Nevada | Colado Geothermal | Drilling/exploration program to evaluate geologic structure, measure pressure – temperature gradients, and test the well to determine reservoir characteristics. Includes well pad construction, etc. | Proposed |

| Project Type | Project Location - State(s) | Project, Plan or Action | Description | Project Status |
|---|---|---|---|---|
| Mining and Energy | Humboldt County, Nevada | Pinto Hot Springs Geothermal Exploration | — | Proposed |
| Mining and Energy | Pershing County, Nevada | Spring Valley Gold Mine | Proposed gold mine (baseline surveys currently underway) | Proposed |
| Lands and Realty | White Pine County, Nevada | Stagecoach Wind Development Project | Stagecoach Wind Development Wind Energy ROW is a 11,035-acre pending wind energy zone in White Pine County, Nevada. | Proposed |
| Lands and Realty | White Pine County, Nevada | Pantheon Solar | Pantheon Solar Project would be built on 8,086 acres of public lands, partially located in GRSG habitat. | Proposed |
| Mining and Energy | Eureka County | Ruby Hill Mine | Expanded drill program at existing Ruby Hill Mine | Ongoing |
| Mining and Energy | Lander County, Nevada | Robertson Gold Mine | Mining development and exploration operations by Nevada Gold Mines LLC (NGM) on 5,990 acres, consisting of approximately 5,822 acres of public lands administered by the Bureau of Land Management (BLM) and 168 acre of private land in Lander County, Nevada. | Proposed |
| Vegetation | Eureka County, Nevada | Three Bars Ecosystem and Landscape Restoration Project | The 3 Bars Ecosystem in central Eureka County, Nevada spans approximately 725,000 acres and includes portions of three major mountain ranges (Roberts Mountain, Simpson Park Range, and Sulphur Spring Range). Many factors are contributing to the overall decline in land condition of this area. The gradual loss of sagebrush, bitterbrush, and mountain shrub communities impact wildlife species such as sage grouse, pygmy rabbit, and mule deer. Compromised riparian habitats impact the threatened Lahontan cutthroat trout and other aquatic species. Factors contributing to the overall decline in land health include increasing incidence and severity of wildfire, increasing expansion of downy brome (cheatgrass), increasing expansion and densification of pinyon pine and Utah juniper woodlands, and increasing human impacts. | Ongoing |
| Mining and Energy | Lander County, Nevada | McGinness Hills Geothermal Complex | The McGinness Hills Geothermal Complex is a complex of 3 geothermal power stations located in a valley between the Toiyabe Range and Simpson Park Range in Lander County, Nevada. It is the largest geothermal complex in Nevada and the fourth largest in the United States.<br>The complex consists of two 45 MW geothermal power stations that were commissioned in July 2012, as well as a third 48 MW geothermal power station that was commissioned on 20 December 2018. The entire complex is owned by Ormat. | Ongoing |

| Project Type | Project Location - State(s) | Project, Plan or Action | Description | Project Status |
|---|---|---|---|---|
| Livestock Grazing | Battle Mountain, Carson City, Elko, Ely, and Winnemucca Districts | Targeted and Prescribed Grazing of Annual Grasses in Great Basin Ecosystems in Nevada | Targeted grazing treatments for reduction of annual invasive grasses in a variety of Disturbance Response Groups on BLM managed public lands throughout the Great Basin ecoregions in Nevada. The project purpose is to manage invasive annual grasses by using a variety of livestock grazing practices in the Great Basin ecoregions of Nevada | Ongoing |
| Energy and Mining | White Pine Co, Nevada | Sage City Solar | Proposes solar facility is 16 miles west of Ely, NV on 6,790 acres, with a projected output of 800 MW. | Proposed |
| Energy and Mining | White Pine Co, Nevada | Tromso Solar | Proposed solar facility 17 miles west of Ely, NV with a10,000 acre project area. | Proposed |
| Energy and Mining | White Pine Co, Nevada | Spring Valley Wind | Spring Valley Wind Generation Project has 63 2.4 Mitsubishi wind turbines currently working. | Authorized |
| Energy and Mining | White Pine Co, Nevada | Aquilo Wind | The proposed project is for wind development within an application area totaling 18,744 acres, with a projected output of 700 MW. | Proposed |
| Energy and Mining | White Pine Co, Nevada | CGI Wind Testing | This project is located 15 miles west of Ely, NV and has an application area of 46,205 acres. | Proposed |
| Energy and Mining | White Pine Co, Nevada | CGI Solar Testing | This project is located 15 miles west of Ely, NV and has an application area of 15,728 acres. | Proposed |
| Energy and Mining | White Pine Co, Nevada | Scout Wind | This project is located in Spring Valley and has an application area of 2,965 acres. | Proposed |
| Energy and Mining | Lander Co, Nevada | Wildcat Solar | This project is located 13 miles southeast of Austin, NV with an application area of 21,668 acres, and a projected output of 400 MW. | Proposed |
| Energy and Mining | Lander Co, Nevada | Lonely Solar | This project is located 15 miles southwest of Austin, NV with an application area of 4,686 acres, and a projected output of 500 MW. | Proposed |
| Energy and Mining | Washoe Co, Nevada | Dodge Flat II Solar | This project is located 4 miles northwest of Fernley, NV with an application area of 917 acres. | Proposed |
| Livestock Grazing | Battle Mountain, Carson City, Elko, and Winnemucca Districts | Flexibility in Grazing Authorizations to Improve Lahontan Cutthroat Trout in Nevada | This project would modify grazing permits to create flexibility in livestock management to improve Lahontan cutthroat trout (*Oncorhynchus clarki henshawi*, LCT) habitat on BLM Nevada-administered grazing allotments. The project area includes 40 allotments administered through 43 permits, containing approximately 368 miles of occupied LCT stream habitat and approximately 875 acres of occupied LCT lake habitat in 4 Districts. | Proposed |
| Energy and Mining | Elko Co, Nevada | Tabor Flats Wind Test | This proposed project is 13 miles northwest of Wells, NV. No other information at this time. | Proposed |
| Lands and Realty | Lassen Co, California | Fourth Element 345 kV Transmission Line | Fourth Element is proposing to build a 345 kV transmission line to connect a wind energy generation facility to the power grid. The line would be 22 miles long, with 17.23 miles on BLM land. | Proposed |

| Project Type | Project Location - State(s) | Project, Plan or Action | Description | Project Status |
|---|---|---|---|---|
| Vegetation | Washoe Co, Nevada | Dry Valley Rim Herbicide and Seeding | The BLM is treating 20,500 acres of the Dry Valley Rim with aerial herbicide with Imazapic and reseeding the area. | Ongoing |
| | | **Montana, North Dakota, and South Dakota** | | |
| Land Use Plan | North Dakota | North Dakota Resource Management Plan (RMP) Revision | The North Dakota Bureau of Land Management (BLM) is revising its 32-year old Resource Management Plan (RMP) to provide goals, objectives, and direction for approximately 58,500 acres of BLM managed public lands and approximately 4.1 million acres of subsurface BLM managed federal mineral estate in North Dakota. | Draft EIS/Draft RMP |
| Energy and Mining | Montana | Miles City FO Resource Management Plan Supplemental EIS/Plan Amendment | BLM Montana/Dakotas has prepared a Supplemental EIS and potential Resource Management Plan Amendments due to a court order issued by the United States District Court of Montana (Western Organization of Resource Councils, et al. v. BLM; CV 4:20-CV00076-GF-BMM; 8/3/2022). Pursuant to the Order, the BLM completed a new coal screening and remedial NEPA analysis that considers no-leasing and limited coal leasing alternatives and discloses the public health impacts (both climate and non-climate) of burning fossil fuels (coal, oil, and gas) from the planning area. The Supplemental EIS and potential Resource Management Plan Amendment alternatives vary the amount of BLM-administered federal coal authorized to be available for leasing within the planning area. | Draft Supplemental EIS/Draft RMPA |
| Lands and Realty | Montana, North Dakota | North Plains Connector Transmission Line | The North Plains Connector is a proposed 525 kilovolt high voltage direct current (HVDC) transmission line connecting the U.S. eastern and western electric grids in Montana and North Dakota. The North Plains Connector would be approximately 385 miles long, extending from an existing substation in Colstrip, Montana, to an existing substation in Center, North Dakota, and a new substation in Morton County, North Dakota. The route is still being developed and will not be finalized until input has been received from landowners, communities, and local, state and federal government officials. | Proposed |

| Project Type | Project Location - State(s) | Project, Plan or Action | Description | Project Status |
|---|---|---|---|---|
| Energy and Mining | Montana | Denbury Carbon Solutions, LLC, Deep Permanent CO2 Geologic Sequestration Project | The application involves approximately 100,190 acres of BLM-administered lands. The project includes access roads, well pads for 15 underground injection wells (12 on BLM, 3 on State), powerlines, substation, main bulk line, flowlines, temporary use areas, underground pore space, and two pump stations. It is estimated that over a 20-year injection time period the project area has a potential storage of approximately 409.5 million metric tons of CO2 on federal land that CO2 would be injected by the 15 proposed wells over a 20-year period. This project (if approved) when fully operational would offset greenhouse gas emissions. This would be responsive to the US 2050 net-zero goal outlined in EO 14008. | Proposed |
| **Oregon** | | | | |
| Land Use Plan | Oregon | Southeast Oregon RMP Amendment | On June 16th, 2023, the BLM published in the Federal Register a Notice of Availability the Southeastern Oregon Proposed Resource Management Plan Amendment (PRMPA) and Final Environmental Impact Statement (FEIS) for the Southeastern Oregon planning area of the Vale District. This planning process proposes to amend the long-term management of the Southeastern Oregon planning area. The planning area encompasses approximately 4.6 million acres for the Malheur Field Office of the Vale District BLM. The proposed plan would prioritize protection of thirty-three areas (approx. 420,000 acres found by BLM to possess wilderness characteristics (outside of existing Wilderness Study Areas). Management of protected areas would emphasize maintenance and/or enhancement of the wilderness resource. In addition, the amendment would designate approximately 320,000 acres that are currently Open to cross-country off-highway vehicle (OHV) use as Limited to existing roads and primitive routes. Also addressed are rangeland health, grazing permit relinquishment and livestock grazing issues. | Ongoing |
| Land Use Plan | Oregon | Lakeview RMP Amendment | A Notice of Intent to prepare an EIS was published in the Federal Register. The Plan amendment will address the management of Lands with Wilderness Characteristics on about 1.65 million acres within the 3.2 million acre Lakeview planning area. | Ongoing |

| Project Type | Project Location - State(s) | Project, Plan or Action | Description | Project Status |
|---|---|---|---|---|
| Vegetation and GRSG Habitat Management | Oregon | Northwest Malheur County Greater Sage-Grouse Habitat Restoration Project | Implementation started in 2017 and is ongoing. The BLM is using a combination of prescribed fire, silvicultural thinning, and herbicide and mechanical invasive species treatments that include western juniper removal, to maintain and restore habitat for GRSG and other sagebrush species in a 258,556-acre project area. | Ongoing |
| **Utah** | | | | |
| Federal Resource Management / Land Use Plans | Utah | Manti/LaSal National Forest, Forest Plan Revision | The Manti-La Sal National Forest is nearing completion of a revised Forest Plan that will replace the Forest's 1986 Forest Plan. The draft revised Forest Plan includes a desired condition that Greater sage grouse are managed to meet or exceed the desired conditions stated in the September 2015 Sage Grouse Management Plan Record of Decision, or the most recent interagency sage-grouse management plan. The draft revised Forest Plan also includes a standard that the geographic area shall be managed per the standards and guidelines described in the September 2015 Sage Grouse Management Plan Record of Decision or the most recent interagency sage-grouse management plan. | Proposed |
| Federal Resource Management / Land Use Plans | Utah | Grand Staircase-Escalante National Monument Resource Management Plan | Resource Management Plan revision for the Grand Staircase-Escalante National Monument in Kane and Garfield counties, Utah. | Proposed |
| Lands and Realty | Utah | Pine Valley Water Supply Project | Central Iron County Water Conservancy District proposes to develop and transport water from Pine Valley, southwest of Milford, Utah, to their existing system in central Iron County, Utah. | Proposed |

| Project Type | Project Location - State(s) | Project, Plan or Action | Description | Project Status |
|---|---|---|---|---|
| Lands and Realty | Utah | Dingell Act – Emery County Land Exchange | Implementing an exchange of federal and non-federal land as directed by the Dingell Act. An agreement to initiate (ATI) an exchange was prepared in November 2021. The land exchange would include public and state lands located across up to 18 counties in Utah: Beaver, Carbon, Emery, Grand, Iron, Juab, Kane, Millard, Rich, San Juan, Sevier, Summit, Tooele, Uintah, Utah, Wasatch, Washington, and Wayne Counties. Under the land exchange, the Secretary of the Interior, acting through the BLM, would convey to the State of Utah School and Institutional Trust Lands Administration (SITLA) approximately 89,700 acres of federal lands or interests in land. In exchange for the BLM lands, SITLA would convey to the BLM approximately 116,000 acres of non-federal lands or interests therein. The SITLA parcels are located within newly created wilderness areas, the San Rafael Swell Recreation Area, the Green River Wild and Scenic Rivers (WSR) Corridor in Emery County, and the John Wesley Powell National Conservation Area (NCA) in Uintah County. Additional SITLA lands located within wilderness areas or NCAs in Washington County could be included in the land exchange if needed to equalize values. | Proposed |
| **Wyoming** | | | | |
| Wildland Fires 2018-2022 | Wyoming | BLM: Past – Acres burned on BLM administered land | Approximately 150,954 acres of HMA burned between 2018 and 2022. Post fire restoration and habitat treatments are being implemented, as described below, to diminish impacts of habitat lost to wildland fire. | Past |
| Fire Restoration (Emergency Stabilization and Rehabilitation) | Wyoming | BLM: Past and Present – Habitat restoration following wildland fires | 0 acres of BLM-administered habitat are either currently being treated or scheduled to be treated according to specific prescriptions outlined in Emergency Stabilization and Burned Area Rehabilitation plans following wildfire. | Past/present |
| Habitat Treatments | Wyoming | BLM: Past – Habitat improvement projects | Approximately 434,704 acres of Greater Sage-Grouse habitat were treated between 2018 and 2022 to maintain or improve conditions for Greater Sage-Grouse. Treatments included conifer removal, fuel breaks, invasive species removal and habitat protection/ restoration. | Past |

| Project Type | Project Location - State(s) | Project, Plan or Action | Description | Project Status |
|---|---|---|---|---|
| Land Use and Realty (issued and pending) 2018-2022 | Wyoming | BLM: Past Non-Renewable Energy Development ROWs Issued on BLM-Administered Public Land | BLM Wyoming issued approximately 2,428 non-renewable energy ROWs in the planning area during calendar years 2018-2022. This includes amendments and reauthorizations, which may not have resulted in new disturbance. For ROWs occurring in sage grouse habitat, effects were offset by the management prescriptions in the RMPs and ARMPA, and through the application of mitigation to conserve Greater sage-grouse and their habitats on non-federal lands in coordination with State and federal partners. | Past |
| — | Wyoming | BLM: Past Renewable Energy Development ROWs Issued on BLM-Administered Public Land | BLM Wyoming issued two renewable energy development ROWs in the planning area during calendar years 2018-2022 (one solar, one wind) and six renewable energy testing/monitoring ROWs (all wind). ROW authorizations conformed to the approved RMPs, including applicable Greater Sage-Grouse conservation measures, and were coordinated with State and federal partners to address effects from appurtenant project facilities and operations on non-federal lands. | Past |
| — | Wyoming | BLM: Pending Non-Renewable Energy Development ROWs | From this same period, there are approximately 469 non-renewable energy ROW applications pending review and analysis. No additional cumulative impacts are anticipated beyond those described. | Pending |
| — | Wyoming | BLM: Pending Renewable Energy Development ROWs | There are nine renewable energy development ROW applications (four solar, five wind) and two renewable energy testing/monitoring ROW applications (both wind) pending review and analysis. No additional cumulative impacts are anticipated beyond those described. | Pending |
| Oil and Gas | Wyoming | BLM: Past | BLM Wyoming has offered for lease approximately 2,123,417 acres; 1,748,733 acres of that total was leased from February 2019 to July 2023. Leases followed management prescriptions in the RMPs and ARMPA and stipulations apply as described in the leases according to HMA category. | Past |
| — | Wyoming | BLM: Pending | BLM Wyoming has a scheduled lease sale in each quarter of the year, as described in the Minerals Leasing Act (MLA). | Pending |
| Locatable Mineral Projects | Wyoming | BLM: Past and Present | Between 2018-2022, the BLM has approved 27 new mines and/or expansions within the planning area (including non-habitat). | Past/present |
| — | Wyoming | BLM: Pending | The BLM is currently reviewing 15 plans of operation for new mines and/or mine expansions. This number also includes 10 pending mine patents, which are in the process of being patented into private ownership. | Pending |

| Project Type | Project Location - State(s) | Project, Plan or Action | Description | Project Status |
|---|---|---|---|---|
| Leasable Mineral Projects (Coal) | Wyoming | BLM: Past | One coal lease modification was issued in 2018, totaling 450 acres. For lease modifications occurring in sage grouse habitat, effects were offset by the management prescriptions in the RMPs and ARMPA. | Past |
| — | — | BLM: Pending | BLM Wyoming is currently reviewing two coal lease applications / modifications totaling 313 acres. | Pending |

## 14.3 CUMULATIVE IMPACTS PRESENTED BY HAF GROUP

When assessing the cumulative impact of the RMPA/EIS on GRSG and its habitat, there are multiple geographic scales that the BLM has considered. In 2015 and 2019, cumulative impacts to GRSG were analyzed using Management Zones identified by the Western Association of Fish and Wildlife Agencies (WAFWA). The WAFWA Management Zones were based on floristic provinces. Based on information that has become available since the 2015 effort, GRSG cumulative impacts in this effort are conducted at both the range-wide scale and at a scale that is based on habitat associated with GRSG populations, using GRSG populations identified using genetic information and correlating those to second-order (Mid-Scale) Habitat Assessment Framework (HAF) groups.

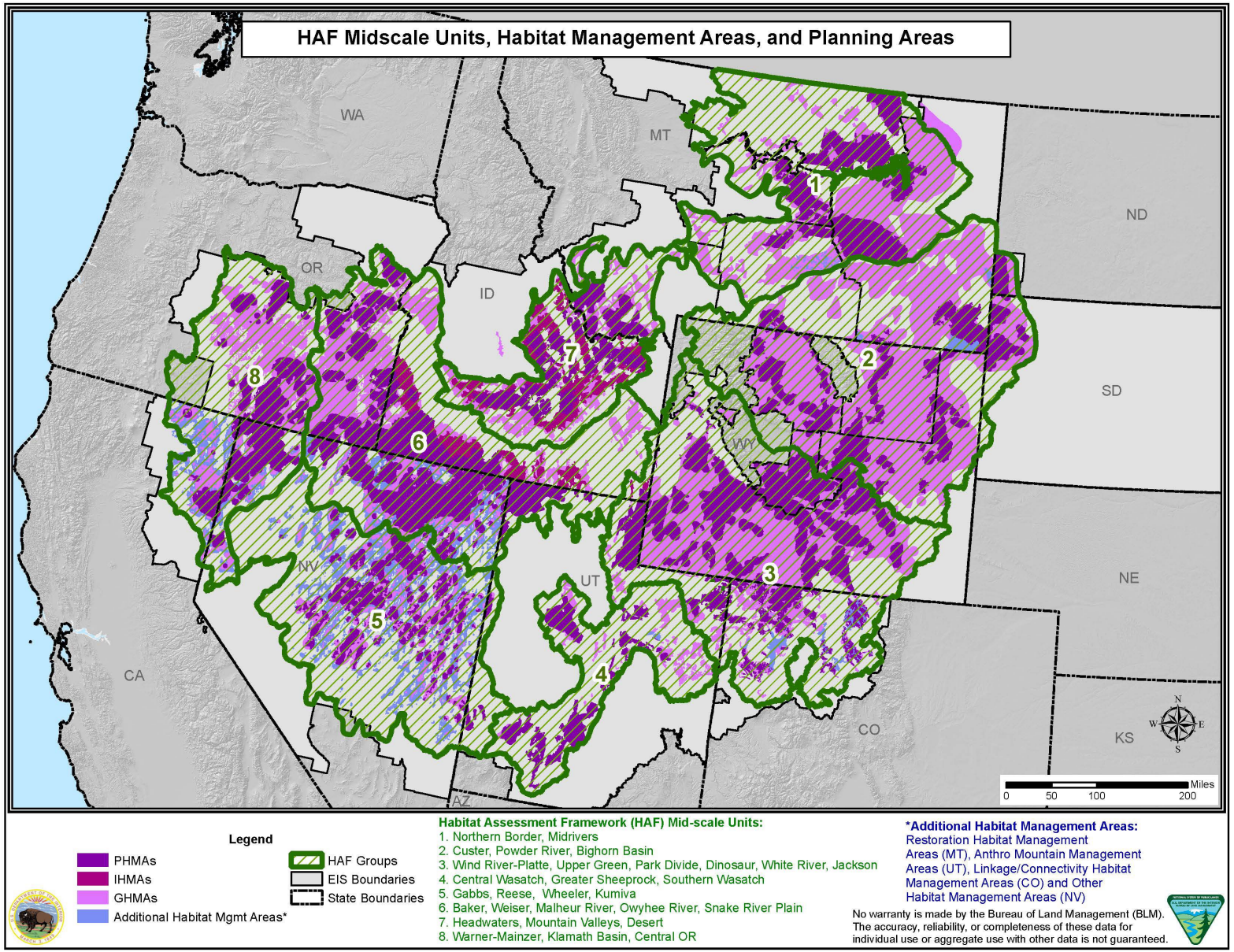
HAF is a tool to measure the suitability of GRSG habitat at multiple scales. Mid-scale (second order) HAF areas are conceptually linked to GRSG dispersal capabilities in population and subpopulation areas as described by Connelly and others (2004). Mid-scale HAF delineations also conceptually provide the life requisite space for GRSG dispersal, allowing for migration movements (presumably between seasonal habitats) based on the following key inputs:

- availability of sagebrush habitat,
- size and number of habitat patches,
- connectivity of habitat patches,
- characteristics of linkage areas between patches,
- landscape matrix and edge effects, and
- anthropogenic disturbances.

The mid-scale HAF delineations identified by the BLM capture a conceptual biologically meaningful unit. In addition, recent genetic analyses (Oyler-McCance et al. 2022) delineated sub-population clusters across GRSG range based on data collected between 2005 and 2015. These sub-population delineations indicate movement of GRSG within these areas (either in the past or currently), indicating a cumulative effects analysis on those units would have a biological basis. As such, the BLM combined habitat information using mid-scale HAF and results from the lek persistence model (Wann et al. 2022) with genetic information from Oyler-McCance et al. (2022), to group mid-scale HAF units within the genetic subpopulation boundaries. Given the divisions between subpopulation groupings are not distinct, groupings are based on the preponderance of genetic and habitat information. The resulting eight GRSG cumulative impacts analysis areas are show in **Figure 14-1**.

The remainder of this section provides a quantified comparison of major land use decisions and allocations across GRSG range, organized by the HAF groupings (GRSG cumulative impact analysis areas).

**Figure 14-1. GRSG Cumulative Impacts Analysis Areas**



### 14.3.1 HAF Group 1

#### *I. Habitat Management*

**Table 14-2. Habitat Management Areas within HAF 1**

Acres and percentages reflect all lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Habitat Assessment Framework summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized.

| Approximate Acres of HMA in HAF 1 | | | | |
|---|---|---|---|---|
| PHMA | GHMA | RHMA | Non-HMA | Total |
| 2,119,000 | 1,269,000 | 71,000 | 1,262,000 | **4,722,000** |
| **Alternative 2** | | | | |
| PHMA | GHMA | RHMA | Non-HMA | Total |
| 2,119,000 | 1,269,000 | 71,000 | 1,262,000 | **4,722,000** |
| **Alternative 3** | | | | |
| PHMA | GHMA | RHMA | Non-HMA | Total |
| 3,145,000 | 0 | 0 | 1,279,000 | **4,424,000** |
| **Alternative 4** | | | | |
| PHMA | GHMA | RHMA | Non-HMA | Total |
| 2,125,000 | 949,000 | 71,000 | 1,279,000 | **4,424,000** |
| **Alternative 5** | | | | |
| PHMA | GHMA | RHMA | Non-HMA | Total |
| 2,125,000 | 949,000 | 71,000 | 1,279,000 | 4,424,000 |
| **Alternative 6** | | | | |
| PHMA | GHMA | RHMA | Non-HMA | Total |
| 2,125,000 | 949,000 | 71,000 | 1,279,000 | 4,424,000 |

| Approximate Percent of HAF 1 that is HMA | | | |
|---|---|---|---|
| PHMA | GHMA | RHMA | Non-HMA |
| 37.83% | 61.62% | 0.55% | 0.00% |
| **Alternative 2** | | | |
| PHMA | GHMA | RHMA | Non-HMA |
| 37.83% | 61.62% | 0.55% | 0.00% |
| **Alternative 3** | | | |
| PHMA | GHMA | RHMA | Non-HMA |
| 100% | 0.00% | 0.00% | 0.00% |
| **Alternative 4** | | | |
| PHMA | GHMA | RHMA | Non-HMA |
| 45.21% | 54.17% | 0.63% | 0.00% |
| **Alternative 5** | | | |
| PHMA | GHMA | RHMA | Non-HMA |
| 45.21% | 54.17% | 0.63% | 0.00% |

### *II. Locatable Minerals*

**Table 14-3. Locatable Minerals Decisions within HAF 1**

Acres and percentages reflect BLM managed lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Habitat Assessment Framework summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized.

| Approximate Acres of Locatable Minerals Decisions[2] in HAF 1 by Habitat Management Area Type | | | | | |
|---|---|---|---|---|---|
| **Locatable Minerals** | **Alternative 1** | | | | |
| | **PHMA** | **GHMA** | **RHMA** | **Non-HMA** | **Total** |
| Existing Withdrawals | 14,000 | 181,000 | 0 | 208,000 | **403,000** |
| Recommended Withdrawals | 981,000 | 0 | 0 | 24,000 | **1,005,000** |
| Open | 1,265,000 | 981,000 | 79,000 | 1,470,000 | **3,794,000** |
| **Total** | **2,260,000** | **1,162,000** | **79,000** | **1,701,000** | **5,202,000** |
| **Locatable Minerals** | **Alternative 2** | | | | |
| | **PHMA** | **GHMA** | **RHMA** | **Non-HMA** | **Total** |
| Existing Withdrawals | 14,000 | 181,000 | 0 | 208,000 | **403,000** |
| Recommended Withdrawals | 981,000 | 0 | 0 | 24,000 | **1,005,000** |
| Open | 1,265,000 | 981,000 | 79,000 | 1,470,000 | **3,715,000** |
| **Total** | **2,260,000** | **1,162,000** | **79,000** | **1,701,000** | **5,123,000** |
| **Locatable Minerals** | **Alternative 3** | | | | |
| | **PHMA** | **GHMA** | **RHMA** | **Non-HMA** | **Total** |
| Existing Withdrawals | 77,000 | 0 | 0 | 326,000 | **403,000** |
| Recommended Withdrawals | 3,118,000 | 0 | 0 | 23,000 | **3,141,000** |
| Open | 0 | 0 | 0 | 1,291,000 | **1,291,000** |
| **Total** | **3,195,000** | **0** | **0** | **1,640,000** | **4,835,000** |
| **Locatable Minerals** | **Alternative 4** | | | | |
| | **PHMA** | **GHMA** | **RHMA** | **Non-HMA** | **Total** |
| Existing Withdrawals | 19,000 | 59,000 | 0 | 326,000 | **404,000** |
| Recommended Withdrawals | 26,000 | 0 | 0 | 23,000 | **49,000** |
| Open | 2,203,000 | 811,000 | 79,000 | 1,291,000 | **4,384,000** |
| **Total** | **2,247,000** | **870,000** | **79,000** | **1,640,000** | **4,835,000** |
| **Locatable Minerals** | **Alternative 5** | | | | |
| | **PHMA** | **GHMA** | **RHMA** | **Non-HMA** | **Total** |
| Existing Withdrawals | 19,000 | 59,000 | 0 | 326,000 | **403,000** |
| Recommended Withdrawals | 26,000 | 0 | 0 | 23,000 | **48,000** |
| Open | 2,203,000 | 811,000 | 79,000 | 1,291,000 | **4,384,000** |
| **Total** | **2,247,000** | **870,000** | **79,000** | **1,640,000** | **4,835,000** |
| **Locatable Minerals** | **Alternative 6** | | | | |
| | **PHMA** | **GHMA** | **RHMA** | **Non-HMA** | **Total** |
| Existing Withdrawals | 19,000 | 59,000 | 0 | 326,000 | **403,000** |
| Recommended Withdrawals | 26,000 | 0 | 0 | 23,000 | **48,000** |
| Open | 2,203,000 | 811,000 | 79,000 | 1,291,000 | **4,384,000** |
| **Total** | **2,247,000** | **870,000** | **79,000** | **1,640,000** | **4,835,000** |

| Approximate % of Habitat Management Area by Locatable Minerals Decisions[2] within Habitat in HAF 1 | | | | |
|---|---|---|---|---|
| **Locatable Minerals** | **Alternative 1** | | | |
| | **PHMA** | **GHMA** | **RHMA** | **Non-HMA** |
| Existing Withdrawals | 3.47% | 44.91% | 0.00% | 51.61% |
| Recommended Withdrawals | 97.61% | 0.00% | 0.00% | 2.39% |
| Open | 33.34% | 25.86% | 2.08% | 38.75% |
| **Total** | **43.44%** | **22.34%** | **1.52%** | **32.70%** |
| **Locatable Minerals** | **Alternative 2** | | | |
| | **PHMA** | **GHMA** | **RHMA** | **Non-HMA** |
| Existing Withdrawals | 3.47% | 44.91% | 0.00% | 51.61% |
| Recommended Withdrawals | 33.34% | 25.86% | 2.08% | 38.75% |
| Open | 97.61% | 0.00% | 0.00% | 2.39% |
| **Total** | **43.44%** | **22.34%** | **1.52%** | **32.70%** |
| **Locatable Minerals** | **Alternative 3** | | | |
| | **PHMA** | **GHMA** | **RHMA** | **Non-HMA** |
| Existing Withdrawals | 19.11% | 0.00% | 0.00% | 80.89% |
| Recommended Withdrawals | 0.00% | 0.00% | 0.00% | 84.99% |
| Open | 99.27% | 0.00% | 0.00% | 0.73% |
| **Total** | **63.10%** | 0.00% | 0.00% | **32.39%** |
| **Locatable Minerals** | **Alternative 4** | | | |
| | **PHMA** | **GHMA** | **RHMA** | **Non-HMA** |
| Existing Withdrawals | 4.71% | 14.64% | 0.00% | 80.89% |
| Recommended Withdrawals | 54.17% | 0.00% | 0.00% | 47.92% |
| Open | 47.77% | 17.58% | 1.71% | 27.99% |
| **Total** | 44.38% | 17.18% | 1.56% | 32.39% |
| **Locatable Minerals** | **Alternative 5** | | | |
| | **PHMA** | **GHMA** | **RHMA** | **Non-HMA** |
| Existing Withdrawals | 4.71% | 14.64% | 0.00% | **80.89%** |
| Recommended Withdrawals | 54.17% | 0.00% | 0.00% | **47.92%** |
| Open | 50.25% | 18.50% | 1.80% | **29.45%** |
| **Total** | **46.47%** | **17.99%** | **1.63%** | **33.92%** |

### *III. Fluid Minerals (Oil & Gas)*

**Table 14-4. Fluid Minerals (Oil & Gas) Decisions within HAF 1**

Acres and percentages reflect BLM managed lands. Percentages may not total to 100% due to rounding. Calculations reflect only the portions of the HAF where data was available. All figures and tables are intended for Habitat Assessment Framework summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized.

| Approximate Acres of Fluid Minerals (Oil & Gas) Decisions[4] in HAF 1 by Habitat Management Area Type | | | | | |
|---|---|---|---|---|---|
| **Fluid Minerals (Oil and Gas)** | **Alternative 1** | | | | |
| | **PHMA** | **GHMA** | **RHMA** | **Non-HMA** | **Total** |
| Closed | 100,000 | 217,000 | 0 | 296,000 | **613,000** |
| Open Major Stipulations | 2,433,000 | 320,000 | 51,000 | 245,000 | **3,049,000** |
| Open Moderate Stipulations | 0 | 1,209,000 | 43,000 | 1,481,000 | **2,733,000** |
| Open Standard Stipulations | 0 | 297,000 | 0 | 219,000 | **516,000** |
| **Total** | **2,533,000** | **2,043,000** | **94,000** | **2,241,000** | **6,911,000** |

| Approximate Acres of Fluid Minerals (Oil & Gas) Decisions[4] in HAF 1 by Habitat Management Area Type | | | | | |
|---|---|---|---|---|---|
| **Fluid Minerals (Oil and Gas)** | **Alternative 2** | | | | |
| | **PHMA** | **GHMA** | **RHMA** | **Non-HMA** | **Total** |
| Closed | 100,000 | 217,000 | 0 | 296,000 | **612,000** |
| Open Major Stipulations | 2,433,000 | 320,000 | 51,000 | 245,000 | **3,048,000** |
| Open Moderate Stipulations | 0 | 1,209,000 | 43,000 | 1,481,000 | **2,733,000** |
| Open Standard Stipulations | 0 | 297,000 | 0 | 219,000 | **516,000** |
| **Total** | **2,532,000** | **2,043,000** | **93,000** | **2,241,000** | **6,909,000** |
| **Fluid Minerals (Oil and Gas)** | **Alternative 3** | | | | |
| | **PHMA** | **GHMA** | **RHMA** | **Non-HMA** | **Total** |
| Closed | 4,076,000 | 0 | 0 | 443,000 | **4,519,000** |
| Open Major Stipulations | 0 | 0 | 0 | 240,000 | **240,000** |
| Open Moderate Stipulations | 0 | 0 | 0 | 1,333,000 | **1,333,000** |
| Open Standard Stipulations | 0 | 0 | 0 | 226,000 | **226,000** |
| **Total** | **4,076,000** | **0** | **0** | **2,242,000** | **6,318,000** |
| **Fluid Minerals (Oil and Gas)** | **Alternative 4** | | | | |
| | **PHMA** | **GHMA** | **RHMA** | **Non-HMA** | **Total** |
| Closed | 104,000 | 64,000 | 0 | 443,000 | **611,000** |
| Open Major Stipulations | 2,485,000 | 284,000 | 40,000 | 240,000 | **3,049,000** |
| Open Moderate Stipulations | 0 | 1,069,000 | 31,000 | 1,333,000 | **2,432,000** |
| Open Standard Stipulations | 0 | 0 | 0 | 226,000 | **226,000** |
| **Total** | **2,589,000** | **1,417,000** | **71,000** | **2,242,000** | **6,319,000** |
| **Fluid Minerals (Oil and Gas)** | **Alternative 5** | | | | |
| | **PHMA** | **GHMA** | **RHMA** | **Non-HMA** | **Total** |
| Closed | 104,000 | 64,000 | 0 | 443,000 | **611,000** |
| Open Major Stipulations | 2,485,000 | 284,000 | 40,000 | 240,000 | **3,049,000** |
| Open Moderate Stipulations | 0 | 1,069,000 | 31,000 | 1,333,000 | **2,432,000** |
| Open Standard Stipulations | 0 | 0 | 0 | 226,000 | **226,000** |
| **Total** | **2,589,000** | **1,417,000** | **71,000** | **2,242,000** | **6,319,000** |
| **Fluid Minerals (Oil and Gas)** | **Alternative 6** | | | | |
| | **PHMA** | **GHMA** | **RHMA** | **Non-HMA** | **Total** |
| Closed | 104,000 | 64,000 | 0 | 443,000 | **2,410,000** |
| Open Major Stipulations | 2,485,000 | 284,000 | 40,000 | 240,000 | **4,142,000** |
| Open Moderate Stipulations | 0 | 1,069,000 | 31,000 | 1,333,000 | **1,325,000** |
| Open Standard Stipulations | 0 | 0 | 0 | 226,000 | **443,000** |
| **Total** | **2,589,000** | **1,417,000** | **71,000** | **2,242,000** | **8,321,000** |

| Approximate % of Habitat Management Area by Fluid Minerals (Oil a& Gas) Decision[4] within Habitat in HAF 1 | | | | |
|---|---|---|---|---|
| **Fluid Minerals (Oil and Gas)** | **Alternative 1** | | | |
| | **PHMA** | **GHMA** | **RHMA** | **Non-HMA** |
| Closed | 16.34% | 35.46% | 0.00% | **48.37%** |
| Open Major Stipulations | 79.80% | 10.50% | 1.67% | **8.04%** |
| Open Moderate Stipulations | 0.00% | 44.24% | 1.57% | **54.19%** |
| Open Standard Stipulations | 0.00% | 57.56% | 0.00% | **42.44%** |
| **Total** | **36.65%** | **29.57%** | **1.35%** | **32.44%** |

| Approximate % of Habitat Management Area by Fluid Minerals (Oil a& Gas) Decision[4] within Habitat in HAF 1 | | | | |
|---|---|---|---|---|
| **Fluid Minerals (Oil and Gas)** | **Alternative 2** | | | |
| | **PHMA** | **GHMA** | **RHMA** | **Non-HMA** |
| Closed | 16.34% | 35.46% | 0.00% | 48.37% |
| Open Major Stipulations | 79.80% | 10.50% | 1.67% | 8.04% |
| Open Moderate Stipulations | 0.00% | 44.24% | 1.57% | 54.19% |
| Open Standard Stipulations | 0.00% | 57.56% | 0.00% | 42.44% |
| **Total** | **36.64%** | **29.57%** | **1.35%** | **32.43%** |
| **Fluid Minerals (Oil and Gas)** | **Alternative 3** | | | |
| | **PHMA** | **GHMA** | **RHMA** | **Non-HMA** |
| Closed | 90.20% | 0.00% | 0.00% | **9.80%** |
| Open Major Stipulations | 0.00% | 0.00% | 0.00% | **48.19%** |
| Open Moderate Stipulations | 0.00% | 0.00% | 0.00% | **100.00%** |
| Open Standard Stipulations | 0.00% | 0.00% | 0.00% | **100.00%** |
| **Total** | **61.99%** | **0.00%** | **0.00%** | **34.08%** |
| **Fluid Minerals (Oil and Gas)** | **Alternative 4** | | | |
| | **PHMA** | **GHMA** | **RHMA** | **Non-HMA** |
| Closed | 17.02% | 10.47% | 0.00% | **72.50%** |
| Open Major Stipulations | 80.97% | 9.25% | 1.30% | **7.82%** |
| Open Moderate Stipulations | 0.00% | 40.07% | 1.16% | **49.87%** |
| Open Standard Stipulations | 0.00% | 0.00% | 0.00% | **100.00%** |
| **Total** | **39.35%** | **21.57%** | **1.08%** | **34.08%** |
| **Fluid Minerals (Oil and Gas)** | **Alternative 5** | | | |
| | **PHMA** | **GHMA** | **RHMA** | **Non-HMA** |
| Closed | 17.02% | 10.47% | 0.00% | **72.50%** |
| Open Major Stipulations | 81.50% | 9.31% | 1.31% | **7.87%** |
| Open Moderate Stipulations | 0.00% | 43.98% | 1.27% | **54.74%** |
| Open Standard Stipulations | 0.00% | 0.00% | 0.00% | **100.00%** |
| **Total** | **43.52%** | **23.71%** | **1.24%** | **31.51%** |

### 14.3.2 HAF Group 2

#### *I. Habitat Management*

**Table 14-5. Habitat Management Areas within HAF 2**

Acres and percentages reflect all lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Habitat Assessment Framework summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized.

| Approximate Acres of HMA in HAF 2 | | | | |
|---|---|---|---|---|
| **Alternative 1** | | | | |
| PHMA | GHMA | RHMA | Non-HMA | Total |
| 2,780,000 | 4,786,000 | 94,000 | 1,262,000 | **7,995,000** |
| **Alternative 2** | | | | |
| PHMA | GHMA | RHMA | Non-HMA | Total |
| 2,780,000 | 4,786,000 | 94,000 | 335,000 | **7,995,000** |
| **Alternative 3** | | | | |
| PHMA | GHMA | RHMA | Non-HMA | Total |
| 7,612,000 | 0 | 0 | 387,000 | **7,999,000** |

| Approximate Acres of HMA in HAF 2 | | | | |
|---|---|---|---|---|
| **Alternative 4** | | | | |
| PHMA | GHMA | RHMA | Non-HMA | Total |
| 3,312,000 | 4,276,000 | 23,000 | 387,000 | **7,998,000** |
| **Alternative 5** | | | | |
| PHMA | GHMA | RHMA | Non-HMA | Total |
| 2,941,000 | 4,631,000 | 23,000 | 389,000 | **7,984,000** |
| **Alternative 6** | | | | |
| PHMA | GHMA | RHMA | Non-HMA | Total |
| 2,941,000 | 4,632,000 | 23,000 | 387,000 | **7,984,000** |

| Approximate Percent of HAF 2 that is HMA | | | |
|---|---|---|---|
| **Alternative 1** | | | |
| PHMA | GHMA | RHMA | Non-HMA |
| 25.05% | 73.84% | 1.10% | 0.00% |
| **Alternative 2** | | | |
| PHMA | GHMA | RHMA | Non-HMA |
| 25.05% | 73.84% | 1.10% | 0.00% |
| **Alternative 3** | | | |
| PHMA | GHMA | RHMA | Non-HMA |
| 100% | 0.00% | 0.00% | 0.00% |
| **Alternative 4** | | | |
| PHMA | GHMA | RHMA | Non-HMA |
| 29.03% | 70.67% | 0.30% | 0.00% |
| **Alternative 5** | | | |
| PHMA | GHMA | RHMA | Non-HMA |
| 26.17% | 73.54% | 0.29% | 0.00% |

### *II. Locatable Minerals*

**Table 14-6. Locatable Minerals Decisions within HAF 2**

Acres and percentages reflect BLM managed lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Habitat Assessment Framework summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized.

| **Approximate Acres of Locatable Minerals Decisions[4] in HAF 2 by Habitat Management Area Type** | | | | | |
|---|---|---|---|---|---|
| **Locatable Minerals** | **Alternative 1** | | | | |
| | **PHMA** | **GHMA** | **RHMA** | **Non-HMA** | **Total** |
| Existing Withdrawals | 10,000 | 57,000 | 0 | 233,000 | **300,000** |
| Recommended Withdrawals | 107,000 | 249,000 | 0 | 49,000 | **405,000** |
| Open | 4,438,000 | 9,329,000 | 93,000 | 872,000 | **14,760,000** |
| **Total** | **4,555,000** | **9,635,000** | **93,000** | **1,153,000** | **15,465,000** |
| **Locatable Minerals** | **Alternative 2** | | | | |
| | **PHMA** | **GHMA** | **RHMA** | **Non-HMA** | **Total** |
| Existing Withdrawals | 9,900 | 57,000 | 200 | 233,000 | **300,000** |
| Recommended Withdrawals | 107,000 | 249,000 | 0 | 49,000 | **405,000** |
| Open | 4,438,000 | 9,329,000 | 93,000 | 872,000 | **14,639,000** |
| **Total** | **4,555,000** | **9,635,000** | **93,000** | **1,153,000** | **15,343,000** |

| Approximate Acres of Locatable Minerals Decisions[4] in HAF 2 by Habitat Management Area Type | | | | | |
|---|---|---|---|---|---|
| **Locatable Minerals** | **Alternative 3** | | | | |
| | **PHMA** | **GHMA** | **RHMA** | **Non-HMA** | **Total** |
| Existing Withdrawals | 75,000 | 0 | 0 | 226,000 | **300,000** |
| Recommended Withdrawals | 13,855,000 | 0 | 0 | 37,000 | **13,892,000** |
| Open | 437,000 | 0 | 0 | 782,000 | **1,219,000** |
| **Total** | **14,367,000** | **0** | **0** | **1,044,000** | **15,412,000** |
| **Locatable Minerals** | **Alternative 4** | | | | |
| | **PHMA** | **GHMA** | **RHMA** | **Non-HMA** | **Total** |
| Existing Withdrawals | 14,000 | 60,000 | 200 | 226,000 | **300,000** |
| Recommended Withdrawals | 160,000 | 232,000 | 0 | 38,000 | **430,000** |
| Open | 5,714,000 | 8,246,000 | 22,000 | 783,000 | **14,764,000** |
| **Total** | **5,888,000** | **8,537,000** | **22,000** | **1,047,000** | **15,495,000** |
| **Locatable Minerals** | **Alternative 5** | | | | |
| | **PHMA** | **GHMA** | **RHMA** | **Non-HMA** | **Total** |
| Existing Withdrawals | 12,000 | 62,000 | 0 | 226,000 | **300,000** |
| Recommended Withdrawals | 120,000 | 246,000 | 0 | 39,000 | **405,000** |
| Open | 4,548,000 | 9,277,000 | 22,000 | 790,000 | **14,636,000** |
| **Total** | **4,680,000** | **9,584,000** | **22,000** | **1,054,000** | **15,341,000** |
| **Locatable Minerals** | **Alternative 6** | | | | |
| | **PHMA** | **GHMA** | **RHMA** | **Non-HMA** | **Total** |
| Existing Withdrawals | 12,000 | 62,000 | 200 | 226,000 | **300,000** |
| Recommended Withdrawals | 120,000 | 246,000 | 0 | 38,000 | **405,000** |
| Open | 4,547,000 | 9,283,000 | 22,000 | 783,000 | **14,636,000** |
| **Total** | **4,680,000** | **9,591,000** | **22,000** | **1,047,000** | **15,341,000** |

| Approximate % of Habitat Management Area by Locatable Minerals Decisions[2] within Habitat in HAF 2 | | | | |
|---|---|---|---|---|
| **Locatable Minerals** | **Alternative 1** | | | |
| | **PHMA** | **GHMA** | **RHMA** | **Non-HMA** |
| Existing Withdrawals | 3.32% | 19.13% | 0.07% | 77.52% |
| Recommended Withdrawals | 27.23% | 60.41% | 0.00% | 12.36% |
| Open | 30.19% | 63.28% | 0.63% | 5.89% |
| **Total** | **29.60%** | **62.36%** | **0.60%** | **7.44%** |
| **Locatable Minerals** | **Alternative 2** | | | |
| | **PHMA** | **GHMA** | **RHMA** | **Non-HMA** |
| Existing Withdrawals | 3.32% | 19.13% | 0.07% | 77.52% |
| Recommended Withdrawals | 27.23% | 60.41% | 0.00% | 12.36% |
| Open | 30.19% | 63.28% | 0.63% | 5.89% |
| **Total** | **29.60%** | **62.36%** | **0.60%** | **7.44%** |
| **Locatable Minerals** | **Alternative 3** | | | |
| | **PHMA** | **GHMA** | **RHMA** | **Non-HMA** |
| Existing Withdrawals | 25.00% | 0.00% | 0.00% | 75.33% |
| Recommended Withdrawals | 28.65% | 0.00% | 0.00% | 71.35% |
| Open | 99.73% | 0.00% | 0.00% | 0.27% |
| **Total** | **93.10%** | **0.00%** | **0.00%** | **6.90%** |
| **Locatable Minerals** | **Alternative 4** | | | |
| | **PHMA** | **GHMA** | **RHMA** | **Non-HMA** |
| Existing Withdrawals | 6.03% | 0.17% | 0.09% | 93.53% |
| Recommended Withdrawals | 36.51% | 53.72% | 0.00% | 9.07% |
| Open | 33.49% | 55.80% | 0.15% | 5.37% |
| **Total** | **33.17%** | **54.91%** | **0.14%** | **6.80%** |

| Approximate % of Habitat Management Area by Locatable Minerals Decisions[2] within Habitat in HAF 2 | | | | |
|---|---|---|---|---|
| **Locatable Minerals** | **Alternative 5** | | | |
| | **PHMA** | **GHMA** | **RHMA** | **Non-HMA** |
| Existing Withdrawals | 4.00% | 20.67% | 0.00% | **75.33%** |
| Recommended Withdrawals | 31.07% | 63.38% | 0.15% | **5.40%** |
| Open | 31.86% | 59.07% | 0.00% | **9.07%** |
| **Total** | **30.57%** | **62.42%** | **0.14%** | **6.86%** |

### *III. Fluid Minerals (Oil & Gas)*

**Table 14-7. Fluid Minerals (Oil & Gas) Decisions within HAF 2**

Acres and percentages reflect BLM managed lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Habitat Assessment Framework summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized.

| Approximate Acres of Fluid Minerals (Oil & Gas) Decisions in HAF 2 by Habitat Management Area Type | | | | | |
|---|---|---|---|---|---|
| **Fluid Minerals (Oil and Gas)** | **Alternative 1** | | | | |
| | **PHMA** | **GHMA** | **RHMA** | **Non-HMA** | **Total** |
| Closed | 166,000 | 403,000 | 0 | 258,000 | **827,000** |
| Open Major Stipulations | 2,622,000 | 1,720,000 | 186,000 | 251,000 | **4,779,000** |
| Open Moderate Stipulations | 2,229,000 | 5,710,000 | 20,000 | 756,000 | **8,715,000** |
| Open Standard Stipulations | 5,000 | 3,113,000 | 0 | 314,000 | **3,432,000** |
| **Total** | **5,022,000** | **10,946,000** | **206,000** | **1,579,000** | **17,753,000** |
| **Fluid Minerals (Oil and Gas)** | **Alternative 2** | | | | |
| | **PHMA** | **GHMA** | **RHMA** | **Non-HMA** | **Total** |
| Closed | 166,000 | 403,000 | 0 | 258,000 | **827,000** |
| Open Major Stipulations | 2,622,000 | 1,720,000 | 186,000 | 251,000 | **4,779,000** |
| Open Moderate Stipulations | 2,229,000 | 5,709,000 | 20,000 | 756,000 | **8,714,000** |
| Open Standard Stipulations | 4,600 | 3,113,000 | 0 | 314,000 | **3,432,000** |
| **Total** | **5,021,000** | **10,945,000** | **206,000** | **1,578,000** | **17,751,000** |
| **Fluid Minerals (Oil and Gas)** | **Alternative 3** | | | | |
| | **PHMA** | **GHMA** | **RHMA** | **Non-HMA** | **Total** |
| Closed | 15,615,000 | 0 | 0 | 248,000 | **15,864,000** |
| Open Major Stipulations | 130,000 | 0 | 0 | 241,000 | **371,000** |
| Open Moderate Stipulations | 220,000 | 0 | 0 | 707,000 | **926,000** |
| Open Standard Stipulations | 116,000 | 0 | 0 | 256,000 | **372,000** |
| **Total** | **16,081,000** | **0** | **0** | **1,452,000** | **17,533,000** |
| **Fluid Minerals (Oil and Gas)** | **Alternative 4** | | | | |
| | **PHMA** | **GHMA** | **RHMA** | **Non-HMA** | **Total** |
| Closed | 201,000 | 377,000 | 0 | 248,000 | **827,000** |
| Open Major Stipulations | 5,983,000 | 1,432,000 | 14,000 | 241,000 | **7,670,000** |
| Open Moderate Stipulations | 162,000 | 5,170,000 | 20,000 | 911,000 | **6,263,000** |
| Open Standard Stipulations | 14,000 | 2,646,000 | 0 | 257,000 | **2,916,000** |
| **Total** | **6,360,000** | **9,625,000** | **34,000** | **1,657,000** | **17,676,000** |
| **Fluid Minerals (Oil and Gas)** | **Alternative 5** | | | | |
| | **PHMA** | **GHMA** | **RHMA** | **Non-HMA** | **Total** |
| Closed | 174,000 | 404,000 | 0 | 248,000 | **827,000** |
| Open Major Stipulations | 2,794,000 | 1,664,000 | 14,000 | 243,000 | **4,714,000** |
| Open Moderate Stipulations | 2,239,000 | 5,831,000 | 20,000 | 917,000 | **9,006,000** |
| Open Standard Stipulations | 11,000 | 2,734,000 | 0 | 257,000 | **3,002,000** |
| **Total** | **5,218,000** | **10,633,000** | **34,000** | **1,664,000** | **17,549,000** |

| Approximate Acres of Fluid Minerals (Oil & Gas) Decisions in HAF 2 by Habitat Management Area Type | | | | | |
|---|---|---|---|---|---|
| **Fluid Minerals (Oil and Gas)** | **Alternative 6** | | | | |
| | **PHMA** | **GHMA** | **RHMA** | **Non-HMA** | **Total** |
| Closed | 174,000 | 404,000 | 0 | 248,000 | **2,236,000** |
| Open Major Stipulations | 2,806,000 | 1,665,000 | 14,000 | 241,000 | **5,397,000** |
| Open Moderate Stipulations | 2,227,000 | 5,836,000 | 20,000 | 911,000 | **8,340,000** |
| Open Standard Stipulations | 11,000 | 2,734,000 | 0 | 257,000 | **2,994,000** |
| **Total** | **5,218,000** | **10,640,000** | **34,000** | **1,657,000** | **18,966,000** |

| Approximate % of Habitat Management Area by Fluid Minerals (Oil & Gas) Decision in HAF 2 | | | | |
|---|---|---|---|---|
| **Fluid Minerals (Oil and Gas)** | **Alternative 1** | | | |
| | **PHMA** | **GHMA** | **RHMA** | **Non-HMA** |
| Closed | 20.07% | 48.73% | 0.00% | **31.20%** |
| Open Major Stipulations | 55.07% | 36.64% | 3.91% | **4.39%** |
| Open Moderate Stipulations | 25.36% | 65.47% | 0.22% | **8.95%** |
| Open Standard Stipulations | 0.00% | 95.70% | 0.00% | **10.04%** |
| **Total** | **28.33%** | **61.65%** | **1.16%** | **8.86%** |
| **Fluid Minerals (Oil and Gas)** | **Alternative 2** | | | |
| | **PHMA** | **GHMA** | **RHMA** | **Non-HMA** |
| Closed | 20.07% | 48.73% | 0.00% | **31.20%** |
| Open Major Stipulations | 55.07% | 36.64% | 3.91% | **4.39%** |
| Open Moderate Stipulations | 25.36% | 65.47% | 0.22% | **8.95%** |
| Open Standard Stipulations | 0.00% | 95.70% | 0.00% | **10.04%** |
| **Total** | **28.33%** | **61.65%** | **1.16%** | **8.86%** |
| **Fluid Minerals (Oil and Gas)** | **Alternative 3** | | | |
| | **PHMA** | **GHMA** | **RHMA** | **Non-HMA** |
| Closed | 98.44% | 0.00% | 0.00% | **1.56%** |
| Open Major Stipulations | 29.86% | 0.00% | 0.00% | **70.43%** |
| Open Moderate Stipulations | 19.48% | 0.00% | 0.00% | **80.52%** |
| Open Standard Stipulations | 21.95% | 0.00% | 0.00% | **78.05%** |
| **Total** | **91.66%** | **0.00%** | **0.00%** | **8.33%** |
| **Fluid Minerals (Oil and Gas)** | **Alternative 4** | | | |
| | **PHMA** | **GHMA** | **RHMA** | **Non-HMA** |
| Closed | 23.34% | 45.59% | 0.00% | **29.99%** |
| Open Major Stipulations | 73.96% | 19.56% | 0.19% | **3.35%** |
| Open Moderate Stipulations | 0.00% | 79.63% | 0.31% | **14.10%** |
| Open Standard Stipulations | 0.43% | 87.44% | 0.00% | **8.49%** |
| **Total** | **31.61%** | **54.65%** | **0.19%** | **9.46%** |
| **Fluid Minerals (Oil and Gas)** | **Alternative 5** | | | |
| | **PHMA** | **GHMA** | **RHMA** | **Non-HMA** |
| Closed | 80.99% | 13.56% | 0.64% | **4.81%** |
| Open Major Stipulations | 49.54% | 40.31% | 0.31% | **9.84%** |
| Open Moderate Stipulations | 0.00% | 98.21% | 0.00% | **1.79%** |
| Open Standard Stipulations | 21.04% | 48.85% | 0.00% | **29.99%** |
| **Total** | **30.44%** | **62.71%** | **0.20%** | **6.64%** |

### 14.3.3 HAF Group 3

#### *I. Habitat Management*

**Table 14-8. Habitat Management Areas within HAF 3**

Acres and percentages reflect all lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Habitat Assessment Framework summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized.

| Approximate Acres of HMA in HAF 3 | | | |
|---|---|---|---|
| **Alternative 1** | | | |
| **PHMA** | **GHMA** | **Non-HMA** | **Total** |
| 7,453,000 | 6,420,000 | 3,099,000 | **16,972,000** |
| **Alternative 2** | | | |
| **PHMA** | **GHMA** | **Non-HMA** | **Total** |
| 7,625,000 | 6,209,000 | 3,153,000 | **16,987,000** |
| **Alternative 3** | | | |
| **PHMA** | **GHMA** | **Non-HMA** | **Total** |
| 14,101,000 | 0 | 2,890,000 | **16,991,000** |
| **Alternative 4** | | | |
| **PHMA** | **GHMA** | **Non-HMA** | **Total** |
| 8,596,000 | 5,473,000 | 2,902,000 | **16,971,000** |
| **Alternative 5** | | | |
| **PHMA** | **GHMA** | **Non-HMA** | **Total** |
| 7,609,000 | 6,110,000 | 3,257,000 | **16,991,000** |
| **Alternative 6** | | | |
| **PHMA** | **GHMA** | **Non-HMA** | **Total** |
| 7,609,000 | 6,321,000 | 3,046,000 | **16,976,000** |

| Approximate Percent of HAF 3 that is HMA | | |
|---|---|---|
| **Alternative 1** | | |
| **PHMA** | **GHMA** | **Non-HMA** |
| 50.82% | 48.86% | 0.33% |
| **Alternative 2** | | |
| **PHMA** | **GHMA** | **Non-HMA** |
| 51.43% | 48.24% | 0.33% |
| **Alternative 3** | | |
| **PHMA** | **GHMA** | **Non-HMA** |
| 100% | 0.00% | 0.00% |
| **Alternative 4** | | |
| **PHMA** | **GHMA** | **Non-HMA** |
| 55.49% | 44.51% | 0.00% |
| **Alternative 5** | | |
| **PHMA** | **GHMA** | **Non-HMA** |
| 51.47% | 48.53% | 0.00% |

### *II. Locatable Minerals*

**Table 14-9. Locatable Minerals Decisions within HAF 3**

Acres and percentages reflect BLM managed lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Habitat Assessment Framework summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized.

| Approximate Acres of Locatable Minerals Decisions in HAF 3 by Habitat Management Area Type | | | | |
|---|---|---|---|---|
| **Locatable Minerals** | **Alternative 1** | | | |
| | **PHMA** | **GHMA** | **Non-HMA** | **Total** |
| Existing Withdrawals | 1,916,000 | 2,258,000 | 3,331,000 | **7,517,000** |
| Recommended Withdrawals | 1,001,000 | 221,000 | 330,000 | **1,555,000** |
| Open | 6,312,000 | 5,381,000 | 6,471,000 | **18,348,000** |
| **Total** | **9,230,000** | **7,861,000** | **10,131,000** | **27,420,000** |
| **Locatable Minerals** | **Alternative 2** | | | |
| | **PHMA** | **GHMA** | **Non-HMA** | **Total** |
| Existing Withdrawals | 1,837,000 | 1,873,000 | 3,488,000 | **7,198,000** |
| Recommended Withdrawals | 732,000 | 446,000 | 353,000 | **1,532,000** |
| Open | 6,748,000 | 5,239,000 | 6,414,000 | **18,400,000** |
| **Total** | **9,317,000** | **7,559,000** | **10,255,000** | **27,130,000** |
| **Locatable Minerals** | **Alternative 3** | | | |
| | **PHMA** | **GHMA** | **Non-HMA** | **Total** |
| Existing Withdrawals | 4,260,000 | 0 | 3,253,000 | **7,513,000** |
| Recommended Withdrawals | 12,625,000 | 0 | 343,000 | **12,968,000** |
| Open | 723,000 | 0 | 5,972,000 | **6,694,000** |
| **Total** | **17,608,000** | **0** | **9,567,000** | **27,175,000** |
| **Locatable Minerals** | **Alternative 4** | | | |
| | **PHMA** | **GHMA** | **Non-HMA** | **Total** |
| Existing Withdrawals | 935,000 | 838,000 | 3,269,000 | **5,042,000** |
| Recommended Withdrawals | 775,000 | 423,000 | 347,000 | **1,545,000** |
| Open | 7,267,000 | 4,995,000 | 6,007,000 | **18,269,000** |
| **Total** | **8,977,000** | **6,257,000** | **9,622,000** | **24,856,000** |
| **Locatable Minerals** | **Alternative 5** | | | |
| | **PHMA** | **GHMA** | **Non-HMA** | **Total** |
| Existing Withdrawals | 2,004,000 | 2,005,000 | 3,485,000 | **7,495,000** |
| Recommended Withdrawals | 839,000 | 223,000 | 328,000 | **1,390,000** |
| Open | 6,489,000 | 5,613,000 | 6,215,000 | **18,317,000** |
| **Total** | **9,332,000** | **7,842,000** | **10,027,000** | **27,201,000** |
| **Locatable Minerals** | **Alternative 6** | | | |
| | **PHMA** | **GHMA** | **Non-HMA** | **Total** |
| Existing Withdrawals | 2,004,000 | 2,085,000 | 3,405,000 | **7,495,000** |
| Recommended Withdrawals | 839,000 | 225,000 | 326,000 | **1,390,000** |
| Open | 6,489,000 | 5,771,000 | 6,057,000 | **18,317,000** |
| **Total** | **9,332,000** | **8,081,000** | **9,788,000** | **27,201,000** |

| Approximate % of Habitat Management Area by Locatable Minerals Decisions[2] within Habitat in HAF 3 | | | |
|---|---|---|---|
| **Locatable Minerals** | **Alternative 1** | | |
| | **PHMA** | **GHMA** | **Non-HMA** |
| Existing Withdrawals | 13.72% | 19.53% | 66.53% |
| Recommended Withdrawals | 34.64% | 29.31% | 35.05% |
| Open | 62.21% | 14.18% | 23.49% |
| **Total** | **32.20%** | **26.34%** | **40.68%** |
| **Locatable Minerals** | **Alternative 2** | | |
| | **PHMA** | **GHMA** | **Non-HMA** |
| Existing Withdrawals | 13.72% | 16.49% | 69.57% |
| Recommended Withdrawals | 45.44% | 29.88% | 24.55% |
| Open | 37.06% | 30.89% | 31.16% |
| **Total** | **33.22%** | **28.17%** | **37.89%** |
| **Locatable Minerals** | **Alternative 3** | | |
| | **PHMA** | **GHMA** | **Non-HMA** |
| Existing Withdrawals | 33.29% | 0.00% | 66.61% |
| Recommended Withdrawals | 10.16% | 0.00% | 87.66% |
| Open | 97.73% | 0.00% | 2.26% |
| **Total** | **63.15%** | **0.00%** | **36.26%** |
| **Locatable Minerals** | **Alternative 4** | | |
| | **PHMA** | **GHMA** | **Non-HMA** |
| Existing Withdrawals | 19.57% | 5.37% | 74.06% |
| Recommended Withdrawals | 48.08% | 26.95% | 22.22% |
| Open | 39.63% | 27.76% | 29.95% |
| **Total** | **36.84%** | **24.05%** | **36.72%** |
| **Locatable Minerals** | **Alternative 5** | | |
| | **PHMA** | **GHMA** | **Non-HMA** |
| Existing Withdrawals | 15.63% | 15.42% | 68.95% |
| Recommended Withdrawals | 46.53% | 29.81% | 23.66% |
| Open | 37.55% | 31.67% | 30.78% |
| **Total** | **34.01%** | **28.58%** | **37.41%** |

### *III. Fluid Minerals (Oil & Gas)*

**Table 14-10. Fluid Mineral (Oil & Gas) Decisions within HAF 3**

Percentages reflect BLM managed lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Habitat Assessment Framework summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized.

| Approximate Acres of Fluid Minerals (Oil & Gas) Decisions in HAF 3 by Habitat Management Area Type | | | | |
|---|---|---|---|---|
| **Fluid Mineral (Oil & Gas) Decisions** | **Alternative 1** | | | |
| | **PHMA** | **GHMA** | **Non-HMA** | **Total** |
| Closed | 1,308,000 | 952,000 | 3,365,000 | **5,625,000** |
| Open Major Stipulations | 2,966,000 | 996,000 | 1,466,000 | **5,428,000** |
| Open Moderate Stipulations | 5,033,000 | 4,654,000 | 3,021,000 | **12,708,000** |
| Open Standard Stipulations | 0 | 1,262,000 | 1,057,000 | **2,319,000** |
| **Total** | **9,307,000** | **7,864,000** | **8,909,000** | **26,080,000** |

| Approximate Acres of Fluid Minerals (Oil & Gas) Decisions in HAF 3 by Habitat Management Area Type | | | | |
|---|---|---|---|---|
| **Fluid Mineral (Oil & Gas) Decisions** | **Alternative 2** | | | |
| | **PHMA** | **GHMA** | **Non-HMA** | **Total** |
| Closed | 1,027,000 | 890,000 | 3,492,000 | **5,417,000** |
| Open Major Stipulations | 3,486,000 | 860,000 | 1,721,000 | **6,143,000** |
| Open Moderate Stipulations | 5,047,000 | 4,582,000 | 3,296,000 | **13,006,000** |
| Open Standard Stipulations | 100 | 1,296,000 | 1,369,000 | **2,675,000** |
| **Total** | **9,561,000** | **7,628,000** | **9,878,000** | **27,241,000** |
| **Fluid Mineral (Oil & Gas) Decisions** | **Alternative 3** | | | |
| | **PHMA** | **GHMA** | **Non-HMA** | **Total** |
| Closed | 16,965,000 | 0 | 3,255,000 | **20,219,000** |
| Open Major Stipulations | 387,000 | 0 | 1,477,000 | **1,864,000** |
| Open Moderate Stipulations | 217,000 | 0 | 2,476,000 | **2,693,000** |
| Open Standard Stipulations | 50,000 | 0 | 994,000 | **1,044,000** |
| **Total** | **17,619,000** | **0** | **8,201,000** | **25,821,000** |
| **Fluid Mineral (Oil & Gas) Decisions** | **Alternative 4** | | | |
| | **PHMA** | **GHMA** | **Non-HMA** | **Total** |
| Closed | 1,078,000 | 940,000 | 3,256,000 | **5,274,000** |
| Open Major Stipulations | 9,564,000 | 1,093,000 | 1,476,000 | **12,133,000** |
| Open Moderate Stipulations | 700 | 3,970,900 | 2,788,300 | **6,760,000** |
| Open Standard Stipulations | 13,000 | 1,086,000 | 996,000 | **2,094,000** |
| **Total** | **10,656,000** | **7,089,000** | **8,516,000** | **26,261,000** |
| **Fluid Mineral (Oil & Gas) Decisions** | **Alternative 5** | | | |
| | **PHMA** | **GHMA** | **Non-HMA** | **Total** |
| Closed | 1,015,000 | 990,000 | 3,270,000 | **5,275,000** |
| Open Major Stipulations | 3,224,000 | 1,063,000 | 1,494,000 | **5,781,000** |
| Open Moderate Stipulations | 5,294,000 | 4,537,000 | 3,037,000 | **12,869,000** |
| Open Standard Stipulations | 0 | 1,159,000 | 1,101,000 | **2,261,000** |
| **Total** | **9,533,000** | **7,750,000** | **8,903,000** | **26,186,000** |

| Approximate Acres of Fluid Minerals (Oil & Gas) Decisions in HAF 3 by Habitat Management Area Type | | | | |
|---|---|---|---|---|
| **Fluid Mineral (Oil & Gas) Decisions** | **Alternative 6** | | | |
| | **PHMA** | **GHMA** | **Non-HMA** | **Total** |
| Closed | 1,015,000 | 996,000 | 3,265,000 | **5,275,000** |
| Open Major Stipulations | 3,581,000 | 1,080,000 | 1,478,000 | **6,139,000** |
| Open Moderate Stipulations | 4,938,000 | 4,713,000 | 2,862,000 | **12,512,000** |
| Open Standard Stipulations | 0 | 1,202,000 | 1,059,000 | **2,261,000** |
| **Total** | **9,534,000** | **7,990,000** | **8,663,000** | **26,187,000** |

| Approximate % of Habitat Management Area by Fluid Mineral (Oil & Gas) Decision in HAF 3 | | | |
|---|---|---|---|
| **Fluid Mineral (Oil & Gas) Decisions** | **Alternative 1** | | |
| | **PHMA** | **GHMA** | **Non-HMA** |
| Closed | 28.16% | 17.67% | 53.77% |
| Open Major Stipulations | 52.89% | 16.67% | 29.01% |
| Open Moderate Stipulations | 38.00% | 39.04% | 22.03% |
| Open Standard Stipulations | 0.00% | 45.64% | 53.89% |
| **Total** | 35.59% | 30.07% | 33.46% |
| **Fluid Mineral (Oil & Gas) Decisions** | **Alternative 2** | | |
| | **PHMA** | **GHMA** | **Non-HMA** |
| Closed | 19.34% | 17.24% | 63.29% |
| Open Major Stipulations | 50.55% | 18.22% | 29.86% |
| Open Moderate Stipulations | 37.92% | 38.61% | 22.55% |
| Open Standard Stipulations | 0.00% | 42.88% | 56.68% |
| **Total** | 33.48% | 30.28% | 35.40% |
| **Fluid Mineral (Oil & Gas) Decisions** | **Alternative 3** | | |
| | **PHMA** | **GHMA** | **Non-HMA** |
| Closed | 83.57% | 0.00% | 16.38% |
| Open Major Stipulations | 19.92% | 0.00% | 77.10% |
| Open Moderate Stipulations | 7.77% | 0.00% | 88.62% |
| Open Standard Stipulations | 4.57% | 0.00% | 95.25% |
| **Total** | 67.19% | 0.00% | 32.16% |
| **Fluid Mineral (Oil & Gas) Decisions** | **Alternative 4** | | |
| | **PHMA** | **GHMA** | **Non-HMA** |
| Closed | 19.86% | 17.62% | 61.61% |
| Open Major Stipulations | 76.36% | 9.33% | 13.03% |
| Open Moderate Stipulations | 0.01% | 53.32% | 42.18% |
| Open Standard Stipulations | 0.59% | 47.51% | 47.37% |
| **Total** | 37.61% | 26.27% | 33.75% |
| **Fluid Mineral (Oil & Gas) Decisions** | **Alternative 5** | | |
| | **PHMA** | **GHMA** | **Non-HMA** |
| Closed | 19.15% | 18.68% | 61.69% |
| Open Major Stipulations | 58.95% | 11.79% | 27.23% |
| Open Moderate Stipulations | 63.82% | 15.65% | 19.53% |
| Open Standard Stipulations | 0.01% | 87.02% | 12.81% |
| **Total** | **38.83%** | **31.93%** | **28.39%** |

### 14.3.4 HAF Group 4

#### *I. Habitat Management*

**Table 14-11. Habitat Management Areas within HAF 4**

Acres and percentages reflect all lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Habitat Assessment Framework summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized.

| Approximate Acres of HMA in HAF 4 | | | |
|---|---|---|---|
| **Alternative 1** | | | |
| **PHMA** | **GHMA** | **Non-HMA** | **Total** |
| 1,062,000 | 277,000 | 3,358,000 | **4,698,000** |
| **Alternative 2** | | | |
| **PHMA** | **GHMA** | **Non-HMA** | **Total** |
| 1,062,000 | 0 | 3,635,000 | **4,698,000** |
| **Alternative 3** | | | |
| **PHMA** | **GHMA** | **Non-HMA** | **Total** |
| 1,845,000 | 0 | 2,872,000 | **4,717,000** |
| **Alternative 4** | | | |
| **PHMA** | **GHMA** | **Non-HMA** | **Total** |
| 1,108,000 | 590,000 | 3,014,000 | **4,712,000** |
| **Alternative 5** | | | |
| **PHMA** | **GHMA** | **Non-HMA** | **Total** |
| 625,000 | 357,000 | 3,715,000 | **4,698,000** |
| **Alternative 6** | | | |
| **PHMA** | **GHMA** | **Non-HMA** | **Total** |
| 625,000 | 357,000 | 3,715,000 | **4,698,000** |

| Approximate Percent of HAF 4 that is HMA | | |
|---|---|---|
| **Alternative 1** | | |
| **PHMA** | **GHMA** | **Non-HMA** |
| 69.36% | 30.64% | 0.00% |
| **Alternative 2** | | |
| **PHMA** | **GHMA** | **Non-HMA** |
| 100.00% | 0.00% | 0.00% |
| **Alternative 3** | | |
| **PHMA** | **GHMA** | **Non-HMA** |
| 100% | 0.00% | 0.00% |
| **Alternative 4** | | |
| **PHMA** | **GHMA** | **Non-HMA** |
| 59.05% | 40.95% | 0.00% |
| **Alternative 5** | | |
| **PHMA** | **GHMA** | **Non-HMA** |
| 73.41% | 26.59% | 0.00% |

### *II. Locatable Minerals*

**Table 14-12. Locatable Minerals Decisions within HAF 4**

Acreages and Percentages reflect BLM managed lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Habitat Assessment Framework summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized.

| Approximate Acres of Locatable Minerals Decisions in HAF 4 by Habitat Management Area Type | | | | |
|---|---|---|---|---|
| **Locatable Minerals** | **Alternative 1** | | | |
| | **PHMA** | **GHMA** | **Non-HMA** | **Total** |
| Existing Withdrawals | 46,000 | 192,000 | 1,959,000 | **2,197,000** |
| Recommended Withdrawals | 4,000 | 0 | 2,000 | **6,000** |
| Open | 1,741,000 | 188,000 | 5,594,000 | **7,523,000** |
| **Total** | **1,790,000** | **380,000** | **7,555,000** | **9,726,000** |
| **Locatable Minerals** | **Alternative 2** | | | |
| | **PHMA** | **GHMA** | **Non-HMA** | **Total** |
| Existing Withdrawals | 46,000 | 0 | 2,151,000 | **2,197,000** |
| Recommended Withdrawals | 3,600 | 0 | 2,000 | **5,600** |
| Open | 1,741,000 | 0 | 5,782,000 | **7,523,000** |
| **Total** | **1,790,000** | **0** | **7,935,000** | **9,726,000** |
| **Locatable Minerals** | **Alternative 3** | | | |
| | **PHMA** | **GHMA** | **Non-HMA** | **Total** |
| Existing Withdrawals | 355,000 | 0 | 1,842,000 | **2,197,000** |
| Recommended Withdrawals | 1,537,000 | 0 | 1,000 | **1,538,000** |
| Open | 1,305,000 | 0 | 4,750,000 | **6,055,000** |
| **Total** | **3,197,000** | **0** | **6,593,000** | **9,790,000** |
| **Locatable Minerals** | **Alternative 4** | | | |
| | **PHMA** | **GHMA** | **Non-HMA** | **Total** |
| Existing Withdrawals | 115,000 | 233,000 | 1,849,000 | **2,197,000** |
| Recommended Withdrawals | 3,600 | 500 | 1,600 | **5,600** |
| Open | 1,774,000 | 889,000 | 4,917,000 | **7,580,000** |
| **Total** | **1,893,000** | **1,122,000** | **6,768,000** | **9,783,000** |
| **Locatable Minerals** | **Alternative 5** | | | |
| | **PHMA** | **GHMA** | **Non-HMA** | **Total** |
| Existing Withdrawals | 22,000 | 0 | 2,173,000 | **2,196,000** |
| Recommended Withdrawals | 4,000 | 0 | 2,000 | **6,000** |
| Open | 1,228,000 | 505,000 | 5,849,000 | **7,583,000** |
| **Total** | **1,254,000** | **506,000** | **8,024,000** | **9,784,000** |
| **Locatable Minerals** | **Alternative 6** | | | |
| | **PHMA** | **GHMA** | **Non-HMA** | **Total** |
| Existing Withdrawals | 22,000 | 500 | 2,173,000 | **2,196,000** |
| Recommended Withdrawals | 3,600 | 500 | 1,900 | **5,900** |
| Open | 1,228,000 | 505,000 | 5,849,000 | **7,583,000** |
| **Total** | **1,254,000** | **506,000** | **8,024,000** | **9,784,000** |

| Approximate % of Habitat Management Area by Locatable Minerals Decisions[2] within Habitat in HAF 4 | | | |
|---|---|---|---|
| **Locatable Minerals** | **Alternative 1** | | |
| | **PHMA** | **GHMA** | **Non-HMA** |
| Existing Withdrawals | 2.09% | 8.74% | 89.17% |
| Recommended Withdrawals | 64.29% | 3.57% | 32.14% |
| Open | 23.85% | 2.47% | 73.68% |
| **Total** | **18.99%** | **3.87%** | **77.13%** |
| **Locatable Minerals** | **Alternative 2** | | |
| | **PHMA** | **GHMA** | **Non-HMA** |
| Existing Withdrawals | 2.09% | 0.00% | 97.91% |
| Recommended Withdrawals | 60.00% | 0.00% | 40.00% |
| Open | 23.85% | 0.00% | 76.16% |
| **Total** | **18.99%** | **0.00%** | **81.01%** |
| **Locatable Minerals** | **Alternative 3** | | |
| | **PHMA** | **GHMA** | **Non-HMA** |
| Existing Withdrawals | 16.16% | 0.00% | 83.84% |
| Recommended Withdrawals | 22.09% | 0.00% | 77.91% |
| Open | 99.93% | 0.00% | 0.07% |
| **Total** | **32.94%** | **0.00%** | **67.06%** |
| **Locatable Minerals** | **Alternative 4** | | |
| | **PHMA** | **GHMA** | **Non-HMA** |
| Existing Withdrawals | 5.23% | 10.61% | 84.16% |
| Recommended Withdrawals | 23.84% | 11.66% | 64.51% |
| Open | 60.00% | 8.33% | 26.67% |
| **Total** | **19.69%** | **11.42%** | **68.89%** |
| **Locatable Minerals** | **Alternative 5** | | |
| | **PHMA** | **GHMA** | **Non-HMA** |
| Existing Withdrawals | 1.00% | 0.02% | 98.95% |
| Recommended Withdrawals | 61.02% | 8.47% | 32.20% |
| Open | 16.66% | 6.62% | 76.71% |
| **Total** | **13.19%** | **5.15%** | **81.65%** |

### *III. Fluid Minerals (Oil & Gas)*

**Table 14-13. Fluid Mineral (Oil & Gas) Decisions within HAF 4**

Percentages reflect BLM managed lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Habitat Assessment Framework summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized.

| Approximate Acres of Fluid Minerals (Oil & Gas) Decisions in HAF 4 by Habitat Management Area Type | | | | |
|---|---|---|---|---|
| **Fluid Mineral (Oil & Gas) Decisions** | **Alternative 1** | | | |
| | **PHMA** | **GHMA** | **Non-HMA** | **Total** |
| Closed | 46,000 | 28,000 | 1,321,000 | **1,395,000** |
| Open Major Stipulations | 1,740,000 | 27,000 | 2,185,000 | **3,952,000** |
| Open Moderate Stipulations | 0 | 186,000 | 1,578,000 | **1,764,000** |
| Open Standard Stipulations | 0 | 105,000 | 1,760,000 | **1,865,000** |
| **Total** | **1,786,000** | **346,000** | **6,844,000** | **8,976,000** |

| Approximate Acres of Fluid Minerals (Oil & Gas) Decisions in HAF 4 by Habitat Management Area Type | | | | |
|---|---|---|---|---|
| **Fluid Mineral (Oil & Gas) Decisions** | **Alternative 2** | | | |
| | **PHMA** | **GHMA** | **Non-HMA** | **Total** |
| Closed | 46,000 | 0 | 1,349,000 | **1,402,000** |
| Open Major Stipulations | 1,739,000 | 0 | 2,212,000 | **3,986,000** |
| Open Moderate Stipulations | 0 | 0 | 1,763,000 | **1,764,000** |
| Open Standard Stipulations | 0 | 0 | 1,865,000 | **1,865,000** |
| **Total** | **1,785,000** | **0** | **7,189,000** | **9,016,000** |
| **Fluid Mineral (Oil & Gas) Decisions** | **Alternative 3** | | | |
| | **PHMA** | **GHMA** | **Non-HMA** | **Total** |
| Closed | 1,876,000 | 0 | 1,270,000 | **3,146,000** |
| Open Major Stipulations | 1,041,000 | 0 | 1,904,000 | **2,945,000** |
| Open Moderate Stipulations | 127,000 | 0 | 1,274,000 | **1,400,000** |
| Open Standard Stipulations | 58,000 | 0 | 1,488,000 | **1,545,000** |
| **Total** | **3,102,000** | **0** | **5,935,000** | **9,037,000** |
| **Fluid Mineral (Oil & Gas) Decisions** | **Alternative 4** | | | |
| | **PHMA** | **GHMA** | **Non-HMA** | **Total** |
| Closed | 68,000 | 63,000 | 1,270,000 | **1,402,000** |
| Open Major Stipulations | 1,813,000 | 284,000 | 1,917,000 | **4,015,000** |
| Open Moderate Stipulations | 1,600 | 402,900 | 1,303,000 | **1,707,500** |
| Open Standard Stipulations | 4,000 | 298,400 | 1,601,800 | **1,904,300** |
| **Total** | **1,887,000** | **1,049,000** | **6,092,000** | **9,028,000** |
| **Fluid Mineral (Oil & Gas) Decisions** | **Alternative 5** | | | |
| | **PHMA** | **GHMA** | **Non-HMA** | **Total** |
| Closed | 39,000 | 1,000 | 1,354,000 | **1,395,000** |
| Open Major Stipulations | 1,211,000 | 98,000 | 2,200,000 | **3,509,000** |
| Open Moderate Stipulations | 0 | 69,000 | 1,780,000 | **1,849,000** |
| Open Standard Stipulations | 4,000 | 302,000 | 1,917,000 | **2,223,000** |
| **Total** | **1,254,000** | **470,000** | **7,252,000** | **8,976,000** |
| **Fluid Mineral (Oil & Gas) Decisions** | **Alternative 6** | | | |
| | **PHMA** | **GHMA** | **Non-HMA** | **Total** |
| Closed | 39,000 | 1,000 | 1,354,000 | **1,395,000** |
| Open Major Stipulations | 1,211,000 | 98,000 | 2,200,000 | **3,509,000** |
| Open Moderate Stipulations | 0 | 69,000 | 1,780,000 | **1,849,000** |
| Open Standard Stipulations | 4,000 | 302,000 | 1,917,000 | **2,223,000** |
| **Total** | **1,254,000** | **470,000** | **7,252,000** | **8,976,000** |

| Approximate % of Habitat Management Area by Fluid Mineral (Oil & Gas) Decision in HAF 4 | | | |
|---|---|---|---|
| **Fluid Mineral (Oil & Gas) Decisions** | **Alternative 1** | | |
| | **PHMA** | **GHMA** | **Non-HMA** |
| Closed | 1.64% | 2.50% | 95.87% |
| Open Major Stipulations | 89.60% | 1.29% | 9.11% |
| Open Moderate Stipulations | 0.00% | 19.72% | 80.28% |
| Open Standard Stipulations | 0.00% | 6.19% | 93.81% |
| **Total** | **33.02%** | **5.43%** | **61.53%** |
| **Fluid Mineral (Oil & Gas) Decisions** | **Alternative 2** | | |
| | **PHMA** | **GHMA** | **Non-HMA** |
| Closed | 1.64% | 0.00% | 98.36% |
| Open Major Stipulations | 44.88% | 0.00% | 55.12% |
| Open Moderate Stipulations | 0.00% | 0.00% | 100.00% |
| Open Standard Stipulations | 0.00% | 0.00% | 100.00% |
| **Total** | **23.79%** | **0.00%** | **76.21%** |
| **Fluid Mineral (Oil & Gas) Decisions** | **Alternative 3** | | |
| | **PHMA** | **GHMA** | **Non-HMA** |
| Closed | 59.72% | 0.00% | 40.28% |
| Open Major Stipulations | 36.11% | 0.00% | 63.89% |
| Open Moderate Stipulations | 9.07% | 0.00% | 91.00% |
| Open Standard Stipulations | 3.75% | 0.00% | 96.31% |
| **Total** | **34.63%** | **0.00%** | **65.37%** |
| **Fluid Mineral (Oil & Gas) Decisions** | **Alternative 4** | | |
| | **PHMA** | **GHMA** | **Non-HMA** |
| Closed | 5.39% | 4.47% | 90.13% |
| Open Major Stipulations | 45.63% | 7.01% | 47.33% |
| Open Moderate Stipulations | 0.09% | 23.59% | 76.29% |
| Open Standard Stipulations | 0.21% | 15.65% | 84.14% |
| **Total** | **21.27%** | **11.57%** | **67.17%** |
| **Fluid Mineral (Oil & Gas) Decisions** | **Alternative 5** | | |
| | **PHMA** | **GHMA** | **Non-HMA** |
| Closed | 2.80% | 0.07% | 97.06% |
| Open Major Stipulations | 34.51% | 2.79% | 62.70% |
| Open Moderate Stipulations | 0.00% | 3.73% | 96.27% |
| Open Standard Stipulations | 0.18% | 13.59% | 86.23% |
| **Total** | 16.03% | 6.19% | 77.79% |

### 14.3.5 HAF Group 5

#### *I. Habitat Management*

**Table 14-14. Habitat Management Areas within HAF 5**

Acres and percentages reflect all lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Habitat Assessment Framework summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized.

| Approximate Acres of HMA in HAF 5 | | | | |
|---|---|---|---|---|
| **Alternative 1** | | | | |
| **PHMA** | **GHMA** | **OHMA** | **Non-HMA** | **Total** |
| 3,675,000 | 3,594,000 | 3,528,000 | 16,031,000 | **26,827,000** |
| **Alternative 2** | | | | |
| **PHMA** | **GHMA** | **OHMA** | **Non-HMA** | **Total** |
| 3,675,000 | 3,583,000 | 3,528,000 | 16,041,000 | **26,827,000** |

| Approximate Acres of HMA in HAF 5 | | | | |
|---|---|---|---|---|
| **Alternative 3** | | | | |
| **PHMA** | **GHMA** | **OHMA** | **Non-HMA** | **Total** |
| 11,768,000 | 0 | 0 | 15,085,000 | **26,853,000** |
| **Alternative 4** | | | | |
| **PHMA** | **GHMA** | **OHMA** | **Non-HMA** | **Total** |
| 4,540,000 | 4,310,000 | 2,905,000 | 15,098,000 | **23,948,000** |
| **Alternative 5** | | | | |
| **PHMA** | **GHMA** | **OHMA** | **Non-HMA** | **Total** |
| 4,528,000 | 3,592,000 | 2,346,000 | 16,363,000 | **26,830,000** |
| **Alternative 6** | | | | |
| **PHMA** | **GHMA** | **OHMA** | **Non-HMA** | **Total** |
| 4,528,000 | 3,592,000 | 2,346,000 | 16,363,000 | **26,830,000** |

| Approximate Percent of HAF 5 that is HMA | | | |
|---|---|---|---|
| **Alternative 1** | | | |
| **PHMA** | **GHMA** | **OHMA** | **Non-HMA** |
| 32.77% | 36.02% | 31.21% | 0.00% |
| **Alternative 2** | | | |
| **PHMA** | **GHMA** | **OHMA** | **Non-HMA** |
| 33.92% | 33.64% | 32.44% | 0.00% |
| **Alternative 3** | | | |
| **PHMA** | **GHMA** | **OHMA** | **Non-HMA** |
| 100% | 0.00% | 0.00% | 0.00% |
| **Alternative 4** | | | |
| **PHMA** | **GHMA** | **OHMA** | **Non-HMA** |
| 38.51% | 39.08% | 22.41% | 0.00% |
| **Alternative 5** | | | |
| **PHMA** | **GHMA** | **OHMA** | **Non-HMA** |
| 43.47% | 36.52% | 20.01% | 0.00% |

### *II. Locatable Minerals*

**Table 14-15. Locatable Minerals Decisions within HAF 5**

Acres and percentages reflect BLM managed lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Habitat Assessment Framework summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized.

| Approximate Acres of Locatable Minerals Decisions in HAF 5 by Habitat Management Area Type | | | | | |
|---|---|---|---|---|---|
| **Locatable Minerals** | **Alternative 1** | | | | |
| | **PHMA** | **GHMA** | **OHMA** | **Non-HMA** | **Total** |
| Existing Withdrawals | 70,000 | 248,000 | 115,000 | 1,283,000 | **1,716,000** |
| Recommended Withdrawals | 0 | 0 | 0 | 0 | **0** |
| Open | 3,948,000 | 4,160,000 | 3,726,000 | 16,785,000 | **28,618,000** |
| **Total** | **4,019,000** | **4,407,000** | **3,841,000** | **18,068,000** | **30,335,000** |

| Approximate Acres of Locatable Minerals Decisions in HAF 5 by Habitat Management Area Type | | | | | |
|---|---|---|---|---|---|
| **Locatable Minerals** | **Alternative 2** | | | | |
| | **PHMA** | **GHMA** | **OHMA** | **Non-HMA** | **Total** |
| Existing Withdrawals | 16,000 | 100,000 | 42,000 | 1,283,000 | **1,441,000** |
| Recommended Withdrawals | 0 | 0 | 0 | 0 | **0** |
| Open | 3,666,000 | 3,485,000 | 3,495,000 | 16,795,000 | **27,441,000** |
| **Total** | **3,683,000** | **3,585,000** | **3,537,000** | **18,078,000** | **28,882,000** |
| **Locatable Minerals** | **Alternative 3** | | | | |
| | **PHMA** | **GHMA** | **OHMA** | **Non-HMA** | **Total** |
| Existing Withdrawals | 584,000 | 0 | 0 | 1,132,000 | **1,716,000** |
| Recommended Withdrawals | 11,532,000 | 0 | 0 | 0 | **11,532,000** |
| Open | 1,288,000 | 0 | 0 | 15,780,000 | **17,068,000** |
| **Total** | **13,404,000** | **0** | **0** | **16,912,000** | **30,316,000** |
| **Locatable Minerals** | **Alternative 4** | | | | |
| | **PHMA** | **GHMA** | **OHMA** | **Non-HMA** | **Total** |
| Existing Withdrawals | 230,000 | 265,000 | 78,000 | 1,132,000 | **1,706,000** |
| Recommended Withdrawals | 0 | 0 | 0 | 0 | **0** |
| Open | 5,105,000 | 4,702,000 | 3,029,000 | 15,823,000 | **28,658,000** |
| **Total** | **5,336,000** | **4,966,000** | **3,107,000** | **16,955,000** | **30,364,000** |
| **Locatable Minerals** | **Alternative 5** | | | | |
| | **PHMA** | **GHMA** | **OHMA** | **Non-HMA** | **Total** |
| Existing Withdrawals | 230,000 | 231,000 | 58,000 | 1,197,000 | **1,716,000** |
| Recommended Withdrawals | 0 | 0 | 0 | 0 | **0** |
| Open | 5,093,000 | 4,009,000 | 2,482,000 | 17,041,000 | **28,625,000** |
| **Total** | **5,323,000** | **4,240,000** | **2,541,000** | **18,239,000** | **30,342,000** |
| **Locatable Minerals** | **Alternative 6** | | | | |
| | **PHMA** | **GHMA** | **OHMA** | **Non-HMA** | **Total** |
| Existing Withdrawals | 230,000 | 231,000 | 58,000 | 1,197,000 | **1,716,000** |
| Recommended Withdrawals | 0 | 0 | 0 | 0 | **0** |
| Open | 5,093,000 | 4,009,000 | 2,482,000 | 17,041,000 | **28,625,000** |
| **Total** | **5,323,000** | **4,240,000** | **2,541,000** | **18,239,000** | **30,342,000** |

| Approximate % of Habitat Management Area by Locatable Minerals Decisions[2] within Habitat in HAF 5 | | | | |
|---|---|---|---|---|
| **Locatable Minerals** | **Alternative 1** | | | |
| | **PHMA** | **GHMA** | **OHMA** | **Non-HMA** |
| Existing Withdrawals | 4.08% | 14.45% | 6.70% | 74.77% |
| Recommended Withdrawals | 0.00% | 0.00% | 0.00% | 0.00% |
| Open | 13.79% | 14.53% | 13.02% | 58.65% |
| **Total** | **13.25%** | **14.53%** | **12.66%** | **59.57%** |
| **Locatable Minerals** | **Alternative 2** | | | |
| | **PHMA** | **GHMA** | **OHMA** | **Non-HMA** |
| Existing Withdrawals | 1.11% | 6.94% | 2.91% | 89.04% |
| Recommended Withdrawals | 0.00% | 0.00% | 0.00% | 0.00% |
| Open | 13.36% | 12.70% | 12.73% | 61.21% |
| **Total** | **12.75%** | **12.41%** | **12.24%** | **62.59%** |

| Approximate % of Habitat Management Area by Locatable Minerals Decisions[2] within Habitat in HAF 5 | | | | |
|---|---|---|---|---|
| **Locatable Minerals** | **Alternative 3** | | | |
| | **PHMA** | **GHMA** | **OHMA** | **Non-HMA** |
| Existing Withdrawals | 34.03% | 0.00% | 0.00% | 65.97% |
| Recommended Withdrawals | 7.55% | 0.00% | 0.00% | 92.45% |
| Open | 100.00% | 0.00% | 0.00% | 0.00% |
| **Total** | **44.21%** | **0.00%** | **0.00%** | **55.79%** |
| **Locatable Minerals** | **Alternative 4** | | | |
| | **PHMA** | **GHMA** | **OHMA** | **Non-HMA** |
| Existing Withdrawals | 13.48% | 15.53% | 4.57% | 66.35% |
| Recommended Withdrawals | 0.00% | 0.00% | 0.00% | 0.00% |
| Open | 17.81% | 16.41% | 10.57% | 55.21% |
| **Total** | **17.57%** | **16.35%** | **10.23%** | **55.84%** |
| **Locatable Minerals** | **Alternative 5** | | | |
| | **PHMA** | **GHMA** | **OHMA** | **Non-HMA** |
| Existing Withdrawals | 13.87% | 13.93% | 3.52% | 72.20% |
| Recommended Withdrawals | 19.48% | 15.33% | 9.49% | 65.18% |
| Open | 0.00% | 0.00% | 0.00% | 0.00% |
| **Total** | 19.15% | 15.25% | 9.14% | 65.61% |

### *III. Fluid Minerals (Oil & Gas)*

**Table 14-16. Fluid Mineral (Oil & Gas) Decisions within HAF 5**

Percentages reflect BLM managed lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Habitat Assessment Framework summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized.

| Approximate Acres of Fluid Minerals (Oil & Gas) Decisions in HAF 5 by Habitat Management Area Type | | | | | |
|---|---|---|---|---|---|
| **Fluid Mineral (Oil & Gas) Decisions** | **Alternative 1** | | | | |
| | **PHMA** | **GHMA** | **OHMA** | **Non-HMA** | **Total** |
| Closed | 152,000 | 323,000 | 219,000 | 2,420,000 | **2,895,000** |
| Open Major Stipulations | 3,867,000 | 0 | 0 | 16,000 | **3,883,000** |
| Open Moderate Stipulations | 0 | 4,078,000 | 0 | 64,000 | **4,142,000** |
| Open Standard Stipulations | 0 | 7,000 | 3,622,000 | 15,493,000 | **15,500,000** |
| **Total** | **4,019,000** | **4,408,000** | **3,841,000** | **17,993,000** | **26,420,000** |
| **Fluid Mineral (Oil & Gas) Decisions** | **Alternative 2** | | | | |
| | **PHMA** | **GHMA** | **OHMA** | **Non-HMA** | **Total** |
| Closed | 98,000 | 175,000 | 147,000 | 2,420,000 | **2,840,000** |
| Open Major Stipulations | 3,585,000 | 0 | 0 | 16,000 | **3,601,000** |
| Open Moderate Stipulations | 0 | 3,410,000 | 0 | 67,000 | **3,477,000** |
| Open Standard Stipulations | 0 | 0 | 3,391,000 | 15,500,000 | **18,891,000** |
| **Total** | **3,683,000** | **3,585,000** | **3,538,000** | **18,003,000** | **28,809,000** |
| **Fluid Mineral (Oil & Gas) Decisions** | **Alternative 3** | | | | |
| | **PHMA** | **GHMA** | **OHMA** | **Non-HMA** | **Total** |
| Closed | 12,115,000 | 0 | 0 | 1,999,000 | **14,114,000** |
| Open Major Stipulations | 251,000 | 0 | 0 | 154,000 | **406,000** |
| Open Moderate Stipulations | 420,000 | 0 | 0 | 798,000 | **1,218,000** |
| Open Standard Stipulations | 635,000 | 0 | 0 | 13,914,000 | **14,549,000** |
| **Total** | **13,422,000** | **0** | **0** | **16,865,000** | **30,286,000** |

| Approximate Acres of Fluid Minerals (Oil & Gas) Decisions in HAF 5 by Habitat Management Area Type | | | | | |
|---|---|---|---|---|---|
| **Fluid Mineral (Oil & Gas) Decisions** | **Alternative 4** | | | | |
| | **PHMA** | **GHMA** | **OHMA** | **Non-HMA** | **Total** |
| Closed | 314,000 | 524,000 | 283,000 | 2,000,000 | **3,121,000** |
| Open Major Stipulations | 4,626,000 | 18,000 | 5,400 | 18,000 | **4,667,000** |
| Open Moderate Stipulations | 154,000 | 3,947,000 | 12,000 | 151,000 | **4,264,000** |
| Open Standard Stipulations | 242,000 | 478,000 | 2,807,000 | 14,711,000 | **18,237,000** |
| **Total** | **5,336,000** | **4,967,000** | **3,107,000** | **16,878,000** | **30,288,000** |
| **Fluid Mineral (Oil & Gas) Decisions** | **Alternative 5** | | | | |
| | **PHMA** | **GHMA** | **OHMA** | **Non-HMA** | **Total** |
| Closed | 4,615,000 | 17,000 | 5,000 | 19,000 | **4,656,000** |
| Open Major Stipulations | 154,000 | 3,539,000 | 12,000 | 197,000 | **3,903,000** |
| Open Moderate Stipulations | 241,000 | 275,000 | 2,340,000 | 15,735,000 | **18,591,000** |
| Open Standard Stipulations | 314,000 | 409,000 | 183,000 | 2,210,000 | **3,115,000** |
| **Total** | **5,323,000** | **4,240,000** | **2,541,000** | **18,162,000** | **30,265,000** |
| **Fluid Mineral (Oil & Gas) Decisions** | **Alternative 6** | | | | |
| | **PHMA** | **GHMA** | **OHMA** | **Non-HMA** | **Total** |
| Closed | 314,000 | 409,000 | 183,000 | 2,210,000 | **3,115,000** |
| Open Major Stipulations | 4,615,000 | 301,000 | 105,000 | 207,000 | **5,229,000** |
| Open Moderate Stipulations | 154,000 | 3,254,000 | 12,000 | 197,000 | **3,618,000** |
| Open Standard Stipulations | 241,000 | 275,000 | 2,241,000 | 15,548,000 | **18,304,000** |
| **Total** | **5,323,000** | **4,240,000** | **2,541,000** | **18,162,000** | **30,266,000** |

| Approximate % of Habitat Management Area by Fluid Mineral (Oil & Gas) Decision in HAF 5 | | | | |
|---|---|---|---|---|
| **Fluid Mineral (Oil & Gas) Decisions** | **Alternative 1** | | | |
| | **PHMA** | **GHMA** | **OHMA** | **Non-HMA** |
| Closed | 4.88% | 10.37% | 7.03% | 77.69% |
| Open Major Stipulations | 99.82% | 0.00% | 0.00% | 0.19% |
| Open Moderate Stipulations | 0.00% | 99.12% | 0.00% | 0.88% |
| Open Standard Stipulations | 0.00% | 0.04% | 18.95% | 81.01% |
| **Total** | **13.30%** | **14.59%** | **12.71%** | **59.40%** |
| **Fluid Mineral (Oil & Gas) Decisions** | **Alternative 2** | | | |
| | **PHMA** | **GHMA** | **OHMA** | **Non-HMA** |
| Closed | 3.45% | 6.16% | 5.18% | 85.21% |
| Open NSO | 99.56% | 0.00% | 0.00% | 0.44% |
| Open CSU/TL | 0.00% | 98.87% | 0.00% | 1.13% |
| Open Standard Stipulations | 0.00% | 0.00% | 17.96% | 82.04% |
| **Total** | **12.80%** | **12.46%** | **12.30%** | **62.45%** |
| **Fluid Mineral (Oil & Gas) Decisions** | **Alternative 3** | | | |
| | **PHMA** | **GHMA** | **OHMA** | **Non-HMA** |
| Closed | 85.84% | 0.00% | 0.00% | 14.16% |
| Open Major Stipulations | 61.82% | 0.00% | 0.00% | 37.93% |
| Open Moderate Stipulations | 34.48% | 0.00% | 0.00% | 65.52% |
| Open Standard Stipulations | 4.36% | 0.00% | 0.00% | 95.64% |
| **Total** | **44.32%** | **0.00%** | **0.00%** | **55.69%** |
| **Fluid Mineral (Oil & Gas) Decisions** | **Alternative 4** | | | |
| | **PHMA** | **GHMA** | **OHMA** | **Non-HMA** |
| Closed | 10.06% | 16.79% | 9.07% | 64.08% |
| Open Major Stipulations | 99.12% | 0.39% | 0.12% | 0.39% |
| Open Moderate Stipulations | 3.61% | 92.57% | 0.28% | 3.54% |
| Open Standard Stipulations | 1.33% | 2.62% | 15.39% | 80.67% |
| **Total** | **17.62%** | **16.40%** | **10.26%** | **55.73%** |

| Approximate % of Habitat Management Area by Fluid Mineral (Oil & Gas) Decision in HAF 5 | | | | |
|---|---|---|---|---|
| **Fluid Mineral (Oil & Gas) Decisions** | **Alternative 5** | | | |
| | **PHMA** | **GHMA** | **OHMA** | **Non-HMA** |
| Closed | 10.08% | 13.13% | 5.87% | **70.95%** |
| Open Major Stipulations | 99.12% | 0.37% | 0.11% | **0.41%** |
| Open Moderate Stipulations | 3.95% | 90.67% | 0.31% | **5.05%** |
| Open Standard Stipulations | 1.30% | 1.48% | 12.59% | **84.64%** |
| **Total** | **18.45%** | **14.11%** | **8.69%** | **58.76%** |

### 14.3.6 HAF Group 6

#### *I. Habitat Management*

**Table 14-17. Habitat Management Areas within HAF 6**

Acres and percentages reflect all lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Habitat Assessment Framework summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized.

| Approximate Acres of HMA in HAF 6 | | | | |
|---|---|---|---|---|
| **Alternative 1** | | | | |
| **PHMA** | **GHMA** | **OHMA** | **Non-HMA** | **Total** |
| 8,748,000 | 4,767,000 | 863,000 | 4,985,000 | **19,363,000** |
| **Alternative 2** | | | | |
| **PHMA** | **GHMA** | **OHMA** | **Non-HMA** | **Total** |
| 8,684,000 | 4,767,000 | 863,000 | 4,988,000 | **19,302,000** |
| **Alternative 3** | | | | |
| **PHMA** | **GHMA** | **OHMA** | **Non-HMA** | **Total** |
| 16,054,000 | 0 | 0 | 4,542,000 | **20,596,000** |
| **Alternative 4** | | | | |
| **PHMA** | **GHMA** | **OHMA** | **Non-HMA** | **Total** |
| 9,443,000 | 4,769,000 | 668,000 | 4,542,000 | **18,754,000** |
| **Alternative 5** | | | | |
| **PHMA** | **GHMA** | **OHMA** | **Non-HMA** | **Total** |
| 9,314,000 | 3,934,000 | 514,000 | 5,720,000 | **19,482,000** |
| **Alternative 6** | | | | |
| **PHMA** | **GHMA** | **OHMA** | **Non-HMA** | **Total** |
| 9,314,000 | 3,934,000 | 514,000 | 5,720,000 | **19,482,000** |

| Approximate Percent of HAF 6 that is HMA | | | |
|---|---|---|---|
| **Alternative 1** | | | |
| **PHMA** | **GHMA** | **OHMA** | **Non-HMA** |
| 56.68% | 37.30% | 6.02% | 0.00% |
| **Alternative 2** | | | |
| **PHMA** | **GHMA** | **OHMA** | **Non-HMA** |
| 56.50% | 37.75% | 5.75% | 0.00% |
| **Alternative 3** | | | |
| **PHMA** | **GHMA** | **OHMA** | **Non-HMA** |
| 100% | 0.00% | 0.00% | 0.00% |
| **Alternative 4** | | | |
| **PHMA** | **GHMA** | **OHMA** | **Non-HMA** |
| 59.17% | 36.38% | 4.46% | 0.00% |

| Approximate Percent of HAF 6 that is HMA | | | |
|---|---|---|---|
| Alternative 5 | | | |
| PHMA | GHMA | OHMA | Non-HMA |
| 63.22% | 33.08% | 3.69% | 0.00% |

### *II. Locatable Minerals*

**Table 14-18. Locatable Minerals Decisions within HAF 6**

Acres and percentages reflect BLM managed lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Habitat Assessment Framework summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized.

| Approximate Acres of Locatable Minerals Decisions in HAF 6 by Habitat Management Area Type | | | | | |
|---|---|---|---|---|---|
| Locatable Minerals | Alternative 1 | | | | |
| | PHMA | GHMA | OHMA | Non-HMA | Total |
| Existing Withdrawals | 620,000 | 620,000 | 21,000 | 1,052,000 | **2,313,000** |
| Recommended Withdrawals | 3,541,000 | 357,000 | 184,000 | 90,000 | **4,172,000** |
| Open | 5,727,000 | 4,907,000 | 780,000 | 5,593,000 | **17,007,000** |
| **Total** | **9,888,000** | **5,884,000** | **985,000** | **6,735,000** | **23,492,000** |
| **Locatable Minerals** | **Alternative 2** | | | | |
| | **PHMA** | **GHMA** | **OHMA** | **Non-HMA** | **Total** |
| Existing Withdrawals | 561,000 | 564,000 | 0 | 1,052,000 | **2,177,000** |
| Recommended Withdrawals | 7,160,000 | 600 | 0 | 0 | **1,488,000** |
| Open | 1,487,000 | 5,036,000 | 863,000 | 5,686,000 | **18,745,000** |
| **Total** | **9,209,000** | **5,601,000** | **863,000** | **6,738,000** | **22,410,000** |
| **Locatable Minerals** | **Alternative 3** | | | | |
| | **PHMA** | **GHMA** | **OHMA** | **Non-HMA** | **Total** |
| Existing Withdrawals | 1,430,000 | 0 | 0 | 1,010,000 | **2,440,000** |
| Recommended Withdrawals | 16,525,000 | 0 | 0 | 8,300 | **16,533,000** |
| Open | 1,535,000 | 0 | 0 | 5,191,000 | **6,726,000** |
| **Total** | **19,490,000** | **0** | **0** | **6,210,000** | **25,699,000** |
| **Locatable Minerals** | **Alternative 4** | | | | |
| | **PHMA** | **GHMA** | **OHMA** | **Non-HMA** | **Total** |
| Existing Withdrawals | 750,000 | 510,000 | 44,000 | 1,010,000 | **2,315,000** |
| Recommended Withdrawals | 2,673,000 | 1,020,000 | 32,000 | 8,200 | **3,733,000** |
| Open | 7,443,000 | 3,943,000 | 711,000 | 5,169,000 | **17,266,000** |
| **Total** | **10,866,000** | **5,473,000** | **787,000** | **6,187,000** | **23,314,000** |
| **Locatable Minerals** | **Alternative 5** | | | | |
| | **PHMA** | **GHMA** | **OHMA** | **Non-HMA** | **Total** |
| Existing Withdrawals | 751,000 | 347,000 | 44,000 | 1,202,000 | **2,344,000** |
| Recommended Withdrawals | 444,000 | 69,000 | 32,000 | 8,000 | **553,000** |
| Open | 9,045,000 | 4,216,000 | 555,000 | 6,187,000 | **20,003,000** |
| **Total** | **10,240,000** | **4,632,000** | **631,000** | **7,397,000** | **24,234,000** |

| Approximate Acres of Locatable Minerals Decisions in HAF 6 by Habitat Management Area Type | | | | | |
|---|---|---|---|---|---|
| **Locatable Minerals** | **Alternative 5** | | | | |
| | **PHMA** | **GHMA** | **OHMA** | **Non-HMA** | **Total** |
| Existing Withdrawals | 751,000 | 347,000 | 44,000 | 1,202,000 | **2,344,000** |
| Recommended Withdrawals | 444,000 | 69,000 | 32,000 | 8,000 | **553,000** |
| Open | 9,045,000 | 4,216,000 | 555,000 | 6,187,000 | **20,003,000** |
| **Total** | **10,240,000** | **4,632,000** | **631,000** | **7,397,000** | **22,901,000** |

| Approximate % of Habitat Management Area by Locatable Minerals Decisions[2] within Habitat in HAF 6 | | | | |
|---|---|---|---|---|
| **Locatable Minerals** | **Alternative 1** | | | |
| | **PHMA** | **GHMA** | **OHMA** | **Non-HMA** |
| Existing Withdrawals | 25.41% | 25.41% | 0.86% | 43.11% |
| Recommended Withdrawals | 27.30% | 28.22% | 4.49% | 32.16% |
| Open | 87.75% | 6.93% | 3.57% | 1.75% |
| **Total** | **39.59%** | **23.56%** | **3.94%** | **26.96%** |
| **Locatable Minerals** | **Alternative 2** | | | |
| | **PHMA** | **GHMA** | **OHMA** | **Non-HMA** |
| Existing Withdrawals | 24.35% | 24.48% | 0.00% | 45.66% |
| Recommended Withdrawals | 35.50% | 24.97% | 4.28% | 28.19% |
| Open | 99.93% | 0.04% | 0.00% | 0.00% |
| **Total** | **38.43%** | **23.38%** | **3.60%** | **28.12%** |
| **Locatable Minerals** | **Alternative 3** | | | |
| | **PHMA** | **GHMA** | **OHMA** | **Non-HMA** |
| Existing Withdrawals | 58.61% | 0.00% | 0.00% | 41.39% |
| Recommended Withdrawals | 22.82% | 0.00% | 0.00% | 77.18% |
| Open | 99.95% | 0.00% | 0.00% | 0.05% |
| **Total** | **75.84%** | **0.00%** | **0.00%** | **24.16%** |
| **Locatable Minerals** | **Alternative 4** | | | |
| | **PHMA** | **GHMA** | **OHMA** | **Non-HMA** |
| Existing Withdrawals | 30.74% | 20.90% | 1.80% | 41.39% |
| Recommended Withdrawals | 42.25% | 22.38% | 4.04% | 29.34% |
| Open | 55.25% | 21.08% | 0.66% | 0.17% |
| **Total** | 43.65% | 21.98% | 3.16% | 24.85% |
| **Locatable Minerals** | **Alternative 5** | | | |
| | **PHMA** | **GHMA** | **OHMA** | **Non-HMA** |
| Existing Withdrawals | 32.04% | 14.80% | 1.88% | 51.28% |
| Recommended Withdrawals | 45.22% | 21.08% | 2.77% | 30.93% |
| Open | 80.29% | 12.48% | 5.79% | 1.45% |
| **Total** | 44.71% | 20.23% | 2.76% | 32.30% |

### *III. Fluid Minerals (Oil & Gas)*

**Table 14-19. Fluid Mineral (Oil & Gas) Decisions within HAF 6**

Percentages reflect BLM managed lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Habitat Assessment Framework summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized.

| Approximate Acres of Fluid Minerals (Oil & Gas) Decisions in HAF 6 by Habitat Management Area Type | | | | | |
|---|---|---|---|---|---|
| **Fluid Mineral (Oil & Gas) Decisions** | **Alternative 1** | | | | |
| | **PHMA** | **GHMA** | **OHMA** | **Non-HMA** | **Total** |
| Closed | 1,324,000 | 1,336,000 | 42,000 | 1,584,000 | **4,244,000** |
| Open Major Stipulations | 8,569,000 | 200,000 | 0 | 349,000 | **9,118,000** |
| Open Moderate Stipulations | 0 | 4,256,000 | 0 | 669,000 | **4,925,000** |
| Open Standard Stipulations | 0 | 3,000 | 944,000 | 4,311,000 | **4,314,000** |
| **Total** | **9,893,000** | **5,795,000** | **986,000** | **6,913,000** | **22,601,000** |
| **Fluid Mineral (Oil & Gas) Decisions** | **Alternative 2** | | | | |
| | **PHMA** | **GHMA** | **OHMA** | **Non-HMA** | **Total** |
| Closed | 1,265,000 | 1,280,000 | 21,000 | 1,584,000 | **4,150,000** |
| Open Major Stipulations | 8,013,000 | 202,000 | 0 | 349,000 | **8,564,000** |
| Open Moderate Stipulations | 0 | 4,027,000 | 0 | 672,000 | **4,699,000** |
| Open Standard Stipulations | 100 | 2,600 | 842,000 | 4,311,000 | **5,156,000** |
| **Total** | **9,278,000** | **5,511,000** | **863,000** | **6,916,000** | **22,569,000** |
| **Fluid Mineral (Oil & Gas) Decisions** | **Alternative 3** | | | | |
| | **PHMA** | **GHMA** | **OHMA** | **Non-HMA** | **Total** |
| Closed | 16,983,000 | 0 | 0 | 1,403,000 | **18,385,000** |
| Open Major Stipulations | 979,000 | 0 | 0 | 594,000 | **1,573,000** |
| Open Moderate Stipulations | 233,000 | 0 | 0 | 675,000 | **909,000** |
| Open Standard Stipulations | 568,000 | 0 | 0 | 3,515,000 | **4,083,000** |
| **Total** | **18,763,000** | **0** | **0** | **6,187,000** | **24,950,000** |
| **Fluid Mineral (Oil & Gas) Decisions** | **Alternative 4** | | | | |
| | **PHMA** | **GHMA** | **OHMA** | **Non-HMA** | **Total** |
| Closed | 1,472,000 | 1,265,000 | 61,000 | 1,469,000 | **4,268,000** |
| Open Major Stipulations | 9,199,000 | 345,000 | 32,000 | 350,000 | **9,926,000** |
| Open Moderate Stipulations | 53,000 | 3,013,000 | 1,800 | 530,000 | **3,597,000** |
| Open Standard Stipulations | 176,000 | 2,085,000 | 692,000 | 3,949,000 | **6,902,000** |
| **Total** | **10,900,000** | **6,707,000** | **787,000** | **6,298,000** | **24,693,000** |
| **Fluid Mineral (Oil & Gas) Decisions** | **Alternative 5** | | | | |
| | **PHMA** | **GHMA** | **OHMA** | **Non-HMA** | **Total** |
| Closed | 1,463,000 | 956,000 | 61,000 | 1,801,000 | **4,281,000** |
| Open Major Stipulations | 9,021,000 | 404,000 | 32,000 | 371,000 | **9,828,000** |
| Open Moderate Stipulations | 52,000 | 3,124,000 | 2,000 | 960,000 | **4,137,000** |
| Open Standard Stipulations | 28,000 | 1,457,000 | 536,000 | 4,474,000 | **6,495,000** |
| **Total** | **10,564,000** | **5,941,000** | **631,000** | **7,607,000** | **24,742,000** |
| **Fluid Mineral (Oil & Gas) Decisions** | **Alternative 6** | | | | |
| | **PHMA** | **GHMA** | **OHMA** | **Non-HMA** | **Total** |
| Closed | 1,463,000 | 956,000 | 61,000 | 1,801,000 | **4,281,000** |
| Open Major Stipulations | 9,023,000 | 530,000 | 59,000 | 437,000 | **10,049,000** |
| Open Moderate Stipulations | 52,000 | 2,998,000 | 2,000 | 960,000 | **4,011,000** |
| Open Standard Stipulations | 28,000 | 1,457,000 | 509,000 | 4,408,000 | **6,402,000** |
| **Total** | **10,566,000** | **5,941,000** | **631,000** | **7,607,000** | **24,744,000** |

| Approximate % of Habitat Management Area by Fluid Mineral (Oil & Gas) Decision in HAF 6 | | | | |
|---|---|---|---|---|
| **Fluid Mineral (Oil & Gas) Decisions** | **Alternative 1** | | | |
| | **PHMA** | **GHMA** | **OHMA** | **Non-HMA** |
| Closed | 29.21% | 29.48% | 0.93% | 34.95% |
| Open Major Stipulations | 83.29% | 1.94% | 0.00% | 3.16% |
| Open Moderate Stipulations | 0.00% | 86.50% | 0.00% | 13.50% |
| Open Standard Stipulations | 0.00% | 0.05% | 17.83% | 82.11% |
| **Total** | **39.58%** | **23.11%** | **3.93%** | **27.60%** |
| **Fluid Mineral (Oil & Gas) Decisions** | **Alternative 2** | | | |
| | **PHMA** | **GHMA** | **OHMA** | **Non-HMA** |
| Closed | 28.78% | 29.12% | 0.48% | 36.03% |
| Open NSO | 81.52% | 2.06% | 0.00% | 3.55% |
| Open CSU/TL | 0.00% | 85.81% | 0.00% | 14.19% |
| Open Standard Stipulations | 0.00% | 0.05% | 16.22% | 83.72% |
| **Total** | **38.48%** | **22.86%** | **3.58%** | **28.81%** |
| **Fluid Mineral (Oil & Gas) Decisions** | **Alternative 3** | | | |
| | **PHMA** | **GHMA** | **OHMA** | **Non-HMA** |
| Closed | 92.37% | 0.00% | 0.00% | 7.63% |
| Open Major Stipulations | 62.24% | 0.00% | 0.00% | 37.76% |
| Open Moderate Stipulations | 25.63% | 0.00% | 0.00% | 74.26% |
| Open Standard Stipulations | 13.91% | 0.00% | 0.00% | 86.09% |
| **Total** | **75.20%** | **0.00%** | **0.00%** | **24.80%** |
| **Fluid Mineral (Oil & Gas) Decisions** | **Alternative 4** | | | |
| | **PHMA** | **GHMA** | **OHMA** | **Non-HMA** |
| Closed | 32.48% | 27.91% | 1.35% | 32.41% |
| Open NSO | 83.86% | 3.14% | 0.29% | 3.19% |
| Open CSU/TL | 1.47% | 83.74% | 0.05% | 14.73% |
| Open Standard Stipulations | 2.52% | 29.89% | 9.92% | 56.61% |
| **Total** | **41.80%** | **25.72%** | **3.02%** | **24.15%** |
| **Fluid Mineral (Oil & Gas) Decisions** | **Alternative 5** | | | |
| | **PHMA** | **GHMA** | **OHMA** | **Non-HMA** |
| Closed | 34.17% | 22.33% | 1.42% | 42.07% |
| Open NSO | 91.79% | 4.11% | 0.33% | 3.77% |
| Open CSU/TL | 1.26% | 75.51% | 0.05% | 23.21% |
| Open Standard Stipulations | 0.43% | 22.43% | 8.25% | 68.88% |
| **Total** | 44.48% | 24.36% | 2.79% | 28.37% |

### 14.3.7 HAF Group 7

#### *I. Habitat Management*

**Table 14-20. Habitat Management Areas within HAF 7**

Acres and percentages reflect all lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Habitat Assessment Framework summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized.

| Approximate Acres of HMA in HAF 7 | | | | |
|---|---|---|---|---|
| **Alternative 1** | | | | |
| **PHMA** | **GHMA** | **OHMA** | **Non-HMA** | **Total** |
| 2,492,000 | 1,264,000 | 0 | 925,000 | **4,681,000** |
| **Alternative 2** | | | | |
| **PHMA** | **GHMA** | **OHMA** | **Non-HMA** | **Total** |
| 2,480,000 | 1,264,000 | 0 | 937,000 | **4,681,000** |

| Approximate Acres of HMA in HAF 7 | | | | |
|---|---|---|---|---|
| **Alternative 3** | | | | |
| **PHMA** | **GHMA** | **OHMA** | **Non-HMA** | **Total** |
| 4,989,000 | 0 | 0 | 1,177,000 | **6,166,000** |
| **Alternative 4** | | | | |
| **PHMA** | **GHMA** | **OHMA** | **Non-HMA** | **Total** |
| 2,655,000 | 1,049,000 | 0 | 1,177,000 | **4,881,000** |
| **Alternative 5** | | | | |
| **PHMA** | **GHMA** | **OHMA** | **Non-HMA** | **Total** |
| 2,817,000 | 792,000 | 0 | 1,182,000 | **4,790,000** |
| **Alternative 6** | | | | |
| **PHMA** | **GHMA** | **OHMA** | **Non-HMA** | **Total** |
| 2,817,000 | 792,000 | 0 | 1,182,000 | **4,790,000** |

| Approximate Percent of HAF 1 that is HMA | | | |
|---|---|---|---|
| **Alternative 1** | | | |
| **PHMA** | **GHMA** | **OHMA** | **Non-HMA** |
| 57.83% | 42.17% | 0.00% | 0.00% |
| **Alternative 2** | | | |
| **PHMA** | **GHMA** | **OHMA** | **Non-HMA** |
| 57.77% | 42.23% | 0.00% | 0.00% |
| **Alternative 3** | | | |
| **PHMA** | **GHMA** | **OHMA** | **Non-HMA** |
| 100% | 0.00% | 0.00% | 0.00% |
| **Alternative 4** | | | |
| **PHMA** | **GHMA** | **OHMA** | **Non-HMA** |
| 68.96% | 31.04% | 0.00% | 0.00% |
| **Alternative 5** | | | |
| **PHMA** | **GHMA** | **OHMA** | **Non-HMA** |
| 70.29% | 29.71% | 0.00% | 0.00% |

### *II. Locatable Minerals*

**Table 14-21. Locatable Minerals Decisions within HAF 7**

Acres and percentages reflect BLM managed lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Habitat Assessment Framework summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized.

| Approximate Acres of Locatable Minerals Decisions in HAF 7 by Habitat Management Area Type | | | | | |
|---|---|---|---|---|---|
| **Locatable Minerals** | **Alternative 1** | | | | |
| | **PHMA** | **GHMA** | **OHMA** | **Non-HMA** | **Total** |
| Existing Withdrawals | 550,000 | 203,000 | 0 | 412,000 | **1,165,000** |
| Recommended Withdrawals | 1,472,000 | 0 | 0 | 0 | **1,473,000** |
| Open | 1,183,000 | 1,674,000 | 0 | 2,825,000 | **5,682,000** |
| **Total** | **3,205,000** | **1,876,000** | **0** | **3,238,000** | **8,319,000** |

| Approximate Acres of Locatable Minerals Decisions in HAF 7 by Habitat Management Area Type | | | | | |
|---|---|---|---|---|---|
| **Locatable Minerals** | **Alternative 2** | | | | |
| | **PHMA** | **GHMA** | **OHMA** | **Non-HMA** | **Total** |
| Existing Withdrawals | 550,000 | 203,000 | 0 | 412,000 | **1,165,000** |
| Recommended Withdrawals | 1,460,000 | 0 | 0 | 12,000 | **1,472,000** |
| Open | 1,183,000 | 1,674,000 | 0 | 2,825,000 | **5,682,000** |
| **Total** | **3,193,000** | **1,876,000** | **0** | **3,250,000** | **8,319,000** |
| **Locatable Minerals** | **Alternative 3** | | | | |
| | **PHMA** | **GHMA** | **OHMA** | **Non-HMA** | **Total** |
| Existing Withdrawals | 1,039,000 | 0 | 0 | 441,000 | **1,480,000** |
| Recommended Withdrawals | 5,380,000 | 0 | 0 | 5,300 | **5,386,000** |
| Open | 912,000 | 0 | 0 | 3,327,000 | **4,239,000** |
| **Total** | **7,331,000** | **0** | **0** | **3,774,000** | **11,105,000** |
| **Locatable Minerals** | **Alternative 4** | | | | |
| | **PHMA** | **GHMA** | **OHMA** | **Non-HMA** | **Total** |
| Existing Withdrawals | 554,000 | 157,000 | 0 | 441,000 | **1,152,000** |
| Recommended Withdrawals | 2,430,000 | 936,000 | 0 | 5,300 | **3,372,000** |
| Open | 838,000 | 434,000 | 0 | 3,320,000 | **4,592,000** |
| **Total** | **3,822,000** | **1,527,000** | **0** | **3,766,000** | **9,116,000** |
| **Locatable Minerals** | **Alternative 5** | | | | |
| | **PHMA** | **GHMA** | **OHMA** | **Non-HMA** | **Total** |
| Existing Withdrawals | 601,000 | 134,000 | 0 | 444,000 | **1,179,000** |
| Recommended Withdrawals | 169,000 | 6,000 | 0 | 5,000 | **181,000** |
| Open | 2,728,000 | 1,012,000 | 0 | 3,347,000 | **7,087,000** |
| **Total** | **3,498,000** | **1,152,000** | **0** | **3,797,000** | **8,447,000** |
| **Locatable Minerals** | **Alternative 6** | | | | |
| | **PHMA** | **GHMA** | **OHMA** | **Non-HMA** | **Total** |
| Existing Withdrawals | 601,000 | 134,000 | 0 | 444,000 | **1,179,000** |
| Recommended Withdrawals | 2,728,000 | 1,012,000 | 0 | 3,347,000 | **7,087,000** |
| Open | 169,000 | 6,000 | 0 | 5,000 | **181,000** |
| **Total** | **3,498,000** | **1,152,000** | **0** | **3,797,000** | **8,447,000** |

| Approximate % of Habitat Management Area by Locatable Minerals Decisions[2] within Habitat in HAF 7 | | | | |
|---|---|---|---|---|
| **Locatable Minerals** | **Alternative 1** | | | |
| | **PHMA** | **GHMA** | **OHMA** | **Non-HMA** |
| Existing Withdrawals | 37.16% | 13.72% | 0.00% | 27.84% |
| Recommended Withdrawals | 99.93% | 0.00% | 0.00% | 0.03% |
| Open | 16.47% | 23.31% | 0.00% | 39.34% |
| **Total** | **31.63%** | **18.51%** | **0.00%** | **31.95%** |
| **Locatable Minerals** | **Alternative 2** | | | |
| | **PHMA** | **GHMA** | **OHMA** | **Non-HMA** |
| Existing Withdrawals | 37.16% | 13.72% | 0.00% | 27.84% |
| Recommended Withdrawals | 99.12% | 0.00% | 0.00% | 0.81% |
| Open | 16.47% | 23.31% | 0.00% | 39.34% |
| **Total** | 31.51% | 18.51% | 0.00% | 32.07% |

| Approximate % of Habitat Management Area by Locatable Minerals Decisions[2] within Habitat in HAF 7 | | | | |
|---|---|---|---|---|
| **Locatable Minerals** | **Alternative 3** | | | |
| | **PHMA** | **GHMA** | **OHMA** | **Non-HMA** |
| Existing Withdrawals | 70.20% | 0.00% | 0.00% | 29.80% |
| Recommended Withdrawals | 21.51% | 0.00% | 0.00% | 78.49% |
| Open | 99.89% | 0.00% | 0.00% | 0.10% |
| **Total** | **66.02%** | **0.00%** | **0.00%** | **33.98%** |
| **Locatable Minerals** | **Alternative 4** | | | |
| | **PHMA** | **GHMA** | **OHMA** | **Non-HMA** |
| Existing Withdrawals | 37.43% | 10.61% | 0.00% | 29.80% |
| Recommended Withdrawals | 52.18% | 20.10% | 0.00% | 0.11% |
| Open | 16.99% | 8.80% | 0.00% | 67.33% |
| **Total** | 34.53% | 13.80% | 0.00% | 34.03% |
| **Locatable Minerals** | **Alternative 5** | | | |
| | **PHMA** | **GHMA** | **OHMA** | **Non-HMA** |
| Existing Withdrawals | 50.98% | 33.25% | 0.00% | 110.17% |
| Recommended Withdrawals | 38.49% | 14.28% | 0.00% | 47.23% |
| Open | 93.37% | 3.31% | 0.00% | 2.76% |
| **Total** | 41.41% | 13.64% | 0.00% | 44.95% |

### *III. Fluid Minerals (Oil & Gas)*

**Table 14-22. Fluid Mineral (Oil & Gas) Decisions within HAF 7**

Percentages reflect BLM managed lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Habitat Assessment Framework summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized.

| Approximate Acres of Fluid Minerals (Oil & Gas) Decisions in HAF 7 by Habitat Management Area Type | | | | | |
|---|---|---|---|---|---|
| **Fluid Mineral (Oil & Gas) Decisions** | **Alternative 1** | | | | |
| | **PHMA** | **GHMA** | **OHMA** | **Non-HMA** | **Total** |
| Closed | 872,000 | 459,000 | 0 | 2,162,000 | **3,493,000** |
| Open Major Stipulations | 2,437,000 | 242,000 | 0 | 251,000 | **2,930,000** |
| Open Moderate Stipulations | 17,000 | 1,300,000 | 0 | 208,000 | **1,525,000** |
| Open Standard Stipulations | 1,000 | 0 | 0 | 847,000 | **848,000** |
| **Total** | **3,327,000** | **2,001,000** | **0** | **3,468,000** | **8,796,000** |
| **Fluid Mineral (Oil & Gas) Decisions** | **Alternative 2** | | | | |
| | **PHMA** | **GHMA** | **OHMA** | **Non-HMA** | **Total** |
| Closed | 872,000 | 459,000 | 0 | 2,162,000 | **3,493,000** |
| Open NSO | 2,425,000 | 242,000 | 0 | 263,000 | **2,930,000** |
| Open CSU/TL | 17,000 | 1,300,000 | 0 | 208,000 | **1,526,000** |
| Open Standard Stipulations | 800 | 100 | 0 | 847,000 | **848,000** |
| **Total** | **3,316,000** | **2,001,000** | **0** | **3,480,000** | **8,797,000** |
| **Fluid Mineral (Oil & Gas) Decisions** | **Alternative 3** | | | | |
| | **PHMA** | **GHMA** | **OHMA** | **Non-HMA** | **Total** |
| Closed | 6,424,000 | 0 | 0 | 2,272,000 | **8,696,000** |
| Open Major Stipulations | 170,000 | 0 | 0 | 395,000 | **564,000** |
| Open Moderate Stipulations | 36,000 | 0 | 0 | 375,000 | **412,000** |
| Open Standard Stipulations | 306,000 | 0 | 0 | 776,000 | **1,082,000** |
| **Total** | **6,936,000** | **0** | **0** | **3,818,000** | **10,754,000** |

| Approximate Acres of Fluid Minerals (Oil & Gas) Decisions in HAF 7 by Habitat Management Area Type | | | | | |
|---|---|---|---|---|---|
| **Fluid Mineral (Oil & Gas) Decisions** | **Alternative 4** | | | | |
| | **PHMA** | **GHMA** | **OHMA** | **Non-HMA** | **Total** |
| Closed | 1,066,000 | 212,000 | 0 | 2,261,000 | **3,539,000** |
| Open NSO | 2,490,000 | 150,000 | 0 | 397,000 | **3,037,000** |
| Open CSU/TL | 3,100 | 197,000 | 0 | 375,000 | **575,100** |
| Open Standard Stipulations | 116,000 | 1,169,000 | 0 | 941,000 | **2,226,000** |
| **Total** | **3,676,000** | **1,728,000** | **0** | **3,974,000** | **9,378,000** |
| **Fluid Mineral (Oil & Gas) Decisions** | **Alternative 5** | | | | |
| | **PHMA** | **GHMA** | **OHMA** | **Non-HMA** | **Total** |
| Closed | 1,126,000 | 217,000 | 0 | 2,277,000 | **3,621,000** |
| Open NSO | 2,601,000 | 153,000 | 0 | 398,000 | **3,153,000** |
| Open CSU/TL | 2,000 | 697,000 | 0 | 471,000 | **1,170,000** |
| Open Standard Stipulations | 3,000 | 575,000 | 0 | 829,000 | **1,407,000** |
| **Total** | **3,732,000** | **1,643,000** | **0** | **3,976,000** | **9,351,000** |
| **Fluid Mineral (Oil & Gas) Decisions** | **Alternative 6** | | | | |
| | **PHMA** | **GHMA** | **OHMA** | **Non-HMA** | **Total** |
| Closed | 1,126,000 | 217,000 | 0 | 2,277,000 | **3,621,000** |
| Open NSO | 2,601,000 | 153,000 | 0 | 398,000 | **3,153,000** |
| Open CSU/TL | 2,000 | 697,000 | 0 | 471,000 | **1,170,000** |
| Open Standard Stipulations | 3,000 | 575,000 | 0 | 829,000 | **1,407,000** |
| **Total** | **3,732,000** | **1,643,000** | **0** | **3,976,000** | **9,351,000** |

| Approximate % of Habitat Management Area by Fluid Mineral (Oil & Gas) Decision in HAF 7 | | | | |
|---|---|---|---|---|
| **Fluid Mineral (Oil & Gas) Decisions** | **Alternative 1** | | | |
| | **PHMA** | **GHMA** | **OHMA** | **Non-HMA** |
| Closed | 21.02% | 11.07% | 0.00% | 51.74% |
| Open Major Stipulations | 55.68% | 5.53% | 0.00% | 5.73% |
| Open Moderate Stipulations | 1.11% | 85.19% | 0.00% | 13.63% |
| Open Standard Stipulations | 0.09% | 0.01% | 0.00% | 99.88% |
| **Total** | **30.53%** | **18.35%** | **0.00%** | **31.69%** |
| **Fluid Mineral (Oil & Gas) Decisions** | **Alternative 2** | | | |
| | **PHMA** | **GHMA** | **OHMA** | **Non-HMA** |
| Closed | 21.02% | 11.07% | 0.00% | 51.74% |
| Open NSO | 55.40% | 5.53% | 0.00% | 6.01% |
| Open CSU/TL | 1.11% | 85.19% | 0.00% | 13.63% |
| Open Standard Stipulations | 0.09% | 0.01% | 0.00% | 99.88% |
| **Total** | **30.42%** | **18.35%** | **0.00%** | **31.80%** |
| **Fluid Mineral (Oil & Gas) Decisions** | **Alternative 3** | | | |
| | **PHMA** | **GHMA** | **OHMA** | **Non-HMA** |
| Closed | 73.87% | 0.00% | 0.00% | 26.13% |
| Open Major Stipulations | 30.14% | 0.00% | 0.00% | 70.04% |
| Open Moderate Stipulations | 8.74% | 0.00% | 0.00% | 91.02% |
| Open Standard Stipulations | 28.28% | 0.00% | 0.00% | 71.72% |
| **Total** | **64.50%** | **0.00%** | **0.00%** | **35.50%** |

| Approximate % of Habitat Management Area by Fluid Mineral (Oil & Gas) Decision in HAF 7 | | | | |
|---|---|---|---|---|
| **Fluid Mineral (Oil & Gas) Decisions** | **Alternative 4** | | | |
| | **PHMA** | **GHMA** | **OHMA** | **Non-HMA** |
| Closed | 25.70% | 5.11% | 0.00% | 54.51% |
| Open NSO | 59.68% | 3.60% | 0.00% | 9.52% |
| Open CSU/TL | 0.53% | 33.97% | 0.00% | 64.66% |
| Open Standard Stipulations | 4.99% | 50.32% | 0.00% | 40.51% |
| **Total** | **32.75%** | **15.40%** | **0.00%** | **35.41%** |
| **Fluid Mineral (Oil & Gas) Decisions** | **Alternative 5** | | | |
| | **PHMA** | **GHMA** | **OHMA** | **Non-HMA** |
| Closed | 31.10% | 5.99% | 0.00% | 62.88% |
| Open NSO | 82.49% | 4.85% | 0.00% | 12.62% |
| Open CSU/TL | 0.17% | 59.57% | 0.00% | 40.26% |
| Open Standard Stipulations | 0.21% | 40.87% | 0.00% | 58.92% |
| **Total** | 45.47% | 24.88% | 0.00% | 29.65% |

### 14.3.8 HAF Group 8

***I. Habitat Management***

**Table 14-23. Habitat Management Areas within HAF 8**

Acres and percentages reflect all lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Habitat Assessment Framework summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized.

| Approximate Acres of HMA in HAF 8 | | | | |
|---|---|---|---|---|
| **Alternative 1** | | | | |
| **PHMA** | **GHMA** | **OHMA** | **Non-HMA** | **Total** |
| 4,136,000 | 4,005,000 | 471,000 | 2,814,000 | **11,427,000** |
| **Alternative 2** | | | | |
| **PHMA** | **GHMA** | **OHMA** | **Non-HMA** | **Total** |
| 4,109,000 | 4,000,000 | 479,000 | 2,832,000 | **11,420,000** |
| **Alternative 3** | | | | |
| **PHMA** | **GHMA** | **OHMA** | **Non-HMA** | **Total** |
| 9,685,000 | 0 | 0 | 1,744,000 | **11,429,000** |
| **Alternative 4** | | | | |
| **PHMA** | **GHMA** | **OHMA** | **Non-HMA** | **Total** |
| 4,922,000 | 4,530,000 | 233,000 | 1,744,000 | **11,196,000** |
| **Alternative 5** | | | | |
| **PHMA** | **GHMA** | **OHMA** | **Non-HMA** | **Total** |
| 4,844,000 | 3,352,000 | 117,000 | 3,107,000 | **11,419,000** |
| **Alternative 6** | | | | |
| **PHMA** | **GHMA** | **OHMA** | **Non-HMA** | **Total** |
| 4,844,000 | 3,352,000 | 117,000 | 3,107,000 | **11,419,000** |

| Approximate Percent of HAF 1 that is HMA | | | |
|---|---|---|---|
| **Alternative 1** | | | |
| **PHMA** | **GHMA** | **OHMA** | **Non-HMA** |
| 43.19% | 45.97% | 10.84% | 0.00% |
| **Alternative 2** | | | |
| **PHMA** | **GHMA** | **OHMA** | **Non-HMA** |
| 45.61% | 46.15% | 8.24% | 0.00% |

| Approximate Percent of HAF 1 that is HMA | | | |
|---|---|---|---|
| **Alternative 3** | | | |
| **PHMA** | **GHMA** | **OHMA** | **Non-HMA** |
| 100% | 0.00% | 0.00% | 0.00% |
| **Alternative 4** | | | |
| **PHMA** | **GHMA** | **OHMA** | **Non-HMA** |
| 46.17% | 49.50% | 4.33% | 0.00% |
| **Alternative 5** | | | |
| **PHMA** | **GHMA** | **OHMA** | **Non-HMA** |
| 55.84% | 41.80% | 2.36% | 0.00% |

### *II. Locatable Minerals*

**Table 14-24. Locatable Minerals Decisions within HAF 8**

Acres and percentages reflect BLM managed lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Habitat Assessment Framework summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized.

| Approximate Acres of Locatable Minerals Decisions in HAF 8 by Habitat Management Area Type | | | | | |
|---|---|---|---|---|---|
| **Locatable Minerals** | **Alternative 1** | | | | |
| | **PHMA** | **GHMA** | **OHMA** | **Non-HMA** | **Total** |
| Existing Withdrawals | 612,000 | 329,000 | 64,000 | 375,000 | **1,380,000** |
| Recommended Withdrawals | 127,000 | 4,000 | 0 | 1,000 | **132,000** |
| Open | 3,713,000 | 3,797,000 | 409,000 | 2,283,000 | **10,201,000** |
| **Total** | **4,452,000** | **4,130,000** | **472,000** | **2,659,000** | **11,713,000** |
| **Locatable Minerals** | **Alternative 2** | | | | |
| | **PHMA** | **GHMA** | **OHMA** | **Non-HMA** | **Total** |
| Existing Withdrawals | 589,000 | 352,000 | 64,000 | 376,000 | **1,380,000** |
| Recommended Withdrawals | 12,000 | 4,400 | 0 | 0 | **16,000** |
| Open | 3,800,000 | 3,790,000 | 414,000 | 2,300,000 | **10,303,000** |
| **Total** | **4,400,000** | **4,146,000** | **477,000** | **2,675,000** | **11,699,000** |
| **Locatable Minerals** | **Alternative 3** | | | | |
| | **PHMA** | **GHMA** | **OHMA** | **Non-HMA** | **Total** |
| Existing Withdrawals | 1,096,000 | 0 | 0 | 283,000 | **1,379,000** |
| Recommended Withdrawals | 9,042,000 | 0 | 0 | 200 | **9,042,000** |
| Open | 7,200 | 0 | 0 | 1,304,000 | **1,311,000** |
| **Total** | **10,145,000** | **0** | **0** | **1,588,000** | **11,733,000** |
| **Locatable Minerals** | **Alternative 4** | | | | |
| | **PHMA** | **GHMA** | **OHMA** | **Non-HMA** | **Total** |
| Existing Withdrawals | 748,000 | 327,000 | 21,000 | 284,000 | **1,380,000** |
| Recommended Withdrawals | 13,000 | 3,300 | 0 | 100 | **16,000** |
| Open | 4,386,000 | 4,127,000 | 220,000 | 1,308,000 | **10,042,000** |
| **Total** | **5,147,000** | **4,458,000** | **241,000** | **1,592,000** | **11,438,000** |

| Approximate Acres of Locatable Minerals Decisions in HAF 8 by Habitat Management Area Type | | | | | |
|---|---|---|---|---|---|
| **Locatable Minerals** | **Alternative 5** | | | | |
| | **PHMA** | **GHMA** | **OHMA** | **Non-HMA** | **Total** |
| Existing Withdrawals | 748,000 | 199,000 | 14,000 | 418,000 | **1,380,000** |
| Recommended Withdrawals | 13,000 | 1,000 | 0 | 2,000 | **16,000** |
| Open | 4,309,000 | 3,073,000 | 103,000 | 2,545,000 | **10,029,000** |
| **Total** | **5,069,000** | **3,273,000** | **117,000** | **2,965,000** | **11,426,000** |
| **Locatable Minerals** | **Alternative 5** | | | | |
| | **PHMA** | **GHMA** | **OHMA** | **Non-HMA** | **Total** |
| Existing Withdrawals | 748,000 | 199,000 | 14,000 | 418,000 | **1,380,000** |
| Recommended Withdrawals | 13,000 | 1,100 | 0 | 2,400 | **16,000** |
| Open | 4,309,000 | 3,073,000 | 103,000 | 2,545,000 | **10,029,000** |
| **Total** | **5,069,000** | **3,273,000** | **117,000** | **2,965,000** | **11,426,000** |

| Approximate % of Habitat Management Area by Locatable Minerals Decisions[2] within Habitat in HAF 8 | | | | |
|---|---|---|---|---|
| **Locatable Minerals** | **Alternative 1** | | | |
| | **PHMA** | **GHMA** | **OHMA** | **Non-HMA** |
| Existing Withdrawals | 44.35% | 23.84% | 4.64% | 27.17% |
| Recommended Withdrawals | 99.49% | 0.45% | 0.00% | 0.06% |
| Open | 30.69% | 40.56% | 4.37% | 24.39% |
| **Total** | **38.01%** | **35.26%** | **4.03%** | **22.70%** |
| **Locatable Minerals** | **Alternative 2** | | | |
| | **PHMA** | **GHMA** | **OHMA** | **Non-HMA** |
| Existing Withdrawals | 42.68% | 25.51% | 4.64% | 27.25% |
| Recommended Withdrawals | 75.00% | 25.00% | 0.00% | 0.00% |
| Open | 36.88% | 36.79% | 4.02% | 22.32% |
| **Total** | **37.62%** | **35.44%** | **4.08%** | **22.86%** |
| **Locatable Minerals** | **Alternative 3** | | | |
| | **PHMA** | **GHMA** | **OHMA** | **Non-HMA** |
| Existing Withdrawals | 79.48% | 0.00% | 0.00% | 20.52% |
| Recommended Withdrawals | 0.55% | 0.00% | 0.00% | 99.47% |
| Open | 100.00% | 0.00% | 0.00% | 0.00% |
| **Total** | **86.47%** | **0.00%** | **0.00%** | **13.53%** |
| **Locatable Minerals** | **Alternative 4** | | | |
| | **PHMA** | **GHMA** | **OHMA** | **Non-HMA** |
| Existing Withdrawals | 54.20% | 23.70% | 1.52% | 20.58% |
| Recommended Withdrawals | 81.25% | 20.63% | 0.00% | 0.63% |
| Open | 43.68% | 41.10% | 2.19% | 13.03% |
| **Total** | **45.00%** | **38.98%** | **2.11%** | **13.92%** |
| **Locatable Minerals** | **Alternative 5** | | | |
| | **PHMA** | **GHMA** | **OHMA** | **Non-HMA** |
| Existing Withdrawals | 54.20% | 14.42% | 1.01% | 30.29% |
| Recommended Withdrawals | 42.97% | 30.64% | 1.03% | 25.38% |
| Open | 81.25% | 6.25% | 0.00% | 12.50% |
| **Total** | 44.36% | 28.65% | 1.02% | 25.95% |

### *III. Fluid Minerals (Oil & Gas)*

**Table 14-25. Fluid Mineral (Oil & Gas) Decisions within HAF 8**

Percentages reflect BLM managed lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Habitat Assessment Framework summary purposes only. They represent data available at the time of consolidation and may be revised as Plans are finalized.

| Approximate Acres of Fluid Minerals (Oil & Gas) Decisions in HAF 8 by Habitat Management Area Type | | | | | |
|---|---|---|---|---|---|
| **Fluid Mineral (Oil & Gas) Decisions** | **Alternative 1** | | | | |
| | **PHMA** | **GHMA** | **OHMA** | **Non-HMA** | **Total** |
| Closed | 1,395,000 | 750,000 | 144,000 | 660,000 | **2,805,000** |
| Open Major Stipulations | 3,065,000 | 332,000 | 0 | 143,000 | **3,540,000** |
| Open Moderate Stipulations | 0 | 3,049,000 | 0 | 324,000 | **3,373,000** |
| Open Standard Stipulations | 0 | 0 | 330,000 | 1,723,000 | **1,723,000** |
| **Total** | **4,460,000** | **4,131,000** | **474,000** | **2,850,000** | **11,441,000** |
| **Fluid Mineral (Oil & Gas) Decisions** | **Alternative 2** | | | | |
| | **PHMA** | **GHMA** | **OHMA** | **Non-HMA** | **Total** |
| Closed | 1,370,000 | 774,000 | 139,000 | 663,000 | **2,946,000** |
| Open NSO | 3,056,000 | 360,000 | 0 | 143,000 | **3,560,000** |
| Open CSU/TL | 0 | 3,016,000 | 0 | 324,000 | **3,340,000** |
| Open Standard Stipulations | 100 | 100 | 340,000 | 1,737,000 | **2,077,000** |
| **Total** | **4,427,000** | **4,150,000** | **479,000** | **2,867,000** | **11,922,000** |
| **Fluid Mineral (Oil & Gas) Decisions** | **Alternative 3** | | | | |
| | **PHMA** | **GHMA** | **OHMA** | **Non-HMA** | **Total** |
| Closed | 10,132,000 | 0 | 0 | 401,000 | **10,533,000** |
| Open Major Stipulations | 74,000 | 0 | 0 | 135,000 | **209,000** |
| Open Moderate Stipulations | 7,100 | 0 | 0 | 243,000 | **250,000** |
| Open Standard Stipulations | 19,000 | 0 | 0 | 939,000 | **959,000** |
| **Total** | 10,233,000 | **0** | **0** | **1,718,000** | **11,951,000** |
| **Fluid Mineral (Oil & Gas) Decisions** | **Alternative 4** | | | | |
| | **PHMA** | **GHMA** | **OHMA** | **Non-HMA** | **Total** |
| Closed | 1,827,000 | 672,000 | 48,000 | 402,000 | **2,952,000** |
| Open NSO | 3,510,000 | 429,000 | 0 | 129,000 | **4,068,000** |
| Open CSU/TL | 0 | 3,489,000 | 0 | 200,000 | **3,693,000** |
| Open Standard Stipulations | 2,700 | 68,000 | 194,000 | 988,000 | **1,257,000** |
| **Total** | **5,340,000** | **4,658,000** | **242,000** | **1,719,000** | **11,970,000** |
| **Fluid Mineral (Oil & Gas) Decisions** | **Alternative 5** | | | | |
| | **PHMA** | **GHMA** | **OHMA** | **Non-HMA** | **Total** |
| Closed | 1,815,000 | 460,000 | 36,000 | 635,000 | **2,946,000** |
| Open NSO | 3,444,000 | 428,000 | 0 | 129,000 | **4,002,000** |
| Open CSU/TL | 0 | 2,480,000 | 0 | 774,000 | **3,253,000** |
| Open Standard Stipulations | 3,000 | 6,000 | 82,000 | 1,654,000 | **1,745,000** |
| **Total** | **5,262,000** | **3,375,000** | **118,000** | **3,191,000** | **11,946,000** |
| **Fluid Mineral (Oil & Gas) Decisions** | **Alternative 6** | | | | |
| | **PHMA** | **GHMA** | **OHMA** | **Non-HMA** | **Total** |
| Closed | 1,815,000 | 460,000 | 36,000 | 635,000 | **2,946,000** |
| Open NSO | 3,444,000 | 530,000 | 0 | 149,000 | **4,123,000** |
| Open CSU/TL | 0 | 2,378,000 | 0 | 774,000 | **3,152,000** |
| Open Standard Stipulations | 3,000 | 6,000 | 82,000 | 1,634,000 | **1,725,000** |
| **Total** | **5,262,000** | **3,375,000** | **118,000** | **3,191,000** | **11,946,000** |

| Approximate % of Habitat Management Area by Fluid Mineral (Oil & Gas) Decision in HAF 8 | | | | |
|---|---|---|---|---|
| **Fluid Mineral (Oil & Gas) Decisions** | **Alternative 1** | | | |
| | **PHMA** | **GHMA** | **OHMA** | **Non-HMA** |
| Closed | 47.30% | 25.43% | 4.88% | 22.38% |
| Open Major Stipulations | 86.58% | 9.38% | 0.00% | 4.04% |
| Open Moderate Stipulations | 0.00% | 90.39% | 0.00% | 9.61% |
| Open Standard Stipulations | 0.00% | 0.01% | 16.07% | 83.93% |
| **Total** | **37.43%** | **34.67%** | **3.98%** | **23.92%** |
| **Fluid Mineral (Oil & Gas) Decisions** | **Alternative 2** | | | |
| | **PHMA** | **GHMA** | **OHMA** | **Non-HMA** |
| Closed | 46.50% | 26.27% | 4.72% | 22.51% |
| Open NSO | 85.84% | 10.11% | 0.00% | 4.02% |
| Open CSU/TL | 0.00% | 90.30% | 0.00% | 9.70% |
| Open Standard Stipulations | 0.00% | 0.00% | 16.37% | 83.63% |
| **Total** | **37.13%** | **34.81%** | **4.02%** | **24.05%** |
| **Fluid Mineral (Oil & Gas) Decisions** | **Alternative 3** | | | |
| | **PHMA** | **GHMA** | **OHMA** | **Non-HMA** |
| Closed | 96.19% | 0.00% | 0.00% | 3.81% |
| Open Major Stipulations | 35.41% | 0.00% | 0.00% | 64.59% |
| Open Moderate Stipulations | 2.80% | 0.00% | 0.00% | 97.20% |
| Open Standard Stipulations | 1.98% | 0.00% | 0.00% | 97.91% |
| **Total** | **85.62%** | **0.00%** | **0.00%** | **14.38%** |
| **Fluid Mineral (Oil & Gas) Decisions** | **Alternative 4** | | | |
| | **PHMA** | **GHMA** | **OHMA** | **Non-HMA** |
| Closed | 61.95% | 22.79% | 1.63% | 13.63% |
| Open NSO | 86.28% | 10.55% | 0.00% | 3.17% |
| Open CSU/TL | 0.00% | 94.58% | 0.00% | 5.42% |
| Open Standard Stipulations | 0.22% | 5.43% | 15.48% | 78.85% |
| **Total** | **44.65%** | **38.95%** | **2.02%** | **14.37%** |
| **Fluid Mineral (Oil & Gas) Decisions** | **Alternative 5** | | | |
| | **PHMA** | **GHMA** | **OHMA** | **Non-HMA** |
| Closed | 61.61% | 15.61% | 1.22% | **21.55%** |
| Open NSO | 86.06% | 10.69% | 0.00% | **3.22%** |
| Open CSU/TL | 0.00% | 76.24% | 0.00% | **23.79%** |
| Open Standard Stipulations | 0.17% | 0.34% | 4.70% | **94.79%** |
| **Total** | **38.30%** | **32.39%** | **0.91%** | **28.40%** |

# Appendix 15

## Livestock Grazing Management Best Management Practices and Design Features and Supplemental Information

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# Appendix 15. Livestock Grazing Management Best Management Practices and Design Features and Supplemental Information

## 15.1 Livestock Grazing Management Best Management Practices and Design Features

The following measures best management practices (BMP) provide a list of strategies, practices, or design features to be considered during implementation of the RMP. These measures are not required in every instance but are useful to aid in proper livestock grazing management in GRSG habitats. The applicability and overall effectiveness of each BMP cannot be fully assessed until the project level when the project location and design are known. Because of site-specific circumstances, some BMPs may not apply to some projects (e.g., a resource is not present on a given site) and/or may require slight variations. For example, variations could be required for the following reasons:

- A specific BMP is documented to not be applicable to the site-specific conditions of the project/activity. Economic considerations, such as increased costs, do not necessarily require that an RDF be varied or rendered inapplicable.
- An alternative BMP, a state-implemented conservation measure, or plan-level protection is determined to provide equal or better protection for GRSG or its habitat.
- A specific BMP will not avoid or minimize impacts to GRSG or its habitat.

### 15.1.1 Coordination

- 43 CFR 4100 regulations direct BLM to consult, cooperate and coordinate with affected grazing permittees, the state having lands or responsible for managing resources within the area, and the interested public when engaging in program work such as changes in permitted use, Allotment Management Plans, Range Improvements, issuance and/or modification of a grazing authorization. The BLM coordinates with Federal, State, county, Indian tribal and local governmental entities, institutions, organizations, corporations, associations, and individuals when authorizing grazing on BLM lands. In GRSG habitat management areas, these communication efforts should include coordination on how livestock grazing practices could be managed across both BLM-administered lands and non-BLM-administered lands, in partnership with interested permittees and lessees, to improve GRSG habitat conditions.

### 15.1.2 Best Management Practices for Livestock Grazing Management

- Set priorities for grazing management activities (e.g., monitoring, authorization renewals, field checks, etc.) following direction in agency policy, including IM 2018-024 as amended or superseded. When considering competing priorities in GRSG habitat, considerations should include level of management priority (priority vs general habitat management areas) and focusing on areas where current livestock grazing management is a significant causal factor to not meeting or making significant progress towards meeting the special status species (SSS) land health standard, and those containing riparian areas, including wet meadows. Other criteria for prioritization can include the need to respond to urgent natural resource concerns (e.g., fire) and legal obligations.

- When current livestock management practices are determined to not be meeting or making progress towards meeting the SSS land health standard (following appropriate consultation, cooperation and coordination, consistent with BLM Handbook H-4180-1), implement changes in grazing management through grazing authorization modifications, or allotment management plan implementation. Potential modifications, either within the existing terms and conditions or considered as additional alternatives in grazing authorization NEPA analysis as a threshold/response, (not presented in any priority order) could include, but are not limited to, changes in:
  - Season or timing of use;
  - Numbers of livestock;
  - Distribution of livestock use;
  - Duration and/or level of use;
  - Kind of livestock (e.g., cattle, sheep, horses, or goats) (Briske et al. 2011); and
  - Range improvements.
- Locate supplements (salt, mineral, protein, etc.) away from water sources, meadows, riparian areas, swales, and GRSG leks in locations that increase livestock distribution unless effective control of livestock to avoid detrimental impairment of any riparian area or GRSG habitats can be ensured.
- When using salt or mineral supplements, place them outside intact sagebrush stands to reduce impacts to GRSG breeding habitat. For example, place supplements in existing disturbed sites, areas with reduced sagebrush cover, to reduce impacts on GRSG breeding habitat; where feasible use salts or mineral supplements to improve management of livestock for the benefit of GRSG habitat.
- During the lekking season, encourage minimal vehicle use and maintenance activities associated with livestock management during lekking hours (before 9 am and after 6 pm) within 0.6 miles of a lek.
- To decrease attracting predators or decreasing water quality, whenever found and wherever possible, remove dead livestock from public land and dispose of in ways that do not shift the impact to non-public land. If it is not possible to entirely remove livestock carcasses, they should, at a minimum, be removed from riparian areas and water sources.
- In PHMA, IHMA (in Idaho), and GHMA, areas that have received vegetation treatments should be rested from livestock grazing until resource monitoring data verifies the treatment objectives specific to the purposes of the treatment are being met and an appropriate grazing regime has been developed. Examples of vegetation treatments include seedings, hazardous fuels reduction treatments, emergency stabilization and rehabilitation efforts.
- Avoid disturbing lekking and roosting GRSG from human, guard animal, and sheep activities by trailing, overnighting, watering, and bedding sheep on public lands at least 0.6 miles from occupied leks (dates of lek activity determined locally, approximately March 15–May 1 in lower elevations and March 25–May 15 in higher elevations).
- When trailing livestock during the lekking or nesting season, use roads or existing trails, to the extent possible.
- When available, use GRSG habitat use-pattern mapping or habitat monitoring to strategically adjust livestock distribution to benefit occupied GRSG breeding habitat, include herding, salting, and water-source management (e.g., turning troughs/pipelines on/off and extending pipelines/moving troughs) in grazing programs.
- Ensure that permittees are informed of management and movement requirements related to avoiding recent burns, habitat rehabilitation, or other restoration sites.
- Identify and, when feasible, establish strategically located forage reserves, focusing on areas where restoration to GRSG habitat is unlikely or lower priority habitat restoration areas.

### 15.1.3 Design Features for Range Developments

- When installing new range improvement projects in PHMA/IHMA, avoid construction during the applicable seasonal use periods associated with lekking, nesting, or brood rearing seasonal habitats (March 1 – July 15, or as identified for local variability in coordination with the state wildlife agency or other appropriate agency with management expertise and authority).
- Use temporary range infrastructure, such as troughs, fences, and supplements, where feasible and appropriate, to meet management objectives.
- Install shutoff valves at spring sources and troughs. Unless needed for wildlife habitat or water, ensure shutoff valves are closed and troughs are drained when livestock are not utilizing the pasture, as consistent with the water laws of the State within which the land is located.
- Install lids on spring collection boxes.
- Limit structures taller than adjacent vegetation and existing structures that could provide perching opportunities for avian predators. Where they are necessary, place them near taller natural features or partially/entirely bury them if possible.
- Install floats in troughs to prevent overflow and keep water at spring sources, as consistent with the water laws of the State within which the land is located.
- Ensure that new and existing livestock troughs and open water storage tanks are fitted with ramps to facilitate the use of and escape from troughs by GRSG and other wildlife; do not use unsecured, unstable, or ineffective items such as floating boards or similar objects.
- Locate troughs outside meadows, swales, and riparian areas.
- Design new water developments to maintain hydrologic function of spring sources, water courses and associated riparian habitat, as consistent with the water laws of the State within which the land is located.
- Consider virtual fencing opportunities, as appropriate.
- To minimize risk of noxious or invasive plant spread, require all heavy equipment used in construction of range improvements to be thoroughly cleaned of all soil and plant material prior to entering public lands.
- To minimize livestock concentration impacts on nesting and early brood rearing sage-grouse, locate new livestock handling facilities (such as corrals) away from active leks and outside of nesting habitat at least by 1.2 miles (Manier et al., 2014).
- Identify and close roads and trails that are not needed for range development maintenance.
- Where livestock handling and/or watering facilities result in lowering the downstream water table and dewatering of wet meadows or mesic habitat, relocate or remove these facilities when doing so will halt or reverse the dewatering, consistent with applicable laws.
- Design new and maintain existing water projects to avoid standing pools of shallow water that could spread West Nile Virus.

### 15.1.4 Drought Response

- When completing a fully processed grazing authorization in GRSG habitat, incorporate strategies for livestock management during drought conditions.
- During drought conditions use a recognized drought indicator, such as the Drought Monitor, Vegetation Drought Response Index, or Palmer Drought Severity Index, to determine when abnormally dry or drought conditions are developing, present, or easing. When such conditions are developing or present:
  - Conduct pre-season assessments prior to livestock turn out.

  - Monitor vegetation conditions during authorized livestock use periods to determine need for early removal and/or other changes to meet seasonal RMP objectives.
- During drought periods, prioritize evaluating effects of drought in PHMA relative to GRSG needs for food and cover (including riparian areas); ensure that post-drought management allows for vegetation recovery, based on ecological potential, that meets GRSG needs in priority GRSG habitat areas. Where ESDs or STMs are lacking for an area, the best available information to achieve the GRSG needs should be used.
- If livestock grazing is deferred due to drought, reevaluate vegetation and GRSG habitat indicators that measure GRSG habitat prior to reauthorization of grazing.

### 15.1.5 From the BLM National Sage-Grouse Habitat Conservation Strategy of 2004

- Use prescriptive livestock grazing, where appropriate, to reduce annual grass production and the spread of wildfire into sagebrush communities. Timing of grazing and effects on residual native plants need to be carefully evaluated.
- Use grazing practices that promote the growth and persistence of native shrubs, grasses and forbs needed by sage-grouse for seasonal food and concealment. Grazing practices include changing season of use, numbers of livestock, grazing intensity, distribution of livestock use, and type of livestock (sheep, cattle or horses). Altering season of grazing may help to favor perennial plants in areas where native perennials and cheatgrass occur together in the plant community. Vegetation structure (height) should be managed so as to provide adequate cover for sage-grouse during the nesting period.
- Coordinate with state wildlife agencies where concentrations of grazing wildlife detrimentally affects sage-grouse habitat quality.
- Maintain seeps, springs, wet meadows, and riparian vegetation in a functional and diverse condition for young sage-grouse and other species that depend on forbs and insects associated with these areas. Consider fencing if vegetation associated with these wet areas cannot be maintained with current livestock, wildlife or wild horse and burro use and the impacts of the fence are outweighed by the improved habitat quality.
- Where other grazing management options are not achieving, or cannot achieve, the desired objectives, a short-term option may be livestock exclusion. Temporary exclusion can provide the plant community the opportunity to progress toward a point where grazing can again be reintroduced once desired conditions are reached. Removing livestock may not reverse the condition of severely altered habitats and often must be combined with reseeding and other rehabilitation methods to restore appropriate sagebrush habitat.

### 15.1.6 Nevada Specific BMPs

If results from the GRSG Habitat Assessment Framework indicate that GRSG habitat benchmarks are found to be un-suitable, and the land health evaluation results in a finding that Standards are not met or progress made towards meeting, and the determination concludes that current livestock grazing is a causal factor, and until appropriate modifications are incorporated through the grazing authorization renewal process, the following management strategies could be considered that may include, but are not limited to, the following, with considerations to site specific seasonal date restrictions:

- Provide periods of rest or deferment during critical growth periods of key vegetation species
- Manage grazing duration and intensity to allow plant growth sufficient to meet or make progress towards meeting GRSG habitat objectives (**Table 2-2**)

- Employ herd management techniques to minimize impacts of livestock on breeding, nesting, and brood-rearing habitat during the breeding season (March 1 to June 30; Lek—March 1 to May 15, and Nesting—April 1 to June 30)
- Consider any temporary projects that can avoid, minimize, or mitigate livestock impacts (e.g., temporary fencing or temporary water hauling locations;
- To prevent impacts to nesting GRSG, work with permittees to avoid concentrated turn-out locations for livestock within 4 miles of active and pending leks from March 1 to June 30 with consideration of quality of site-specific habitat, current bird activity, probability of sage-grouse nesting within the radius area, and duration intensity of the use.
- Avoid domestic sheep use and bedding areas and herder camps within 2 miles of active and pending leks from March 1 to June 30
- Utilizing land features and roads on maps provided to the permittee to help delineate livestock use avoidance areas

## 15.2 SUPPLEMENTAL INFORMATION: ACTION ALTERNATIVES ADDRESSING LIVESTOCK GRAZING

The USFWS 2013 Greater Sage-grouse (Centrocercus urophasianus) Conservation Objectives: Final Report (COT Report) notes that "livestock grazing is the most widespread type of land use across the sagebrush biome and almost all sagebrush areas are managed for livestock grazing" (USFWS 2013). The COT Report also includes tables that characterize threats to GRSG by population throughout its range (see COT Report, Table 2, pages 16 through 29). One of the threats assessed included grazing, with the report noting the threats from improper livestock grazing varied by population from "present and widespread," to "present but localized," and "not known to be present."

To address the threat of improper livestock grazing, the COT Report recommended a conservation objective to "conduct grazing management…in a manner consistent with local ecological conditions that maintains or restores healthy sagebrush shrub and native perennial grass and forb communities and conserves the essential habitat components for sage-grouse (e.g. shrub cover, nesting cover)" (COT Report, page 45). It goes on to note that "areas which do not currently meet this standard should be managed to restore these components." It concludes that "livestock…numbers must be managed at levels that allow native sagebrush vegetative communities to minimally achieve Proper Functioning Conditions (PFC; for riparian areas) or Rangeland Health Standards (RHS; uplands). The specific management (e.g., type of livestock, numbers, seasons, rotation, etc.) will depend on the local ecological factors and current condition of land health. The COT Report also recommends a conservation objective for range management structures ("avoid or reduce the impact of range management structures on sage-grouse"), and fences ("minimize the impact of fences on sage-grouse populations").

As part of this planning effort livestock/range management actions were reviewed to determine which specifically address COT objectives. The prior GRSG plan amendment efforts included several management actions in the livestock grazing section that are addressed in existing agency regulations, policies, or that are duplicative of management actions in other sections of the ARMPA or the original RMPs. Since these actions would continue to be implemented whether they appear in the RMP, they are being considered for removal in Alternatives 4, 5, and 6. Further, most of these actions address management on livestock grazing in general, rather than focusing on conducting livestock grazing in a manner that reduces the potential for improper livestock grazing. Finally, some of the management actions did not contain specific direction, but provided a series of suggestions of what kind of activities or adjustments may be considered during future grazing

management decisions, with specific decisions deferred to the implementation level. Alternatives 4, 5, and 6 consolidate the livestock grazing decisions to focus on conducting livestock grazing in a manner that would reduce the potential for improper livestock grazing in GRSG habitat and relocate or remove actions that are not required to be in the RMP to implement.

The following table compares livestock grazing management actions from each of the BLM amendment efforts from 2015, with changes made in 2019 (if applicable) displayed in strike-out (for deletions) or underlines (for additions). The right-hand column identifies a summary statement for the row, with similar concepts between the states grouped. The column also identifies whether the concepts in the row are addressed by management in Alternatives 4 and 5 in Chapter 2, whether the concept was retained as a livestock grazing best management practices, or if it is proposed to not be carried forward in this planning process.

| 2019 Amendments/Revisions | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Colorado** | **Idaho** | **Montana/Dakotas** | **Nevada/California** | **Oregon** | **Utah** | **Wyoming** | **NOTES** |
| **Objective RM-1:** GRSG objectives and well-managed livestock operations are compatible because forage availability for livestock and hiding cover for GRSG are both dependent on healthy plant communities. Agreements with partners that promote sustainable GRSG populations concurrent with sustainable ranch operations offer long-term stability. In the context of sustainable range operations, manage the range program to: 1) maintain or enhance vigorous and productive plant communities; 2) maintain residual herbaceous cover to reduce predation during GRSG nesting and early brood-rearing; 3) avoid direct adverse impacts to GRSG-associated range project infrastructure; and 4) employ grazing management strategies that avoid concentrating animals on key GRSG habitats during key seasons. | — | **North Dakota Management Direction LG-1.3:** Within PHMA, incorporate GRSG habitat objectives and management considerations into all BLM grazing allotments through AMP or permit renewals. Develop standards with State of North Dakota and USFWS. | **Objective LG 1:** Manage permitted livestock grazing to maintain and/or enhance PHMAs and GHMAs to meet or make progress towards meeting all GRSG life-cycle requirements and habitat objectives (**Table 2-2**), based on site potential. | **Objective LG 1:** Manage livestock grazing to maintain or improve Greater Sage-grouse habitat by achieving Standards for Rangeland Health (SRH). | — | — | Summary statement:<br>• Manage grazing to achieve GRSG habitat/objectives and/or land health standard<br>• Avoid direct adverse GRSG impacts from range infrastructure<br><br>Applicability for RMPs?<br>There is a regulatory requirement to achieve land health standards (4180), and it is a common objective/desired condition for public lands. In this effort, we want to focus on an objective specific to maintaining/improving GRSG habitat. This concept is included in chapter 2 in Objective RM-1. |

| 2019 Amendments/Revisions | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Colorado** | **Idaho** | **Montana/Dakotas** | **Nevada/California** | **Oregon** | **Utah** | **Wyoming** | **NOTES** |
| — | **MD LG 1**: Maintain existing areas designated as available or unavailable for livestock grazing. Existing active AUMs for livestock grazing within the planning area will not be changed at the broad scale, though the number of AUMs available on an allotment may be adjusted based on site-specific conditions to meet management objectives during term permit renewals, AMP development, or other appropriate implementation planning. Additionally, temporary adjustments can be made annually to livestock numbers, the number of AUMs, and season of use in accordance with applicable regulations. | **Dillon MD LG 1**: Maintain existing areas designated as available or unavailable for livestock grazing. Existing active AUMs for livestock grazing within the planning area will not be changed at the broad scale, though the number of AUMs available on an allotment may be adjusted based on site-specific conditions to meet management objectives during term permit renewals, AMP development, or other appropriate implementation planning. Additionally, temporary adjustments can be made annually to livestock numbers, the number of AUMs, and season of use in accordance with applicable regulations.<br>**Lewistown Action LG-1.2:** The area will remain available for livestock grazing. | — | **Objective LG 2:** On BLM-managed lands, 12,~~083~~105,~~622~~581 acres will continue to be available for livestock grazing in Greater Sage-grouse habitat. Table 2-6 is no longer applicable and is therefore deleted~~In key RNAs, 22,765 acres will be unavailable to livestock grazing. See Table 2-6, Key ACECs and RNAs for ARMPA.~~<br><br>MD LG 1 is deleted.<br>Livestock grazing management in the 13 key RNAs returns to being governed by applicable district RMPs as amended by the 2015 Oregon Greater Sage-Grouse ROD/ARMPA goals, objectives, and management decisions. ~~**MD LG 1:** All or portions of key RNAs will be unavailable to grazing (Table 2-6). Determine whether to remove fences, corrals, or water storage facilities (e.g. reservoirs, catchments, ponds).~~ | ~~**MA LG 1:** PHMA and GHMA will be available for livestock grazing (Figure 2-3, Livestock Grazing [Appendix A]). Active animal unit months (AUMs) for livestock grazing will be 329,521 on BLM lands. Make adjustments to permitted AUMs consistent with regulation and the remaining grazing direction. In addition, on an annual basis livestock numbers and the season of use can be adjusted within the terms and conditions of the permit.<br><br>Make adjustments to permitted use and annual adjustments to levels of livestock use consistent with regulation and the direction identified below where livestock grazing is identified as a causal factor to not meeting standards or habitat objectives.~~ | — | Summary statement:<br>• Available/unavailable allocation decision.<br><br>Applicability for RMPs?<br>One of the primary decisions an RMP is supposed to make is whether a given area is available for livestock grazing. Included in chapter 2 as Management Action RM-1. |
| **MD RM-1:** (ADH) Within ADH, incorporate GRSG habitat objectives and management considerations into all BLM grazing allotments through Allotment Management Plans. | — | — | — | — | — | — | Summary statement:<br>• Manage grazing to achieve GRSG habitat/objectives and/or land health standards<br><br>Applicability for RMPs?<br>Duplicative with other decisions. Consolidate decisions that incorporate habitat objectives into one. See chapter 2 grazing decision RM-2 or Application of Habitat Objectives – Objective SSS Y and actions SSS Y1 and SSS Y2. |

| 2019 Amendments/Revisions | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Colorado** | **Idaho** | **Montana/Dakotas** | **Nevada/California** | **Oregon** | **Utah** | **Wyoming** | **NOTES** |
| **MD RM-2:** (ADH) Work cooperatively on integrated ranch planning within GRSG habitat. Develop management strategies that are seamless with respect to actions on public and private lands within BLM grazing allotments. | **MD LG 3**: Where opportunities exist, coordinate with other land managers to encourage livestock operations that utilize mixed federal, private and/or state land to be managed at the landscape scale to benefit GRSG and their habitat across land ownerships. | **Dillon MD LG 3**: Where opportunities exist, coordinate with other land managers to encourage livestock operations that utilize mixed federal, private and/or state land to be managed at the landscape scale to benefit GRSG and their habitat across land ownerships.<br><br>**Billings Management Direction LG-1.4:** In PHMA, work cooperatively on integrated ranch planning within GRSG habitat so operations with deeded/BLM allotments can be planned as single units.<br><br>**Lewistown Action LG-1.4:** In PHMA, cooperate with ranchers and other agencies on integrated ranch planning so operations with intermingled land ownerships within BLM allotments can be planned as single units. | — | — | ~~**MA LG 3**: In PHMA, consult, cooperate, and collaborate with other land owners and management agencies (e.g., private and SITLA) to develop plans which provide for landscape level approaches to habitat improvement. Manage unfenced private and SITLA lands within a grazing allotment that are under exchange of use agreements or percent public land use as a single unit that will have the same management as the public lands.~~ | **MD LG 2:** Within PHMA the BLM will work cooperatively with permittees, lessees, and other landowners to develop voluntary grazing management strategies that integrate both public and private lands into single management units to improve Greater Sage-Grouse habitat. | <u>Summary statement:</u><br>• Coordinate with partners/neighbors<br><br><u>Applicability for RMPs?</u><br>43 CFR 4100 regulations direct BLM to consult, cooperate and coordinate with affected grazing permittees, the state having lands or responsible for managing resources within and the interested publics when engaging in program work such as changes in permitted use, Allotment Management Plans, Range Improvements, issuance and/or modification of a grazing permit.<br><br>Because regulations already require coordination, and conducting such coordination does not require an RMP decision to implement, it would be removed from the RMP-decision section for Alternatives 4 and 5. However, coordination language has been added specific to managing GRSG habitat across multiple ownership as a BMP in the appendix. |

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| **MD RM-3:** (PHMA) The BLM will prioritize:<br>1. the review of grazing permits/leases, in particular to determine if modification is necessary prior to renewal, and<br>2. the processing of grazing permits/leases in PHMA.<br><br>In setting workload priorities, precedence will be given to existing permits/leases in these areas not meeting Land Health Standards, with focus on those containing riparian areas, including wet meadows. The BLM may use other criteria for prioritization to respond to urgent natural resource concerns (e.g., fire) and legal obligations. | **MD LG 15**: Generally, t~~T~~he BLM will prioritize<br>(1) the review of grazing permits/leases, in particular to determine if modification is necessary prior to renewal, and (2) the processing of grazing permits/leases based on land health conditions or concerns related to rangeland health standards. If similar issues are found in both PHMA and IHMA, then those in PHMA should be addressed first. ~~in Sagebrush Focal Areas (SFA) followed by PHMA outside of the SFA.~~<br><br>In setting workload priorities, precedence will be given to existing permits/leases in these areas not meeting Land Health Standards and that have declining Greater Sage-Grouse populations, defined by a soft or hard population adaptive management trigger being engaged. Greater Sage-Grouse populations that are stable or trending upward will be a lower priority for permit renewal and the assessment process~~, with focus on those containing riparian areas, including wet meadows. Management and conservation action prioritization will occur at the Conservation Area (CA) scale and be based on GRSG population and habitat trends: Focusing management and conservation actions first in SFA followed by areas of PHMA outside SFA~~. The BLM may use other criteria for prioritization to respond to urgent natural resource concerns (e.g., fire) and legal obligations.<br><br>**MD LG 2**: Prioritize BLM land health assessments and processing of BLM grazing | **Dillon MD LG 15**: The BLM will prioritize<br>(1) the review of grazing permits/leases, in particular to determine if modification is necessary prior to renewal, and (2) the processing of grazing permits/leases in Sagebrush Focal Areas (SFA) followed by PHMA outside of the SFA.<br><br>In setting workload priorities, precedence will be given to existing permits/leases in these areas not meeting Land Health Standards, with focus on those containing riparian areas, including wet meadows. Management and conservation action prioritization will occur at the Conservation Area (CA) scale and be based on GRSG population and habitat trends: Focusing management and conservation actions first in SFA followed by areas of PHMA outside SFA. The BLM may use other criteria for prioritization to respond to urgent natural resource concerns (e.g., fire) and legal obligations.<br><br>**MD LG 2:** Prioritize BLM land health assessments and processing of BLM grazing permits consistent with management area prioritization (MD SSS 4), unless other higher priority considerations exist (MD LG 15) or other factors such as threatened, endangered and proposed species habitat that livestock grazing can affect. Where possible, conduct land health assessments at the watershed, or other meaningful landscape-scale.<br><br>**Billings MD LG-14**: The BLM will prioritize (1) the review of grazing permits/leases, in particular to determine if | **MD LG 2:** The BLM will prioritize (1) the review of grazing permits/leases, in particular to determine if modification is necessary prior to renewal, and (2) the processing of grazing permits/leases in ~~SFA followed by~~ PHMAs ~~outside of the SFA~~. In setting workload priorities, precedence will be given to existing permits/leases in these areas not meeting land health standards, with focus on those containing riparian areas, including wet meadows. The BLM may use other criteria for prioritization to respond to urgent natural resource concerns (e.g., fire) and legal obligations. | **MD LG 11:** Sagebrush Focal Areas will be prioritized for management and conservation actions, including, but not limited to review of livestock grazing permits/leases.<br><br>**MD LG 12:** The BLM will prioritize (1) the review of grazing permits/leases, in particular to determine if modification is necessary prior to renewal, and (2) the processing of grazing permits/leases in Sagebrush Focal Areas (SFA) followed by PHMA outside of the SFA. In setting workload priorities, precedence will be given to existing permits/leases in these areas not meeting Land Health Standards, with focus on those containing riparian areas, including wet meadows. The BLM may use other criteria for prioritization to respond to urgent natural resource concerns (e.g. fire) and legal obligations. | ~~**MA LG-2**: The BLM will prioritize~~<br>~~(1) the review of grazing permits/leases, in particular to determine if modification is necessary prior to renewal, and~~<br>~~(2) the processing of grazing permits/leases in SFA first followed by PHMA outside SFA.~~<br><br>~~In setting workload priorities, precedence will be given to existing permits/leases in these areas not meeting Land Health Standards, with focus on those containing riparian areas, including wet meadows. The BLM may use other criteria for prioritization to respond to urgent natural resource concerns (ex., fire) and legal obligations.~~ | **MD LG 5 (cont.):** The BLM would prioritize (1) the review of grazing permits/leases, in particular to determine if modification is necessary prior to renewal, and (2) the processing of grazing permits/leases in ~~SFAs followed by~~ PHMA ~~outside of the SFAs~~. In setting workload priorities, precedence would be given to existing permits/leases in these areas not meeting LHSs, with focus on those containing riparian areas, including wet meadows. The BLM may use other criteria for prioritization to respond to urgent natural resource concerns (e.g., fire) and legal obligations. | Summary statement:<br>• Prioritize review/processing of grazing permits<br><br>Applicability for RMPs?<br>Prioritization is not an RMP decision. It depends on staffing, budget, and the consideration of other resource issues that include, but are not limited to GRSG, other listed species, LHS, wildfire, or other resource concerns.<br><br>Previous national level guidance for prioritization of renewals has always been to look at high resource value areas first. IM's such as WO 2009-018 and WO 2018-024 gave guidance on prioritization.<br><br>The 2015 FWS listing determination cited the prioritization for reviewing grazing permits and conducting monitoring to determine if changes may be needed to meet GRSG habitat conditions – though it also noted that other criteria could be considered.<br><br>Retained language related to prioritization in the livestock grazing BMP appendix. It can help inform and guide during implementation, though it is not needed as an RMP-level decision. |

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| *(See above.)* | permits consistent with management area prioritization (MD SSS 4), unless other higher priority considerations exist (MD LG 15) or other factors such as threatened, endangered and proposed species habitat that livestock grazing can affect. Where possible, conduct land health assessments at the watershed, or other meaningful landscape-scale. | modification is necessary prior to renewal, and (2) the processing of grazing permits/leases in PHMA. In setting workload priorities, precedence will be given to existing permits/leases in these areas not meeting Land Health Standards, with focus on those containing riparian areas, including wet meadows. The BLM may use other criteria for prioritization to respond to urgent natural resource concerns (ex., fire) and legal obligations.<br><br>**Lewistown (Same as Livestock Grazing MD-12**): The BLM will prioritize (1) the review of grazing permits/leases, in particular to determine if modification is necessary prior to renewal, and (2) the processing of grazing permits/leases in SFA followed by PHMA outside of the SFA. In setting workload priorities, precedence will be given to existing permits/leases in these areas not meeting Land Health Standards, with focus on those containing riparian areas, including wet meadows. The BLM may use other criteria for prioritization to respond to urgent natural resource concerns (e.g., fire) and legal obligations.<br><br>**Lewistown Action LG 1.5**: The BLM will prioritize (1) the review of grazing permits/leases in particular to determine if modification is necessary prior to renewal): and (2) the processing of grazing permits/leases in in SFA, followed by PHMA. In setting will prioritize (1) the review of grazing permits/leases in particular to determine if modification is necessary prior | *(See above.)* | *(See above.)* | *(See above.)* | *(See above.)* | *(See above.)* |

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| *(See above.)* | *(See above.)* | to renewal): and (2) the processing of grazing permits/leases in in SFA, followed by PHMA. In setting workload priorities, precedence will be given to existing permits/leases in these areas not meeting Land Health Standards, with focus on those containing riparian areas, including wet meadows. The BLM may use other criteria for prioritization to respond to urgent natural resource concerns (e.g., fire) and legal obligations.<br><br>**Miles City MD LG-3:** The BLM will prioritize (1) the review of grazing permits/leases, in particular to determine if modification is necessary prior to renewal, and (2) the processing of grazing permits/leases in PHMA. In setting workload priorities, precedence will be given to existing permits/leases in these areas not meeting Land Health Standards, with focus on those containing riparian areas, including wet meadows. The BLM may use other criteria for prioritization to respond to urgent natural resource concerns (ex., fire) and legal obligations.<br><br>**North Dakota Management Direction LG-1.5**: The BLM will prioritize (1) the review of grazing permits/leases, in particular to determine if modification is necessary prior to renewal, and (2) the processing of grazing permits/leases in PHMA. In setting workload priorities, precedence will be given to existing permits/leases in these areas not meeting Land Health Standards, with focus on those containing riparian areas, | *(See above.)* | *(See above.)* | *(See above.)* | *(See above.)* |

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| *(See above.)* | *(See above.)* | including wet meadows. The BLM may use other criteria for prioritization to respond to urgent natural resource concerns (such as fire) and legal obligations.<br><br>**South Dakota MD-32** Land Health Standards: BLM will prioritize grazing leases in PHMA to determine if modifications are necessary prior to renewals or if the allotment does not meet Land Health Standards.<br><br>**Management Direction 36**: The BLM will prioritize (1) the review of grazing permits/leases, in particular to determine if modification is necessary prior to renewal, and (2) the processing of grazing permits/leases in PHMA. In setting workload priorities, precedence will be given to existing permits/leases in these areas not meeting Land Health Standards, with focus on those containing riparian areas, including wet meadows. The BLM may use other criteria for prioritization to respond to urgent natural resource concerns (such as fire) and legal obligations. | *(See above.)* | *(See above.)* | *(See above.)* | *(See above.)* | *(See above.)* |

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| **MD RM-4:** (ADH) Conduct land health assessments that include (at a minimum) indicators and measurements of vegetation structure/condition/composition specific to achieving GRSG habitat objectives (Doherty et al. 2011). If local/state seasonal habitat objectives are not available, use GRSG habitat recommendations from Connelly et al. 2000 and Hagen et al. 2007. | **MD LG 4**: PHMA & IHMA: During the land health assessment process, identify the type(s) of seasonal habitat the assessed areas are capable of supporting. Utilize the habitat assessment framework, (Stiver et al. 2015) or other BLM approved methodology, in accordance with current policy and guidance to determine whether vegetation structure, condition and composition are meeting GRSG habitat objectives including riparian and lentic areas (Objective SSS 2; Table 2-2). Use appropriate Ecological Site Descriptions, reference sheets and state and transition models to inform desired habitat conditions and expected responses to management changes for the land unit being assessed. | **Dillon MD LG 4**: PHMA & IHMA: During the land health assessment process, identify the type(s) of seasonal habitat the assessed areas are capable of supporting. Utilize the habitat assessment framework, (Stiver et al. 2015) or other BLM approved methodology, in accordance with current policy and guidance to determine whether vegetation structure, condition and composition are meeting GRSG habitat objectives including riparian and lentic areas (Objective SSS 2; Table 2-2). Use appropriate Ecological Site Descriptions, reference sheets and state and transition models to inform desired habitat conditions and expected responses to management changes for the land unit being assessed.<br><br>**Lewistown Action LG-1.2**: In PHMA and GHMA, conduct land health evaluations and determinations that include (at a minimum) indicators and/or measurements of structure/condition/ composition of vegetation specific to achieving GRSG habitat objectives. Management actions will be developed and implemented within one year if land health determinations indicate that an allotment is not meeting standards due to current livestock grazing. Appendix D addresses mid-scale monitoring.<br><br>**Lewistown Action LG-1.6**: Allotments that have the best opportunities for conserving, enhancing, or restoring habitat for GRSG will receive high priority for monitoring, evaluation, and management. | **MD LG 4:** Complete land health assessments in PHMAs and GHMAs to identify whether or not GRSG habitat objectives (Table 2-2) are being met. The priority order for completing land health assessments in GRSG habitat is:<br>• ~~Allotments containing SFA that have never been evaluated;~~<br>• ~~Allotments containing SFA that have not been re-evaluated in 10 or more years;~~<br>• Allotments containing PHMAs that have never been evaluated;<br>• Allotments containing PHMAs that have not been re-evaluated in 10 or more years;<br>• Allotments containing GHMAs that have never been evaluated;<br>• Allotments containing GHMAs that have not been re-evaluated in 10 or more years. | **Objective LG 3:** Complete rangeland health assessments for grazing permits/leases that have not been renewed and prioritized by Allotment Categories I, M, and C. The priority order for completing rangeland health assessments in Greater Sage-grouse habitat is:<br><br>1. Allotments containing SFA that have never been evaluated.<br>2. Allotments containing SFA that have not been re-evaluated in 10 or more years.<br>3. Allotments containing PHMA that have never been evaluated.<br>4. Allotments containing PHMA that have not been re-evaluated in 10 or more years.<br>5. Allotments containing GHMA that have never been evaluated.<br>6. Allotments containing GHMA that have not been re-evaluated in 10 or more years. | ~~**MA LG-5:** In PHMA and GHMA, conduct land health assessments that include indicators and measurements of structure, condition, composition, etc., of vegetation specific to achieving GRSG habitat objectives (Objective SSS-3), including within wetlands and riparian areas. Prioritize land health assessments in SFA, followed by PHMA outside of the SFA. Conduct land health assessments at the watershed scale and use the GRSG habitat objectives when assessing the applicable standard in GRSG habitats.~~ | **MD LG 1**: The BLM policy in WO-IM-2009-007 and BLM Handbook H-4180-1 will be used to evaluate land health standards achievement in PHMA (core only) and, where not achieved, to determine if existing grazing management practices or levels of grazing use on public lands are significant factors in failing to achieve the standards and conform with the guidelines, which through this process will identify appropriate actions to address nonachievement and nonconformance. | Summary statement:<br>• Land health assessments: include habitat indicators, ecological site descriptions, state and transition, priorities<br><br>Applicability for RMPs?<br>Prioritization is not an RMP decision. It depends on staffing, budget, and the consideration of other resource issues that include, but are not limited to GRSG, other listed species, LHS, wildfire, or other resource concerns.<br><br>Previous national level guidance for prioritization of renewals has always been to look at high resource value areas first. IM's such as WO 2009-018 and WO 2018-024 gave guidance on prioritization.<br><br>The 2015 FWS listing determination cited the prioritization for reviewing grazing permits and conducting monitoring to determine if changes may be needed to meet GRSG habitat conditions – though it also noted that other criteria could be considered.<br><br>Retained language related to prioritization in the livestock grazing BMP appendix. It can help inform and guide during implementation, though it is not needed as an RMP-level decision. |

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| *(See above.)* | *(See above.)* | **Lewistown Action LG-1.7**: In PHMA, conduct land health evaluations and determinations that include (at a minimum) indicators and/or measurements of structure/condition/composition of vegetation specific to achieving GRSG habitat objectives. Management actions will be developed if land health determinations indicate that an allotment is not meeting standards due to current livestock grazing. Appendix D addresses mid-scale monitoring.<br><br>**Lewistown Action LG-1.8:** The BLM will monitor grazing permits/leases renewed or modified in accordance with the direction contained in this guidance as follows: Allotments within SFA, followed by those in other PHMA, and focusing on those with riparian areas, will be prioritized for monitoring to ensure compliance with the terms and conditions in the permits. The BLM will collect, at a minimum, the following monitoring data:<br>· Vegetation Condition<br>· Actual Use<br>· Utilization<br>· Use Supervision<br><br>**Lewistown Action LG-1.9**: In PHMA and GHMA, conduct land health evaluations and determinations that include (at a minimum) indicators and/or measurements of structure/condition/composition of vegetation specific to achieving GRSG habitat objectives. Management actions will be developed if land health determinations indicate that an allotment is not meeting standards due to livestock grazing in accordance with BLM | *(See above.)* | *(See above.)* | *(See above.)* | *(See above.)* | *(See above.)* |

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| *(See above.)* | *(See above.)* | grazing regulations 43 CFR, Part 4100. Appendix D addresses mid-scale monitoring.<br><br>**Lewistown Action LG-1.11**: In PHMA, manage for vegetation composition and structure consistent with ecological site potential within the reference state to achieve GRSG seasonal habitat objectives. Natural ecological processes that impede localized site potential and that create a mosaic of habitat successional patterns will continue to occur.<br><br>**North Dakota Management Direction LG-1.6**: In PHMA, conduct land health assessments that include (at a minimum) indicators and measurements of structure/condition/composition of vegetation specific to achieving GRSG habitat objectives.<br>Local objectives will be developed at the field office level in partnership with North Dakota Game and Fish Department and USFWS, and incorporated into AMPs or livestock grazing permits as appropriate incorporating best available science.<br><br>**North Dakota Management Direction LG-1.9**: In PHMA, manage for vegetation composition and structure consistent with GRSG seasonal habitat objectives. ESDs can help determine whether or not the GRSG seasonal habitat objectives are consistent with the ecological site potential within the reference state.<br>GRSG seasonal habitat objectives and ecological site potential within reference | *(See above.)* | *(See above.)* | *(See above.)* | *(See above.)* |

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| *(See above.)* | *(See above.)* | states are not always going to be the same.<br><br>**HiLine (Same as Vegetation MD-11):** Rangeland health monitoring and assessments will be conducted within current staffing capabilities. The allotments within the Greater Sage-Grouse PHMA and the Grassland Bird/Greater Sage-Grouse PHMA will be high priority for reassessment of land health standards and processing grazing permits as detailed in Appendix I. Rangeland health monitoring plans will be developed and implemented at the field office level. | *(See above.)* | *(See above.)* | *(See above.)* | *(See above.)* | *(See above.)* |
| **MD RM-6:** (ADH) Manage for vegetation composition and structure consistent with ecological site potential and within the reference state subject to habitat objectives, including successional stages. | — | — | — | — | — | — | Summary statement:<br>• Manage for vegetation composition consistent with ecological site potential<br><br>Applicability for RMPs?<br>Duplicative with habitat objective reference action. Consolidate decisions that incorporate habitat objectives into one. See chapter 2 grazing decision RM-2 or Application of Habitat Objectives – Objective SSS Y and actions SSS Y1 and SSS Y2. |

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| **MD RM-5:** (ADH) Develop specific objectives—through NEPA analysis conducted in accordance with the permit/lease renewal process—to conserve, enhance, or restore GRSG habitat. Base benchmarks on Ecological Site/Range Site Descriptions. When existing on Ecological Site/Range Site Descriptions have not been developed, or are too general to serve adequately as benchmarks, identify and document local reference sites for areas of similar potential that exemplify achievement of GRSG habitat objectives and use these sites as the benchmark reference. Establish measurable objectives related to GRSG habitat from baseline monitoring data, ecological site descriptions, or land health assessments/evaluations, or other habitat and successional stage objectives. | — | **Billings: MD LG-12**: Site specific Greater Sage-Grouse habitat and management objectives will be developed for BLM land within Greater Sage-Grouse PHMA. These objectives will be incorporated into the respective allotment management plans (AMPs) or livestock grazing permits as appropriate.<br><br>**Lewistown Action LG-1.2:** Site-specific Greater Sage-Grouse habitat and management objectives will be developed for BLM land and incorporated into the respective AMPs or livestock grazing permits as appropriate. Third order (fine-scale) and fourth order (site-scale) habitat indicators and characteristics for sage-grouse habitat seasonal use areas as described in the Sage-Grouse Habitat Assessment Framework (Stiver, et al. 2015) will be used to quantify habitat objectives.<br><br>**HiLine MD-36**: Consideration will be given to incorporating fine-scale and site-specific Greater Sage-Grouse habitat and management objectives as appropriate to the area into AMPs or livestock grazing permits. | **MD LG 8:** Within PHMAs and GHMAs, incorporate terms and conditions into grazing permits to meet GRSG habitat objectives (Table 2-2), specific terms and conditions will be based on rangeland health assessments (and subsequent monitoring data). | **MD LG 4:** When fine and site-scale Greater Sage-grouse habitat assessment and monitoring is needed or required, (e.g., as a component of a rangeland health assessment), measure the Greater Sage-grouse habitat suitability indicators for seasonal habitats identified in Table 2-2. Site suitability values may be adjusted regionally where there is scientific justification for doing so. When using the indicators to guide management actions or during land health assessments, consider that the indicators are sensitive to the ecological processes operating at the scale of interest and that a single habitat indicator does not necessarily define habitat suitability for an area or particular scale. | ~~**MA-LG-4:** Evaluate Utah's Rangeland Health Standards and process grazing permits. Focus monitoring and management activities on allotments found not to be achieving Utah's Rangeland Health Standards where livestock grazing is identified as a causal factor and that have the best opportunities for conserving, enhancing or restoring habitat for GRSG.~~<br><br>~~Use ecological site descriptions and/or other appropriate information to determine the desired plant community within proper functioning ecological processes for conducting land health assessments to evaluate the achievement or non-achievement of rangeland health standards.~~ | **MD LG 4:** Within PHMA, ~~all BLM use authorizations will contain terms and conditions regarding the actions needed to meet or progress toward meeting the habitat objectives. I~~if monitoring data show the wildlife/special status species standard ~~habitat objectives have~~ has not been met nor progress being made toward meeting ~~them~~that standard, there will be an evaluation and a determination made as to the cause. If it is determined that the current authorized livestock use is a significant causal factor in failing to achieve the wildlife/special status species standards, the BLM would address the achievement or progress toward achieving the LHSs (43 CFR 4180.2) and, if needed, Greater Sage-Grouse habitat maintenance or improvement ~~for healthy rangelands, the use will be adjusted by the response specified in the instrument that authorized the use~~. | Summary statement:<br>• Manage grazing to achieve GRSG habitat/objectives and/or land health standards<br><br>Applicability for RMPs?<br>Developed a consolidated action (Management Action RM-2 in chapter 2) to consider GRSG habitat benchmarks via HAF to inform LHS. The action connects GRSG habitat benchmarks for suitable habitat via HAF to inform land health special status species standard, and then the regulatory requirement to meet LHS (see Management Action RM-2 in chapter 2). |
| **MD RM-7:** (ADH) Include terms and conditions on grazing permits and leases that address disruptive activities that affect GRSG and assure plant growth requirements are met and residual forage remains available for GRSG hiding cover.<br><br>Specify as necessary:<br>1. Season or timing of use<br>2. Numbers of livestock (include temporary non-use or livestock removal) | **MD LG 6:** When livestock management practices are determined to not be compatible with meeting or making progress towards achievable habitat objectives following appropriate consultation, cooperation and coordination, implement changes in grazing management through grazing authorization modifications, or allotment management plan implementation. Potential | **Dillon MD LG 6:** When livestock management practices are determined to not be compatible with meeting or making progress towards achievable habitat objectives following appropriate consultation, cooperation and coordination, implement changes in grazing management through grazing authorization modifications, or allotment management plan implementation. Potential | **MD LG 1:** When livestock management practices are determined to not be compatible with meeting or making progress towards achievable habitat objectives following appropriate consultation, cooperation and coordination, implement changes in grazing management through grazing authorization modifications, or allotment management plan implementation and consistent with 43 CFR 4160.1 and IM- | **MD LG 2:** When livestock management practices are determined to not be compatible with meeting or making progress towards achievable habitat objectives following appropriate consultation, cooperating and coordination, implement changes in grazing management through grazing authorization modifications, or allotment management plan implementation. Potential modifications include, but are not limited to, changes in:<br>1. Season or timing of use; | **MA-LG-6:** In PHMA, when an area is not ~~livestock management practices are determined to not be compatible with~~ meeting or making progress towards achievable habitat objectives and Land Health Standards, and the causal factor is livestock grazing (i.e., improper livestock grazing) ~~following appropriate consultation, cooperating and coordination~~, implement | **MD LG 1**:<br>When determining appropriate actions to address nonachievement of land health standards and nonconformance with the guidelines due to existing grazing management practices or levels of grazing use, management actions including but not limited to the following will be considered singly or in combination:<br>1. Season or timing of use | Summary statement:<br>• Include/Adjust terms and conditions to meet land health standards/GRSG objectives/needs<br><br>Applicability for RMPs?<br>The text in this row does not contain any decision but is a list of what the agency could consider if an area isn't meeting the habitat needs for GRSG. This is evident by language such as "…potential modifications include" or |

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| 3. Distributions of livestock use<br>4. Intensity of use (utilization or stubble height objectives)<br>5. Kind of livestock (e.g., cattle, sheep, horse, llama, alpaca, and goat)<br>6. Class of livestock (e.g., yearlings versus cow/calf pairs)<br>7. Locations of bed grounds, sheep camps, trail routes, and the like | modifications include, but are not limited to, changes in:<br>• Season or timing of use;<br>• Numbers of livestock;<br>• Distribution of livestock use;<br>• Duration and/or level of use;<br>• Kind of livestock (e.g., cattle, sheep, horses, or goats) (Briske et al. 2011); and<br>• Grazing schedules (including rest or deferment).<br>*Not in Priority Order<br><br>**MD LG 8:** PHMA & IHMA - Where practical, design pasture rotations to utilize non-native perennial grass seedings and/or annual grasslands, during GRSG nesting season annually or periodically. | modifications include, but are not limited to, changes in:<br>• Season or timing of use;<br>• Numbers of livestock;<br>• Distribution of livestock use;<br>• Duration and/or level of use;<br>• Kind of livestock (e.g., cattle, sheep, horses, or goats) (Briske et al. 2011); and<br>• Grazing schedules (including rest or deferment).<br>*Not in Priority Order<br><br>**Dillon MD LG 8:** PHMA & IHMA - Where practical, design pasture rotations to utilize non-native perennial grass seedings and/or annual grasslands, during GRSG nesting season annually or periodically.<br><br>**Lewistown Action LG-1.1:** GRSG habitat objectives will be considered when evaluating an allotment's conformance with land health standards (see Appendix F in the Lewistown Field Office Proposed RMPA/Final EIS) prior to renewing a grazing authorization.<br><br>**Lewistown Action LG-1.12**: In PHMA, implement management actions within or outside of the watershed planning/permit renewal process to modify grazing management and to meet seasonal GRSG habitat objectives. Consider singly, or in combination, for changes in:<br>· Season or timing of use<br>· Numbers of livestock (includes temporary non-use or livestock removal)<br>· Distribution of livestock use<br>· Intensity of use<br>· Type of livestock | 2018-023. Potential modifications include, but are not limited to, changes in:<br>• Season or timing of use;<br>• Numbers of livestock;<br>• Distribution of livestock use;<br>• Duration and/or level of use;<br>• Kind of livestock (e.g., cattle, sheep, horses, or goats) (Briske et al. 2011);<br>• Grazing schedules (including rest or deferment);<br>• Class of livestock;<br>• Grazing schedules (including rest or deferment)<br>• Making allotment unavailable to grazing<br>*Not in priority order<br><br>**MD LG 5:** If results from a land health assessment indicate that GRSG habitat objectives (Table 2-2) are not met in ~~SFA,~~ PHMAs or GHMAs and grazing is a causal factor, and until appropriate modifications (MD LG 1) are incorporated through the permit renewal process, then consistent with applicable laws and regulations, implement management strategies that may include, but are not limited to, the following:<br>• Provide periods of rest or deferment during critical growth periods of key vegetation species<br>• Limit grazing duration and intensity to allow plant growth sufficient to meet GRSG habitat objectives (Table 2-2)<br>• Employ herd management techniques to minimize impacts of livestock on breeding, nesting, and brood-rearing habitat during the breeding season (March 1 to June 30; Lek—March 1 to | 2. Numbers of livestock;<br>3. Distribution of livestock use;<br>4. Duration and/or level of use;<br>5. Locations of bed grounds, sheep camps, trail routes, and the like;<br>6. Extended rest or temporary closure from grazing through BLM administrative actions;<br>7. Make allotment unavailable to grazing;<br>8. Kind of livestock (e.g., cattle, sheep, horses, or goats) (Briske et al. 2011); and<br>9. Grazing schedules (including rest or deferment).<br>*Not in Priority Order<br><br>When SRH are being met no changes in current management or activity plans or permits/leases are required, but could occur to meet other resource management objectives. | changes in grazing management through grazing authorization modifications, or allotment management plan implementation. Potential modifications include, but are not limited to, changes in:<br>• Season or timing of use;<br>• Numbers of livestock;<br>• Distribution of livestock use;<br>• Duration and/or level of use;<br>• Kind of livestock (e.g., cattle, sheep, horses, or goats); and<br>• Grazing schedules (including rest or deferment).<br>*Not in priority order | 2. Numbers of livestock (includes temporary nonuse or livestock removal)<br>3. Distribution of livestock use<br>4. Intensity of use<br>5. Kind of livestock (e.g., cattle, sheep, horses, llamas, alpacas and goats)<br>6. Class of livestock (e.g., yearlings versus cow calf pairs)<br>7. Range improvements.<br>Refer to the document, "Grazing Influence, Management, and Objective Development in Wyoming's Greater Sage-Grouse Habitat" (Cagney et al. 2010) for guidance when considering appropriate management actions to achieve conformance. | "implement management strategies that may include" and both instances note that the list is inclusive of but not limited to a series of potential actions. It's just a list – like a toolbox of things the BLM could apply.<br><br>43 CFR 4180 directs BLM to take appropriate action if livestock are the causal factor for failing to achieve the land health standards. Handbook 4180 outlines the process and suggests available tools such as Ecological Site Descriptions to be used as a reference when assessing/evaluating the achievement of land health standards. Moved a consolidated version of this to the BMP appendix, as it's just a list of potential actions the BLM could consider during implementation. |

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| *(See above.)* | *(See above.)* | **HiLine MD-1**: If monitoring data demonstrate that livestock use on an allotment in a priority Greater Sage-Grouse area is adversely affecting Greater Sage-Grouse or their habitat, the terms and conditions of grazing permits may be modified, or changes in active use could be considered in order to meet the standards for rangeland health as described in 43 CFR, Part 4180 and the Standards for Rangeland Health and Guidelines for Livestock Grazing Management (Appendix L) or to otherwise manage, maintain, or improve sage-grouse habitat.<br><br>**HiLine MD-2:** Appropriate indicators and measurements specific to habitat for Greater Sage-Grouse, or any other wildlife species of concern, will be evaluated as part of standards and guidelines assessment and any necessary and appropriate habitat objectives specific to meeting the wildlife health standard for the site will be identified and incorporated into allotment management plans (AMPs) or the terms and conditions of livestock grazing permits.<br><br>**North Dakota Management Direction LG-1.10**: In PHMA, implement management directions (grazing decisions, AMP/Conservation Plan development, or other agreements) to modify grazing management to meet State of North Dakota seasonal GRSG habitat requirements, where allotment evaluations indicate land health assessments are not being met due to livestock. Consider singly, or in combination, changes in: | May 15, and Nesting—April 1 to June 30)<br>• Consider any temporary projects that can mitigate livestock impacts (e.g., temporary fencing or temporary water hauling locations;<br>• Work with permittees to avoid concentrated turn-out locations for livestock within 4 miles of active and pending leks from March 1 to June 30<br>• Avoid domestic sheep use and bedding areas and herder camps within 2 miles of active and pending leks from March 1 to June 30<br>• Utilizing land features and roads on maps provided to the permittee to help delineate livestock use avoidance areas<br>• Considering no grazing from May 15 – Sept. 15 in riparian areas and wet meadows.<br>• Removing livestock within 3-7 days for the remainder of the grazing year once the allowable use levels are reached (BLM 1996, Burton et. al 2011, Cagney et. al, 2010, Connelly et. al 2000, France et. al 2008, Hagen et. al 2007, Holechek 1988, Platts 1990, and Tanaka et. al 2014):<br>▪ In riparian areas and wet meadows the allowable percent utilization is 35% woody species, and a minimum stubble height of 4-6 inches (10-15 cm) for herbaceous riparian vegetation based on site.<br>▪ In mountain big sage habitat, the allowable percent utilization is 40 % herbaceous key species and/or 35 % shrub key species. | *(See above.)* | *(See above.)* | *(See above.)* | *(See above.)* |

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| *(See above.)* | *(See above.)* | 1. Season or timing of use;<br>2. Numbers of livestock (includes temporary non-use or livestock removal);<br>3. Distribution of livestock use;<br>4. Intensity of use; and<br>5. Type of livestock (e.g., cattle, sheep, horses, llamas, alpacas, and goats). | ▪ In Wyoming Basin big sage habitat, the allowable percent utilization is 35% herbaceous key species and/or 35 % shrub key species.<br>▪ In black sage habitat, the allowable percent utilization is 35% herbaceous key species and/or 35 % shrub key species.<br>To the extent that the implementation of these strategies would be in conflict with the terms and conditions of any applicable livestock grazing permit or lease, then the BLM would complete a new decision-making process before implementing the strategies. | *(See above.)* | *(See above.)* | *(See above.)* | *(See above.)* |
| — | — | — | **MD LG 6:** Appropriate allowable utilization levels will be defined through the grazing permit renewal process. At least one alternative in the NEPA process will consider the utilization levels identified in MD LG 5. | — | — | — | Summary statement:<br>• Include/Adjust terms and conditions to meet land health standards/GRSG objectives/needs<br><br>Applicability for RMPs?<br>Only from NV/CA. It's not an RMP decision, but "plan to plan" type of language along with direction for what future NEPA should consider in a range of alternatives, none of which are RMP decisions or BMPs. |
| — | — | — | **MD LG 7:** In pastures where post livestock removal use monitoring results in utilization levels that exceed allowable use levels and livestock are identified as a causal factor, reduce animal unit months (AUMs) grazed the following year ~~accordingly~~in accordance with 43 CFR 4160.1 and IM 2018-023. AUMs cannot be applied to another pasture that is already being used by livestock or is being purposefully rested. | — | — | — | Summary statement:<br>• Include/Adjust terms and conditions to meet land health standards/GRSG objectives/needs<br><br>Applicability for RMPs?<br>Only from NV/CA. Not an RMP decision, but direction for implementation that is not directly linked to habitat conditions. Included as a BMP specific to NV/CA. |

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| — | — | — | **MD LG 10**: In any allotment where land health standards were not met and livestock grazing was found to be a significant causal factor, compliance monitoring will be conducted annually until GRSG habitat objectives (Table 2-2) are met. If compliance monitoring finds that the implemented management strategies identified in MD LG 5 are not achieving the desired results, a change in action will be required in compliance with 43 CFR 4160.1 and IM 2018-023. | — | — | — | Summary statement:<br>• Monitoring commitment if not meeting LHS<br><br>Applicability for RMPs?<br>Monitoring is not an RMP decision but is based on available staff and budget. This is more appropriately addressed as a mix of 1) compliance with the grazing regulations and 2) implementation prioritization. Not carried forward as it's related to implementation prioritization, which is not an RMP action. |
| **MD RM-8:** (ADH) Develop drought contingency plans at the appropriate landscape unit that provide for a consistent/appropriate BLM response. Plans shall establish policy for addressing ongoing drought and post-drought recovery for GRSG habitat objectives. | **MD LG 14**: In response to weather conditions (i.e. drought) adjust grazing management (i.e., delay turnout, adjust pasture rotations, adjust the amount and/or duration of grazing) as appropriate to provide for adequate food and cover for GRSG. | **Dillon MD LG 14**: In response to weather conditions (i.e. drought) adjust grazing management (i.e., delay turnout, adjust pasture rotations, adjust the amount and/or duration of grazing) as appropriate to provide for adequate food and cover for GRSG.<br><br>**Lewistown Action LG-1.13**: During drought periods, prioritize evaluating effects of the drought in PHMA, relative to their needs for food and cover. Drought management will continue to be in accordance with the Montana/Dakotas drought policy (see Appendix I, Drought Policy, in the Lewistown Field Office Proposed RMPA/Final EIS). Since there is a lag in vegetation recovery following drought, post-drought management will be implemented to allow for vegetation recovery that meets GRSG needs in PHMA. In accordance with BLM grazing regulation 43 CFR, Part 4130.3-3, consultation, cooperation, and coordination with owners or lessees having lands or | — | **MD LG 5:** During drought conditions use a recognized drought indicator, such as the Drought Monitor or Palmer Drought Severity Index, to determine when abnormally dry or drought conditions are developing, present, or easing. When such conditions are developing or present:<br>1. Conduct pre-season assessments prior to livestock turn out.<br>2. Monitor vegetation conditions during authorized livestock use periods to determine need for early removal or other changes to meet seasonal PHMA and GHMA objectives.<br><br>If livestock grazing is deferred due to drought, reevaluate vegetation and Greater Sage-grouse habitat indicators that measure Greater Sage-grouse habitat prior to reauthorization of grazing. | ~~**MA LG-7:** In PHMA, during drought periods, prioritize evaluating effects of the drought relative to GRSG needs for food and cover. Initiate emergency management measures (e.g. delaying turnout, adjusting the amount and/or duration of livestock grazing, implement other terms of the permit) during times of drought to protect GRSG habitat, in accordance with Instruction Memorandum 2013-094 (Resource Management During Drought), or other agency policies.~~<br><br>~~Implement post-drought management to allow for vegetation recovery that meets GRSG needs.~~ | **MD LG 7:** When periods of drought occur, where appropriate, the AO will evaluate strategies to address drought through coordination with grazing permittee/lessee and annual billings processes. In cooperation with livestock grazing permittees/lessees, drought contingency plans will be developed at the appropriate landscape unit that provide for a consistent/appropriate BLM response. Contingency plans shall establish strategies for addressing ongoing drought and post-drought recovery. | Summary statement:<br>• Drought response<br><br>Applicability for RMPs?<br>• Drought is not solely a livestock grazing issue. However, as drought directly effects vegetation that is used by both livestock grazing and GRSG, there is a connection. Consolidated grazing related management associated with drought to the BMP appendix, as the existing management to the left is more related to best practices than it is RMP-level decision-making or allocation changes.<br>• Additionally, 43 CFR 4110.3-3(b) provides the ability of the authorized officer to determine that when resources on public lands require protection because of drought … that actions can be taken. |

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| *(See above.)* | *(See above.)* | managing resources within the area, the affected cooperative state grazing district, and interested public will be completed prior to adjusting post-drought livestock management if the grazing permit is being modified to make these adjustments. Implementation of adjustments will be initiated through documented agreement or by decision of the authorized officer in accordance with BLM grazing regulation 43 CFR, Part 4160.<br><br>**North Dakota Management Direction LG-1.11**: During drought periods, prioritize evaluating effects of the drought in PHMA relative to their needs for food and cover. Management will continue to be in accordance with the Montana-Dakotas Drought Policy (see Appendix H, Drought Policy, of the 2015 Greater Sage-Grouse Approved RMPA/ROD [BLM 2015a]). | *(See above.)* | *(See above.)* | *(See above.)* | *(See above.)* | *(See above.)* |
| **MD RM-9:** The NEPA analysis for renewals and modifications of livestock grazing permits/leases that include lands within PHMA would include specific management thresholds based on Table 2.3 in the Proposed Plan, Land Health Standards (43 CFR, Part 4180.2), ecological site potential, and one or more defined responses that would allow the authorizing officer to make adjustments to livestock grazing that have already been subject to NEPA analysis. | **MD LG 16**: Grazing in the PHMA and IHMA will be managed according to the process outlined in the text below, and the grazing permit renewal process will be managed according to 43 CFR 4100, Subpart 4180, and as outlined in the process below.<br><br>a. Incorporate the Greater Sage-Grouse desired conditions in Table 2.2 [of the 2015 Final EIS] and management considerations as desired conditions, and manage livestock grazing, recognizing that these conditions may not be achievable: (1) due to the existing ecological | **Dillon MD LG 16**: The NEPA analysis for renewals and modifications of livestock grazing permits/leases that include lands within SFA and PHMA will include specific management thresholds, based on GRSG Habitat Objectives Table, Land Health Standards (43 CFR 4180.2) and ecological site potential, and one or more defined responses that will allow the authorizing officer to make adjustments to livestock grazing that have already been subjected to NEPA analysis.<br><br>**Billings MD LG-13**: The NEPA analysis for renewals and modifications of livestock grazing permits/leases that include lands within PHMA will | **MD LG 3:** The NEPA analysis for renewals and modifications of livestock grazing permits/leases that include lands within ~~SFA and~~ PHMAs will include specific management thresholds based on GRSG Habitat Objectives Table (**Table 2-2**), Land Health Standards (43 CFR, Part 4180.2) and ecological site potential, and one or more defined responses that will allow the authorizing officer to make adjustments to livestock grazing that have already been subjected to NEPA analysis. | **MD LG 13:** The NEPA analysis for renewals and modifications of livestock grazing permits/leases that include lands within SFA and PHMA will include specific management thresholds based on GRSG Habitat Objectives **Table 2-2**, Land Health Standards (43 CFR, Part 4180.2) and ecological site potential, and one or more defined responses that will allow the authorizing officer to make adjustments to livestock grazing that have already been subjected to NEPA analysis. | **MA-LG-6 (cont.):** When improper livestock grazing is the causal factor for not meeting or making progress towards achievable habitat objectives and Land Health Standards, ~~T~~the NEPA analysis for renewals and modifications of livestock grazing permits/leases that include lands within ~~SFA and~~ PHMA will analyze multiple potential modifications (e.g., alternatives from the list above) that address the reasons for not meeting, allowing the ~~include specific management thresholds based on **Table 2-2**, Land Health Standards (43 CFR, Part 4180.2), and ecological~~ | **MD LG 4 (cont.)**: When NEPA analysis is required for a specific implementation action, one alternative would include mechanisms to make adjustments to meet or make progress toward meeting the wildlife/special status species standard. The analysis should also identify the BLM-approved data collection methodologies used for monitoring conditions and determining when adjustments are necessary. If current grazing management meets land health standards and provides for Greater Sage-Grouse habitat, there would be no need to analyze an alternative for Greater Sage-Grouse. Authorized uses in PHMA that incorporate habitat objectives | Summary statement:<br>• Thresholds and Responses in permit renewals<br><br>Applicability for RMPs?<br>Alternatives 4 and 5 include the concept of a proactive approach associated with thresholds and responses in the alternatives above under Management Action RM-3. |

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| *(See above.)* | condition, ecological potential, or existing vegetation; or (2) due to causal events unrelated to existing livestock grazing; and 3) that they are not intended to be prescriptive at the allotment level.<br>b. Conduct habitat assessments using appropriate monitoring methods. Where appropriate, make a determination of factors causing any failure to achieve the desired conditions in Table 2.2 [of the 2015 Final EIS]. The assessment will be conducted at a resolution and scale sufficient to document the habitat condition and will include local, spatial, and interannual variability. Any determination relative to the habitat characteristics (Table 2.2 [of the 2015 Final EIS]) will be based on existing ecological condition, ecological potential, and existing vegetation information. This is to ensure the assessment recognizes whether these habitat characteristics are achievable.<br>c. The assessment will rely on published characteristics of Greater Sage-Grouse habitat and the ecological site descriptions, on Table 2.2 [of the 2015 Final EIS as amended], and where available and applicable, rangeland health determinations made in accordance with 43 CFR 4180.2(c).<br>d. After conducting the assessment in (b), above, if | include specific management thresholds based on GRSG Habitat Objectives Table (Table 2-6) and Land Health Standards (43 CFR, Part4180.2) and one or more defined responses that will allow the authorizing officer to make adjustments to livestock grazing that have already been subjected to NEPA analysis.<br><br>**MD LG-15**: The NEPA analysis for renewals and modifications of livestock grazing permits/leases that include lands within PHMA will include specific management thresholds based on GRSG Habitat Objectives Table (Table 2-6) and Land Health Standards (43 CFR, Part4180.2) and ecological site potential, and one or more defined responses that will allow the authorizing officer to make adjustments to livestock grazing that have already been subjected to NEPA analysis.<br><br>**Miles City MD LG-4:** The NEPA analysis for renewals and modifications of livestock grazing permits/leases that include lands within PHMA will include specific management thresholds based on GRSG Habitat Objectives Table and Land Health Standards (43 CFR, Part4180.2) and one or more defined responses that will allow the authorizing officer to make adjustments to livestock grazing that have already been subjected to NEPA analysis.<br><br>**South Dakota MD 34**: The NEPA analysis for renewals and modifications of livestock grazing permits/leases that include lands within PHMA will include specific management | *(See above.)* | *(See above.)* | ~~site potential, and one or more defined responses that will allow the~~ authorizing officer to make adjustments to livestock grazing that have already been subjected to NEPA analysis. Adjustments to meet seasonal GRSG habitat requirements could include those items identified in the list above. | for Greater Sage-Grouse must develop desired conditions based on Greater Sage-Grouse habitats present in the allotment and the ecological potential of sites that supports these habitats. Metrics used to monitor for objectives must be developed and inform the wildlife/SSS portion of the Standards for Healthy Rangelands.<br>Within PHMA, seasonal habitat objectives for Greater Sage-Grouse apply only to those habitats delineated within an allotment during the specific season (e.g., breeding season objectives during breeding season). Data needed to inform the relationship between the authorized use and habitat condition would come from sample locations that appropriately reflect the impact of the authorized use on habitat conditions. Data points should fall within Greater Sage-Grouse seasonal habitat areas and be collected on ecological sites that have the potential to produce Greater Sage-Grouse habitat~~The NEPA analysis for renewals and modifications of livestock grazing permits/leases that includes lands within SFAs and PHMA will include specific management thresholds based on GRSG habitat objectives (Tables 2-2 and 2-3) and Land Health Standards (43 CFR 4180.2), and one or more defined responses that will allow the authorizing officer to make adjustments to livestock grazing that have already been subjected to NEPA analysis~~. | *(See above.)* |

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| *(See above.)* | the current grazing system achieves applicable Idaho rangeland health standards, absent substantial and compelling information, no further grazing management changes are necessary to achieve desired conditions for Greater Sage-Grouse habitat.<br>e. If the process and conditions outlined in (b), above demonstrate that livestock grazing is limiting achievement of the desired conditions (Table 2.2 [of the 2015 Final EIS]), renewed permits will include measures, including but not limited to the actions outlined in **Appendix C** to achieve desired habitat conditions. These measures must be tailored to address the specific management issues.<br>f. Adaptive management changes related to existing grazing permits should be undertaken only where improper grazing is determined to be the causal factor in not meeting habitat characteristics, specific to site capability, based on monitoring, with appropriate spatial variability. See **Appendix C**.<br>g. Where management changes are needed and necessary pursuant to (f), above, implement management actions that are narrowly tailored to address the specific habitat objective applied at the allotment or activity plan level, including the actions outlined in **Appendix C**, | thresholds based on GRSG Habitat Objectives Table and Land Health Standards (43 CFR, Part4180.2) and one or more defined responses that will allow the authorizing officer to make adjustments to livestock grazing that have already been subjected to NEPA analysis.<br><br>**South Dakota MD 36:** The NEPA analysis for renewals and modifications of livestock grazing permits/leases that include lands within PHMA will include specific management thresholds, based on GRSG Habitat Objectives (Table 2-3), Habitat Objectives for GRSG and ecological site potential, and one or more defined responses that will allow the authorizing officer to make adjustments to livestock grazing that have already been subjected to NEPA analysis.<br><br>**North Dakota Management Direction LG-1.8:** Develop specific objectives to conserve, enhance or restore PHMA based on ecological site descriptions and assessments (including within wetlands and riparian areas). If an effective grazing system that meets GRSG habitat requirements is not already in place, analyze at least one alternative that conserves, restores or enhances GRSG habitat in the NEPA document prepared for the permit renewal.<br><br>**North Dakota Management Direction LG-1.5**: The NEPA analysis for renewals and modifications of livestock grazing permits/leases that include lands within PHMA will include specific | *(See above.)* | *(See above.)* | *(See above.)* | *(See above.)* | *(See above.)* |

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| *(See above.)* | Grazing Section of BMPs. (The Governor's plan is attached as **Appendix 1** for references to this section.)~~The NEPA analysis for renewals and modifications of livestock grazing permits/leases that include lands within SFA and PHMA will include specific management thresholds, based on GRSG Habitat Objectives Table, Land Health Standards (43 CFR 4180.2) and ecological site potential, and one or more defined responses that will allow the authorizing officer to make adjustments to livestock grazing that have already been subjected to NEPA analysis.~~ | management thresholds, based on GRSG Habitat Objectives (Table 2-3), Habitat Objectives for GRSG and ecological site potential, and one or more defined responses that will allow the authorizing officer to make adjustments to livestock grazing that have already been subjected to NEPA analysis.<br><br>**Lewistown Action LG 1.5** The NEPA analysis for renewals and modifications of livestock grazing permits/leases that include lands within PHMA will include specific management thresholds, based on GRSG Habitat Objectives (Table 2-2), Land Health Standards (43 CFR, Part 4180.2) and ecological site potential, and one or more defined responses that will allow the authorizing officer to make adjustments to livestock grazing that have already been subjected to NEPA analysis.<br><br>**Lewistown Action LG-1.10**: Conserve, enhance, or restore PHMA based on ecological site descriptions (including wetlands and riparian areas). If an effective grazing system that meets GRSG habitat objectives is not already in place, analyze at least one allotment-specific alternative within the planning unit/permit renewal process that conserves, restores, or enhances PHMA. | *(See above.)* | *(See above.)* | *(See above.)* | *(See above.)* | *(See above.)* |

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| **MD RM-10:** Allotments within PHMA, focusing on those containing riparian areas, including wet meadows, would be prioritized for field checks to help ensure compliance with the terms and conditions of the grazing permits. Field checks could include monitoring for actual use, utilization, and use supervision. | **MD LG 17**: Allotments within ~~SFA, followed by those within~~ PHMA with declining Greater Sage-Grouse populations, defined by a soft or hard adaptive management trigger being engaged and/or with land health concerns, ~~and focusing on those containing riparian areas, including wet meadows,~~ will be prioritized for field checks ~~to help ensure compliance with the terms and conditions of the grazing permits. Field checks can include monitoring for actual use, utilization, and use supervision. Management and conservation action prioritization will occur at the Conservation Area (CA) scale and be based on GRSG population and habitat trends: Focusing management and conservation actions first in SFA followed by areas of PHMA outside SFA~~. | **Dillon MD LG 17**: Allotments within SFA, followed by those within PHMA, and focusing on those containing riparian areas, including wet meadows, will be prioritized for field checks to help ensure compliance with the terms and conditions of the grazing permits. Field checks can include monitoring for actual use, utilization, and use supervision. Management and conservation action prioritization will occur at the Conservation Area (CA) scale and be based on GRSG population and habitat trends: Focusing management and conservation actions first in SFA followed by areas of PHMA outside SFA.<br><br>**Billings LG-16, Lewistown LG 1.5, HiLine Grazing MD-17, Miles City MD-5, North Dakota Part of Management Direction LG 1.5, and South Dakota MD-35:** Allotments within PHMA, focusing on those containing riparian areas, including wet meadows, will be prioritized for field checks to help ensure compliance with the terms and conditions of the grazing permits. Field checks can include monitoring for actual use, utilization, and use supervision | **MD LG 11**: Allotments within ~~SFA, followed by those within~~ PHMAs, and focusing on those containing riparian areas, including wet meadows, will be prioritized for field checks to help ensure compliance with the terms and conditions of the grazing permits. Field checks could include monitoring for actual use, utilization, and use supervision. | **MD LG 14:** Allotments within SFA, followed by those within PHMA, and focusing on those containing riparian areas, including wet meadows, will be prioritized for field checks to help ensure compliance with the terms and conditions of the grazing permits. Field checks could include monitoring for actual use, utilization, and use supervision. | ~~**MA LG-9:** In PHMA, assess livestock grazing in riparian and meadow complexes and ensure recovery or maintenance of appropriate vegetation and water quality. Where recovery or maintenance is not occurring and the causal factor is livestock grazing, reduce pressure on riparian or wet meadow vegetation used by GRSG in the summer by adjusting grazing management practices (e.g., use fencing/herding techniques, or changes in seasonal use or livestock distribution).~~<br><br>~~Allotments within SFA, followed by those within PHMA, and focusing on those containing riparian areas, including wet meadows, will be prioritized for field checks to help ensure compliance with the terms and conditions of the grazing permits. Field checks could include monitoring for actual use, utilization, and use supervision.~~ | **MD LG 5**: BLM monitoring would be used to evaluate progress toward achieving land health standards within PHMA and, where not achieved, to determine if existing grazing management practices or levels of grazing use on public lands are significant factors in failing to meet, maintain or make progress toward achieving the standards and conform with the guidelines, which through this process will identify appropriate actions to address nonachievement and nonconformance.<br><br>~~Allotments within SFAs, followed by those within PHMA, and focusing on those containing riparian areas, including wet meadows, will be prioritized for field checks to help ensure compliance with the terms and conditions of the grazing permits. Field checks include monitoring for actual use, utilization, and use supervision.~~ | Summary statement:<br>• Monitoring to LHS/habitat objectives, including riparian monitoring and prioritizing "field checks"<br><br>Applicability for RMPs?<br>Prioritization of monitoring and "field checks" is not an RMP decision. It depends on staffing, budget, and the consideration of other resource issues that include, but are not limited to GRSG, other listed species, LHS, wildfire, or other resource concerns.<br><br>The 2015 FWS listing determination cited the prioritization for reviewing grazing permits and conducting monitoring to determine if changes may be needed to meet GRSG habitat conditions – though it also noted that other criteria could be considered.<br><br>43 CFR 4180 directs BLM to take appropriate action if livestock are the causal factor for failing to achieve the land health standards. Handbook 4180 also provided guidance on assessing/evaluating Standard 2 which is the Riparian standard. |

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| **MD RM-11:** (ADH) Manage riparian areas and wet meadows for proper functioning condition within ADH.<br><br>**MD RM-12:** (ADH) Within ADH, manage wet meadows to maintain diverse species richness, including a component of perennial forbs, relative to site potential (i.e., reference state).<br><br>**MD RM-13:** (ADH) Establish permit/lease terms and conditions in conjunction with grazing strategies to ensure that the timing and level of utilization results in wet meadows with diverse species richness, including a component of perennial forbs, relative to site potential (i.e., reference state). | — | **Lewistown Action LG-1.18**: Within PHMA, reduce hot season grazing on riparian and meadow complexes to promote recovery or maintenance of appropriate vegetation and water quality. Use fencing/herding techniques or seasonal use or livestock distribution changes to reduce pressure on riparian or wet meadow vegetation used by GRSG in summer. Hot season use of riparian and wet meadow complexes may be authorized where consistent with overall GRSG habitat objectives and where use is currently resulting in vegetative conditions that are in conformance with land health standards.<br><br>**HiLine (Same as Riparian MD-10):** Grazing techniques and practices detailed in Appendix I will be implemented to reduce hot season (summer) grazing on riparian and meadow complexes within the PHMA. Alternative water facilities will be installed to relieve grazing impacts on riparian areas inside of priority sage-grouse habitat. | **MD LG 12**: Grazing management strategies for riparian areas and wet meadows will, at a minimum, maintain or achieve proper functioning condition (PFC) and promote GRSG brood-rearing habitat objectives (Table 2-2) within PHMAs and GHMAs. | — | ~~**MA-LG-8:** In PHMA, manage riparian areas and wet meadows for proper functioning condition.~~ | **MD LG 10**: ~~Grazing between~~ In PHMA, for riparian habitats and/or wet meadow communities utilized by Greater Sage-Grouse, livestock grazing would be managed ~~and upland habitats will be balanced~~ to promote the production and availability of beneficial forbs ~~to GRSG~~ for use during ~~nesting and~~ brood-rearing~~, while maintaining upland conditions and functions. Grazing in meadows, mesic habitats, and riparian pastures also will be balanced to promote the production and availability of beneficial grasses and forbs for use during late brood-rearing within PHMA, while maintaining upland conditions and functions.~~ | Summary statement:<br>• Management of riparian areas/wet meadows<br><br>Applicability for RMPs?<br>Riparian management is not a solely livestock grazing issue. Managing for PFC is related to land health standards and vegetation management in an RMP. Including it in the livestock grazing section implies that grazing is the only affected or responsible resource use, which it is not.<br><br>Desired conditions and associated management for riparian areas are a component of the "suitable habitat" action when it comes to GRSG, and/or are addressed in vegetation sections of the original RMP decisions. As this is a duplicative concept with language and concepts in the GRSG habitat objectives and land health standards it is being considered for removal from specific reference in the livestock grazing section under Alternatives 4 and 5. |
| **MD RM-14:** (ADH) Authorize new water development only after determining that the project will not adversely impact GRSG from habitat loss. Ensure that adequate long-term grazing management is in effect before authorizing water developments that may increase levels of use or change season of use. Give specific consideration to adjacent or downstream wetland habitat when a project entails a diversion from a spring or seep. | — | — | **MD LG 16:** Authorize new water developments for diversion from spring or seep source, in accordance with state water law and subject to valid existing rights when PHMAs and GHMAs will benefit from or not be negatively impacted by the new development. This includes developing new water sources for livestock as part of a grazing management plan to improve GRSG habitat. | — | **MA-LG-10:** In PHMA, manage existing and ~~limit authorization of~~ new water developments to ~~projects that~~ have a neutral ~~effect~~ or ~~are~~ beneficial effect to GRSG habitat~~ (such as by shifting livestock use away from critical areas). New developments that divert surface water must be designed to maintain riparian or wet meadow vegetation and hydrology to meet GRSG needs~~. | — | Summary statement:<br>• Guidance/Management for new water developments<br><br>Applicability for RMPs?<br>Developed consolidated management in the alternative table above that combines management for any new grazing improvement project. See chapter 2 Livestock Grazing decisions RM-4 and RM-5. |

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| **MD RM-15:** (ADH) Analyze springs, seeps and associated pipelines to determine if modifications are necessary to maintain the continuity of the predevelopment riparian area. If necessary to maintain GRSG populations or reverse a downward population trend caused by habitat loss, modify the project as necessary to restore the applicable wetland habitat. | — | — | **MD LG 15:** In accordance with state water law and subject to valid existing rights, remove or modify water developments that are negatively impacting GRSG habitats.<br><br>**MD LG 17:** Modify water development projects to ensure riparian habitats in PHMAs and GHMAs are being maintained or improved in compliance with valid existing rights and in accordance with state water law.<br><br>**MD LG 19:** In PHMAs and GHMAs, remove livestock ponds built in perennial channels that are negatively impacting riparian habitats, either directly or indirectly, unless riparian access is able to be controlled and negative impacts effectively mitigated (e.g.; water gap fence to pond), and do not permit new ones to be built in these areas subject to valid existing rights. Prior to pond removal, offsite watering options will be examined and considered. | **MD LG 6:** Authorize new, relocate, or modify existing range improvements that use seeps or springs as a water source to enhance their year round functionality. Install or retrofit wildlife escape ramps in all livestock water troughs or water storage facilities (e.g., catchments, storage tanks).<br><br>Maintain, enhance, or reestablish riparian areas in PHMA and GHMA<br><br>**MD LG 7:** Identify playas, wetlands, and springs that have been modified for livestock watering within PHMA and GHMA. Identify those water improvements that have Greater Sage-grouse population limiting implications, and develop projects for rehabilitation. Further actions should be instigated for development of water off site; new water should be available before existing water is eliminated. | ~~**MA LG-11:** In PHMA, evaluate existing water developments (springs, seeps, etc., and their associated pipelines) to determine if modifications are necessary to maintain or improve riparian areas and GRSG habitat. Make modifications where necessary, considering impacts on other water uses when such considerations are neutral or beneficial to GRSG.~~ | **MD LG 12**: Existing water developments associated with springs and seeps will be evaluated and associated pipelines/structures to those developments having a negative effect on PHMA will be modified. | Summary statement:<br>• Guidance/Management of existing water developments (monitor, evaluate, maintain, adjust, and/or remove)<br><br>Applicability for RMPs?<br>Developed consolidated management in the alternative table above that combines management for any existing grazing improvement project. See chapter 2 Livestock Grazing decisions RM-4 and RM-5. |

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| **MD RM-16:** (ADH) Manage for a habitat objective that is primarily sagebrush with a mosaic of seral stages and sagebrush in all age classes. On a site-by-site basis, do not allow treatments that would adversely affect GRSG populations. See Appendix H, Guidelines for Implementation and Adaptive Management. | — | **North Dakota Management Direction LG-1.16**: In PHMA, allow treatments that conserve, enhance or restore GRSG habitat as well as other priority species habitat (this includes treatments that benefit livestock as part of an AMP/Conservation Plan to improve GRSG habitat). | — | — | ~~**MA-LG-12:** In PHMA, ensure that vegetation treatments conserve, enhance or restore GRSG habitat (this includes treatments that benefit livestock).~~ | — | Summary statement:<br>• Direction for "treatments" that help GRSG<br><br>Applicability for RMPs?<br>Not a grazing specific action. Management actions for vegetation treatments are addressed in management actions in the vegetation section, which are not being changed by this amendment effort. As this is a duplicative concept with language and concepts in the GRSG habitat objectives and land health standards it is being considered for removal from specific reference in the livestock grazing section under Alternatives 4 and 5. |
| — | **MD LG 5**: When modifying grazing management, analyze indirect impacts on habitat, including changes in fuel loading and wildfire behavior. | **Dillon MD LG 5**: When modifying grazing management, analyze indirect impacts on habitat, including changes in fuel loading and wildfire behavior. | — | — | — | — | Summary statement:<br>• Future NEPA guidance<br><br>Applicability for RMPs?<br>Identification of what to analyze in future NEPA actions is not an RMP decision. That's a NEPA policy implementation issue. |

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| **MD RM-17:** (PHMA) Evaluate the role of existing seedings that are currently composed of primarily introduced perennial grasses in and adjacent to GRSG PHMA to determine if they should be restored to sagebrush or habitat of higher quality for GRSG. If these seedings are part of an Allotment Management Plan/Conservation Plan or if they provide value in conserving or enhancing the rest of PHMA, then no restoration would be necessary. Assess the compatibility of these seedings for GRSG habitat or as a component of a grazing system during the land health assessments (Davies et al. 2011).<br><br>For example: Some introduced grass seedings are an integral part of a livestock management plan and reduce grazing pressure in important sagebrush habitats or serve as a strategic fuels management area. | — | **Lewistown Action LG-1.21**: Evaluate the role of existing seedings that are currently composed of primarily introduced perennial grasses in and adjacent to PHMA to determine if they should be restored to sagebrush or habitat of higher quality for GRSG. If these seedings are part of a grazing management plan that is providing value in conserving or enhancing native rangelands in PHMA and other priority wildlife habitats, then no restoration will be necessary. Assess the compatibility of these seedings for GRSG habitat or as a component of a grazing system during the land health evaluation and determination process.<br><br>**North Dakota Management Direction LG-1.17**: Evaluate the role of existing seedings that are currently composed of primarily introduced perennial grasses in and adjacent to PHMA to determine if they should be restored to sagebrush or habitat of higher quality for GRSG. If these seedings are part of an AMP/Conservation Plan or if they provide value in conserving or enhancing the rest of the PHMA, then no restoration will be necessary. Assess the compatibility of these seedings for GRSG habitat or as a component of a grazing system during the land health assessments. | — | — | ~~**MA-LG-13**: In PHMA, evaluate the role of existing seedings that are currently composed of primarily introduced perennial grasses to determine if they should be restored to sagebrush or habitat of higher quality for GRSG. If existing seedings provide value in conserving or enhancing GRSG habitats, then no restoration will be necessary. Assess the compatibility of these seedings for GRSG habitat during the land health assessments.~~ | — | Summary statement:<br>• Seedings (evaluate, restore, management)<br><br>Applicability for RMPs?<br>Not a grazing specific action. Management objectives for vegetation treatments are encapsulated by the GRSG habitat objective and are captured in management by the connection between LHS and habitat objectives. As this is a duplicative concept with language and concepts in the GRSG habitat objectives and land health standards it is being considered for removal from specific reference in the livestock grazing section under Alternatives 4 and 5. |

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| **MD RM-18:** (ADH) Design new range improvement projects to enhance livestock distribution and to control the timing and intensity of utilization. Examples of structural range improvement projects are cattle guards, fences, corrals, pipelines, troughs, storage tanks, windmills, ponds/reservoirs, solar panels, and spring developments.<br><br>Include a plan to monitor and control invasive plant species following any related ground disturbance. Place mineral or salt supplements away from water sources and leks in locations that enhance livestock distribution. | **MD LG 11:** Design any new structural range improvements, following appropriate cooperation, consultation and coordination, to minimize and/or mitigate impacts on GRSG habitat. Any new structural range improvements should be placed along existing disturbance corridors or in unsuitable habitat, to the extent practical, and are subject to RDFs (**Appendix C**). Structural range improvement in this context, include, but are not limited to: fences, exclosures, corrals or other livestock handling structures; pipelines, troughs, storage tanks (including moveable tanks used in livestock water hauling), windmills, ponds/reservoirs, solar panels and spring developments. | **Dillon MD LG 11:** Design any new structural range improvements, following appropriate cooperation, consultation and coordination, to minimize and/or mitigate impacts on GRSG habitat. Any new structural range improvements should be placed along existing disturbance corridors or in unsuitable habitat, to the extent practical, and are subject to RDFs (**Appendix C**). Structural range improvement in this context, include, but are not limited to: fences, exclosures, corrals or other livestock handling structures; pipelines, troughs, storage tanks (including moveable tanks used in livestock water hauling), windmills, ponds/reservoirs, solar panels and spring developments.<br><br>**Lewistown Action LG-1.24**: In PHMA, site and design new structural range improvements and location of supplements (salt or protein blocks) to conserve, enhance, or restore said habitat through an improved grazing management system relative to GRSG habitat objectives. Structural range improvements, in this context, include cattle guards, fences, exclosures, corrals, or other livestock handling structures; pipelines, troughs, storage tanks (including movable tanks used in livestock water hauling), windmills, ponds/reservoirs, solar panels, and spring developments).<br><br>**North Dakota Management Direction LG-1.18**: In PHMA, design any new structural range improvements and location of supplements (salt or protein blocks) to | **MD LG 13:** For range improvement projects, review Objective SSS 4 and apply MDs SSS 1 through SSS 4 when reviewing and analyzing projects and activities proposed in GRSG habitat. | — | ~~**MA LG-14:** In PHMA, design new structural range improvements to have a neutral effect or conserve, enhance, or restore GRSG habitat through an improved grazing management system relative to GRSG objectives. Structural range improvements, in this context, include but are not limited to: cattle guards, fences, exclosures, corrals or other livestock handling structures; pipelines, troughs, storage tanks (including moveable tanks used in livestock water hauling), windmills, ponds/reservoirs, solar panels and spring developments. Potential for invasive species establishment or increase following construction must be considered in the project planning process and monitored and treated post-construction.~~ | **MD LG 11**: Range improvement projects will be planned and authorized in a way that contributes to rangeland health and maintains and/or improves Greater Sage-Grouse and its habitat. | Summary statement:<br>• Guidance/Management for new range improvement projects<br><br>Applicability for RMPs?<br>Developed consolidated management in the alternative table above that combines management for any new grazing improvement projects. See chapter 2 Livestock Grazing decisions RM-4 and RM-5. |

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| *(See above.)* | *(See above.)* | conserve, enhance, or restore GRSG habitat through an improved grazing management system relative to GRSG objectives. Structural range improvements, in this context, include but are not limited to: cattle guards, fences, exclosures, corrals or other livestock handling structures; pipelines, troughs, storage tanks (including moveable tanks used in livestock water hauling), windmills, ponds/reservoirs, solar panels and spring developments. Potential for invasive species establishment or increase following construction must be considered in the project planning process and monitored and treated post-construction.<br><br>**South Dakota MD-37: Range Improvements:** Range improvements in PHMA would be allowed if the improvements would not impact GRSG, improvements would provide a conservation benefit to GRSG such as fences for protecting important seasonal habitats, or if improvements would meet the lek buffer requirement. Refer to Appendix B for a discussion about GRSG lek buffers. | *(See above.)* | *(See above.)* | *(See above.)* | *(See above.)* | *(See above.)* |

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| **MD RM-19:** (PHMA) Where conditions create the potential for impacts from West Nile virus from developments or modification of water developments, use preferred design features (PDFs)/RDFs to mitigate the potential impacts. See **Appendix C** (Required Design Features, Preferred Design Features, and Suggested Design Features). | — | **Lewistown Action LG-1.26**: When developing or modifying water developments in PHMA and GHMA, use applicable RDFs (Appendix C) to reduce potential impacts from West Nile virus.<br><br>**HiLine (Same as Vegetation MD-9):** Water developments will be installed and/or maintained to facilitate control of livestock use of vegetation, support other uses, and protect resource values. In order to minimize surface disturbance, have reliable water of better quality and not alter normal surface flow of water, alternative water developments will be emphasized before constructing new pits and reservoirs. The BLM will manage water developments within Greater Sage-Grouse habitat to reduce the spread of West Nile virus (Appendix I).<br><br>**Miles City MD 1:** Where deemed effective, water developments will be managed to reduce the spread of West Nile virus (see Appendix C, GRSG Required Design Features).<br><br>**North Dakota Management Direction LG-1.19**: When developing or modifying water developments in PHMA, use applicable RDFs (Appendix C of the 2015 Greater Sage-Grouse Approved RMPA/ROD2 [BLM 2015a]) to mitigate potential impacts from West Nile virus. | — | **MD LG 8:** Design new and maintain existing water projects to avoid standing pools of shallow water that would spread West Nile Virus. | — | — | Summary statement:<br>• West Nile virus guidance<br><br>Applicability for RMPs?<br>These are worded like a BMP and were added to the livestock grazing BMP appendix. |

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| **MD RM-20:** (PHMA) Evaluate existing structural range improvements to determine if modifications are necessary to maintain GRSG populations or reverse a downward population trend caused by habitat loss. Modify, relocate, or remove projects as necessary. | **MD LG 12:** During the land health assessment and grazing permit renewal process, evaluate existing livestock management range improvements with respect to their effect on GRSG habitat. Consider removal of projects that are not needed for effective livestock management, are no longer in working condition, and/or negatively affect GRSG habitat, with the exception of functional projects needed for management of habitat for other threatened, endangered or proposed species or other sensitive resources. | **Dillon MD LG 12:** During the land health assessment and grazing permit renewal process, evaluate existing livestock management range improvements with respect to their effect on GRSG habitat. Consider removal of projects that are not needed for effective livestock management, are no longer in working condition, and/or negatively affect GRSG habitat, with the exception of functional projects needed for management of habitat for other threatened, endangered or proposed species or other sensitive resources. | | **MD LG 10:** Avoid construction of livestock facilities and supplemental feeding of livestock within 1.2 mile of occupied or pending leks in Greater Sage-grouse habitat unless it is part of an approved habitat improvement project or approved by the authorized officer to improve ecological health or to create mosaics in dense sagebrush stands that are needed for optimum Greater Sage-grouse habitat. | ~~**MA LG 15:** In PHMA, evaluate existing structural range improvements to make sure they have a neutral effect or conserve, enhance or restore GRSG habitat.~~ | **MD LG 8**: In ~~GHMA and~~ PHMA, existing range improvements (e.g., fences, livestock/wildlife watering facilities) would continue to be evaluated and modified when necessary. ~~The potential risk to Greater Sage-Grouse and its habitats from existing structural range improvements will be evaluated. The potential for modification of those structural range improvements identified as posing a risk will be addressed.~~ | Summary statement:<br>• Guidance/Management of existing structural range improvements (evaluate, maintain, adjust, and/or remove), as well as mineral/salt supplements<br><br>Applicability for RMPs?<br>Developed a consolidated management action specific to management of existing grazing projects in GRSG HMAs. See chapter 2 Livestock Grazing decisions RM-4 and RM-5. |
| Place mineral and salt supplements away from water sources and leks in locations that enhance livestock distribution. | **MD LG 9:** Evaluate the locations where salt/supplements are placed, coordinate salt/supplements placement to reduce impacts on GRSG habitat (e.g., existing disturbed areas). | **Dillon MD LG 9:** Evaluate the locations where salt/supplements are placed, coordinate salt/supplements placement to reduce impacts on GRSG habitat (e.g., existing disturbed areas).<br><br>**Lewistown Action LG-1.27**: During the land health evaluation and determination and grazing authorization renewal process (typically every 10 years), examine existing structural range improvements and location of supplements (salt or protein blocks) to ensure they conserve, enhance or restore PHMA.<br><br>During the allotment evaluation and determination and grazing authorization renewal process, examine existing structural range improvements to ensure they conserve, enhance, or restore PHMA.<br><br>**HiLine Same as Wildlife MD-43g):** Existing range improvements, including the location of supplements, will be | **MD LG 18:** Locate salting and supplemental feeding locations, temporary or mobile watering, and new handling facilities (e.g., corrals and chutes) at least 1 mile from riparian areas, springs, and meadows. The distance can be greater based on site-specific conditions. | Supplemental feeding in Greater Sage-grouse habitat must be part of an approved habitat improvement plan or approved by the authorized officer. | | Supplements and supplemental feeding would continue to be authorized where appropriate. | As for the supplement guidance, supplemental feeding has to be approved by the AO, whether it is in this RMP or not. And terms and conditions can include (and usually do include) specifications on where/where not to place supplements. As such, it is not an RMP decision, but fits better as grazing BMPs, where these concepts are considered to be moved under Alternatives 4 and 5. |

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| *(See above.)* | *(See above.)* | evaluated and if necessary modified to conserve, enhance or restore sage-grouse habitat.<br><br>**North Dakota Management Direction LG-1.20**: In PHMA, evaluate existing structural range improvements and location of supplements (salt or protein blocks) during grazing lease renewal process to make sure they conserve, enhance or restore GRSG habitat. | *(See above.)* | *(See above.)* | *(See above.)* | *(See above.)* | *(See above.)* |
| **MD RM-21:** (ADH) Mark fences in high risk areas (Christiansen 2009; Stevens 2011).<br><br>(PHMA) Where marking fences does not reduce fence-related GRSG mortality, modify fences. Where modification does not reduce GRSG mortality and the fence-related mortality is sufficient to adversely affect GRSG populations, remove fences. | **MD LG 13**: Prioritize removal, modification or marking of fences or other structures in areas of high collision risk following appropriate cooperation, consultation and coordination to reduce the incidence of GRSG mortality due to fence strikes (Stevens et al. 2012). | **Dillon MD LG 13**: Prioritize removal, modification or marking of fences or other structures in areas of high collision risk following appropriate cooperation, consultation and coordination to reduce the incidence of GRSG mortality due to fence strikes (Stevens et al. 2012).<br><br>**Lewistown Action LG-1.27** Identify and mark fences in high and moderate risk areas, as identified by the use of "The Fence Collision Risk Tool" (http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/) within PHMA, based on proximity to lek, lek size, and topography (Stevens 2011, Stevens et al. 2013).<br><br>**North Dakota Management Direction LG-1.20:** To reduce outright GRSG strikes and mortality, remove, modify or mark fences in high risk areas within PHMA based on proximity to lek, lek size, and topography. | **MD LG 14:** Build or modify livestock exclosures so that they are large enough to provide hiding cover to GRSG and other wildlife and to reduce the possibility of wildlife collisions with fences (Christiansen 2009; Stevens 2011; NRCS 2012).<br><br>**MD LG 23:** Fences shall not be constructed or reconstructed within 1.2 miles from the perimeter of occupied leks, unless the collision risk can be mitigated through design features or markings (e.g., mark, laydown fences, and design). | **MD LG 9:** Remove, modify, or mark fences identified as high risk for collisions, generally within 1.2 miles of occupied or pending leks. | **MA-LG-16:** To reduce outright GRSG strikes and mortality, remove, modify or mark fences in high risk areas (Stevens et al. 2012) based on proximity to lek (e.g., within 1.2 miles of a lek), lek size, and topography, or as latest science indicates. ~~Prioritize actions in SFA first, then PHMA.~~<br><br>Employ NRCS fence collision risk tool (NRCS/CEAP Conservation Insight Publication "Applying the Sage Grouse Fence Collision Risk Tool to Reduce Bird Strikes"). | — | Summary statement:<br>• Fences – construction, reconstructions, marking, removal, modification, etc.<br><br>Applicability for RMPs?<br>Developed a consolidated management action specific to management of fences in GRSG HMAs. See chapter 2 Livestock Grazing decision RM-6. |

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| **Colorado** | **Idaho** | **Montana/Dakotas** | **Nevada/California** | **Oregon** | **Utah** | **Wyoming** | **NOTES** |
| **MD RM-22:** (ADH) Monitor for and treat invasive species associated with existing range improvements (Gelbard and Belnap 2003; Bergquist et al. 2007). | — | **Lewistown Action LG-1.27:** In PHMA and GHMA, monitor for and treat invasive and noxious weed species associated with existing range improvement projects.<br><br>**North Dakota Management Direction LG-1.20:** Monitor for, and treat invasive species associated with existing range improvements. | — | — | ~~**MA-LG-17:** In PHMA, monitor for and treat noxious weeds and treat invasive species where needed, associated with existing range improvements.~~ | — | Summary statement:<br>• Invasive species associated with range improvements<br><br>Applicability for RMPs?<br>Don't need a specific management action related to weeds in livestock grazing. The GRSG habitat objectives encapsulates the weed issue. The language in the management actions are not required to be an RMP decision to implement given language that is already captured in the habitat objective to manage for suitable GRSG habitat. |
| **MD RM-23:** (ADH) At the time a permittee or lessee voluntarily relinquishes a permit or lease, the BLM will consider whether the public lands where that permitted use was authorized shall remain available for livestock grazing or be used for other resource management objectives, such as reserve common allotments or fire breaks. This does not apply to or impact grazing preference transfers, which are addressed in 43 CFR, Part 4110.2-3.<br><br>When a permittee or lessee voluntarily relinquishes grazing preference, consider conversion of the allotment to a reserve common allotment that will remain available for use on a temporary, nonrenewable basis for the benefit of GRSG habitat. Authorize temporary nonrenewal permits in Reserve Common Allotments to meet resource objectives elsewhere such as rest or deferment due to fire or vegetation treatments. Temporary use of reserve common allotments would not be allowed due to drought or overuse of customary allotments. | **MD LG 18**: At the time a permittee or lessee voluntarily relinquishes a permit or lease, the BLM will consider whether the public lands where that permitted use was authorized should remain available for livestock grazing or be used for other resource management objectives, such as reserve common allotments or fire breaks. This does not apply to or impact grazing preference transfers, which are addressed in 43 CFR 4110.2-3. | **Dillon MD LG 18, Billings Management Direction LG-17, Lewistown Action LG 1.5, HiLine LG-16, Miles City Management Decision 6, North Dakota Management Decision LG-1.7, South Dakota MD-23:** At the time a permittee or lessee voluntarily relinquishes a permit or lease, the BLM will consider whether the public lands where that permitted use was authorized should remain available for livestock grazing or be used for other resource management objectives, such as reserve common allotments or fire breaks. This does not apply to or impact grazing preference transfers, which are addressed in 43 CFR 4110.2-3.<br><br>**Billings MD-LG-11:** All allotments wholly located in Greater Sage-Grouse PHMA will be considered for retirement, where the base property owner relinquishes their preference | **MD LG 21:** At the time a permittee or lessee voluntarily relinquishes a permit or lease, the BLM will consider whether the public lands where that permitted use was authorized shall remain available for livestock grazing or be used for other resource management objectives, such as reserve common allotments and fire breaks. This does not apply to or impact grazing preference transfers, which are addressed in 43 CFR, Part 4110.2-3. | **MD LG 15:** At the time a permittee or lessee voluntarily relinquishes a permit or lease, the BLM will consider whether the public lands where that permitted use was authorized should remain available for livestock grazing or be used for other resource management objectives, such as reserve common allotments. This does not apply to or impact grazing preference transfers, which are addressed in 43 CFR, Part 4110.2-3. | ~~**MA-LG-18:** At the time a permittee or lessee voluntarily relinquishes a permit or lease, the BLM will consider whether the public lands where that permitted use was authorized should remain available for livestock grazing or be used for other resource management objectives, such as reserve common allotments or fire breaks. This does not apply to or impact grazing preference transfers, which are addressed in 43 CFR, Part 4110.2-3.~~ | **MD LG 6:** At the time a permittee or lessee voluntarily relinquishes a permit or lease, the BLM will consider whether the public lands where that permitted use was authorized should remain available for livestock grazing or be used for other resource management objectives, such as reserve common allotments or fire breaks. This does not apply to or impact grazing preference transfers, which are addressed in 43 CFR 4110.2-3. | Summary statement:<br>• Relinquishment<br><br>Applicability for RMPs?<br>Retained this specific grazing management action in chapter 2 as Management Action RM-7. |

| 2019 Amendments/Revisions | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Colorado** | **Idaho** | **Montana/Dakotas** | **Nevada/California** | **Oregon** | **Utah** | **Wyoming** | **NOTES** |
| — | **MD LG 10**: Incorporate RDFs into Terms and Conditions for crossing permits to limit disturbance of occupied leks when trailing livestock across BLM administered lands in the spring. Work with permittees in locating over-nighting, watering and bedding locations to minimize impacts on seasonal habitats. | **Dillon MD LG 10**: Incorporate RDFs into Terms and Conditions for crossing permits to limit disturbance of occupied leks when trailing livestock across BLM administered lands in the spring. Work with permittees in locating over-nighting, watering and bedding locations to minimize impacts on seasonal habitats. | — | **MD LG 3:** The timing and location of livestock turnout and trailing shall not contribute to livestock congregation on occupied or pending leks during the Greater Sage-grouse breeding season of March 1 through June 30. | — | **MD LG 9:** Livestock trailing that is authorized will include a trailing plan to utilize non-habitat to the extent possible, include specific routes and timeframes for trailing, utilize existing trails, and avoid stopovers on occupied leks, as appropriate. | Summary statement:<br>• Management of trailing activities<br><br>Applicability for RMPs?<br>The existing language fits better as BMPs, not as RMP decisions. Included in the BMP appendix under Alternatives 4 and 5. |
| — | **MD LG 7**: Where opportunities exist, establish forage reserves to facilitate restoration and rehabilitation efforts in GRSG habitat areas. A forage reserve is an area that is set aside for use as needed by various permittees who might be displaced by wildfire, ESR, restoration efforts, etc. rather than having a term permit issued for grazing like a regular allotment. | **Dillon MD LG 7**: Where opportunities exist, establish forage reserves to facilitate restoration and rehabilitation efforts in GRSG habitat areas. A forage reserve is an area that is set aside for use as needed by various permittees who might be displaced by wildfire, ESR, restoration efforts, etc. rather than having a term permit issued for grazing like a regular allotment. | — | — | — | — | Summary statement:<br>• Forage reserves<br><br>Applicability for RMPs?<br>Reserve Common Allotments are already included in Management Action RM-7. As such, a separate action is not needed as an RMP action. The area would still be available for livestock grazing, but authorizations would be applied to fill in for areas where authorized uses could not occur due to fire or vegetation treatments. Additional language is included in the BMP appendix for Alternatives 4 and 5. |

| 2019 Amendments/Revisions | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Colorado** | **Idaho** | **Montana/Dakotas** | **Nevada/California** | **Oregon** | **Utah** | **Wyoming** | **NOTES** |
| — | — | — | **MD LG 9:** When a transfer application is received for preference on an allotment within GRSG habitat:<br>• Transfer of Preference: A transfer of preference will be approved unless the applicant does not meet qualifications (43 CFR, Part 4110.1 and 4110.2). A transfer will be approved to an unqualified applicant if 4110.2-3(e) applies.<br>• Issuing the permit: In accordance with Section 402(c)(2) of FLPMA, a new permit will be issued to the new preference holder with the same terms and conditions as the terminated permit unless:<br>– A NEPA analysis of alternative terms and conditions has been completed. If changes in terms and conditions are needed to meet sage-grouse habitat needs or otherwise make progress toward meeting land health standards, issue a decision offering a permit with the new terms and conditions<br>– If a new permit is issued as required by Section 402(c)(2) of FLPMA, then determine priority for completing land health evaluations, habitat assessments and NEPA analysis as described in MD LG 1. | — | — | — | Summary statement:<br>• Transfers<br><br>Applicability for RMPs?<br>Not needed as an RMP action; can consider this type of action without an RMP. Most of this action just cites to regulations or refers to policy. Considered for removal under Alternatives 4 and 5. |

| 2019 Amendments/Revisions | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Colorado** | **Idaho** | **Montana/Dakotas** | **Nevada/California** | **Oregon** | **Utah** | **Wyoming** | **NOTES** |
| — | — | — | **MD LG 20:** In PHMA and GHMA, rest areas that have received vegetative treatments from livestock grazing until resource monitoring data verifies the treatment objectives are being met and an appropriate grazing regime has been developed. Any livestock grazing temporary suspended use or other management changes per 43 CFR, Part 4110.3-2a for the purpose of a vegetation treatment will be done through the grazing decision, prior to treatment.<br><br>**MD LG 22:** After grazing rest associated with vegetation treatments in PHMAs and GHMAs, monitor annually for a minimum of 5 years to ensure project objectives are being maintained. | — | — | — | Summary statement:<br>• Resting after vegetation treatments<br><br>Applicability for RMPs?<br>Don't need a specific RMP management action related to resting treated areas from livestock grazing. The GRSG habitat objectives encapsulates the need to adjust any of the land uses to meet GRSG habitat objectives. The action itself refers to regulations under which such changes would be considered. Beyond that, monitoring is not an RMP decision but is based on available staff and budget. Considered for removal under Alternatives 4 and 5. |

# Appendix 16

## Montana and Dakotas Oil and Gas Lease Stipulations for Alternatives 4 and 5

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# Appendix 16. Montana and Dakotas Oil and Gas Lease Stipulations for Alternatives 4 and 5

| No. | Area | Stip Type | Language |
|---|---|---|---|
| 1. | PHMA/RHMA | NSO | GREATER SAGE-GROUSE PHMA/WEST DECKER RHMA (LEKS)<br><br>To protect Greater Sage-grouse breeding activities, surface occupancy and use is prohibited within 0.6 mile of the perimeter of active leks and lek complexes in Priority Habitat Management Areas (PHMA) and West Decker RHMA. |
| 2. | PHMA/RHMA | NSO | GREATER SAGE-GROUSE PHMA/WEST DECKER RHMA (ALL)<br><br>To protect high density Greater-Sage Grouse habitat, including all seasonal habitats, surface occupancy and use is prohibited within Priority Habitat Management Areas.(PHMA) and West Decker RHMA. |
| 3. | PHMA/RHMA | CSU | GREATER SAGE-GROUSE PHMA/WEST DECKER RHMA<br><br>Disturbance/Density Cap<br>To protect Greater-Sage Grouse habitat including all seasonal habitats, projects are subject to disturbance and density thresholds. |
| 4. | GHMA/RHMA | NSO | GREATER SAGE-GROUSE LEKS IN GHMA/MUSSELSHELL RHMA<br><br>To protect Greater Sage-grouse breeding activities, surface occupancy and use is prohibited within 0.6 mile of the perimeter of active leks and lek complexes in General Habitat Management Areas (GHMA) and Musselshell RHMA. |
| 5. | GHMA/RHMA | NSO | GREATER SAGE-GROUSE CRUCIAL WINTER RANGE IN GHMA/MUSSELSHELL RHMA<br><br>To protect Greater Sage-grouse winter concentration area, surface occupancy and use is prohibited for oil and gas exploration and development in crucial winter range in General Habitat Management Areas (GHMA) and Musselshell RHMA. |

| No. | Area | Stip Type | Language |
|---|---|---|---|
| 6. | GHMA/RHMA | CSU | GREATER SAGE-GROUSE SEASONAL HABITATS IN GHMA/MUSSELSHELL RHMA<br><br>Surface occupancy and use will be avoided unless the project proponent can clearly demonstrate that the impacts can be adequately addressed through the application of the mitigation hierarchy, including conservation actions, needed design features, and offsets with initial emphasis on avoidance and minimization. Prior to surface-disturbing or disruptive activities a plan to maintain functionality of breeding, nesting sage-grouse, brood rearing and/or winter habitats for Greater Sage-Grouse will be prepared by the proponent and implemented upon approval by the authorized officer. The plan shall address how short-term and long-term direct and indirect effects to seasonal habitats will be mitigated based on current science and research. |
| 7. | RHMA Cedar Creek | CSU | GREATER SAGE-GROUSE CEDAR CREEK RHMA<br><br>Surface occupancy and use would be allowed with design features to minimize disturbance to sage-grouse habitat within the Cedar Creek Greater Sage-Grouse Restoration Habitat Management Area such that avoidance of impacts to GRSG and habitat is clearly demonstrated to the extent possible. |
| 8. | CHMA | CSU | GREATER SAGE-GROUSE CHMA<br><br>Surface occupancy and use will be avoided unless the project proponent can clearly demonstrate that the impacts to potential stopover sites are adequately addressed through the application of the mitigation hierarchy, including conservation actions, needed design features, and offsets with initial emphasis on avoidance and minimization. Prior to such activities a plan to mitigate impacts will be prepared by the proponent and implemented upon approval by the AO. |
| 9. | ALL HMAs | TL | GREATER SAGE GROUSE HMAs<br><br>To protect Greater Sage-grouse populations utilizing important seasonal habitats, no surface use is allowed from December 1 through March 15 in winter range, March 15 - July 15 in breeding and nesting habitats and during migratory periods for stopover sites. This stipulation does not apply to operation and maintenance of production facilities. |

## 16.1 OIL AND GAS LEASE STIPULATION LANGUAGE AND DETAILS

### 16.1.1 No Surface Occupancy
### Greater Sage-grouse PHMA/West Decker RHMA (LEKS)

Stipulation: To protect Greater Sage-grouse breeding activities, surface occupancy and use is prohibited within 0.6 mile of the perimeter of active leks and lek complexes in Priority Habitat Management Areas (PHMA) and West Decker RHMA.

Objective: To maintain the integrity of Greater Sage-Grouse breeding activities in PHMA/West Decker RHMA and support sustainable Greater-Sage Grouse populations.

Waivers, Exceptions & Modifications (See Cross-Cutting Issues)

### 16.1.2 No Surface Occupancy
### Greater Sage-grouse PHMA/West Decker RHMA (ALL)

Stipulation: To protect high density Greater-Sage Grouse habitat, including all seasonal habitats, surface occupancy and use is prohibited within Priority Habitat Management Areas (PHMA) and West Decker RHMA.

Objective: To maintain areas with the most important of habitats and highest densities of sage-grouse (e.g., core areas) by facilitating long-term sustainability by minimizing impacts to habitat through disturbance and disruption. Since GRSG utilize different seasonal habitats and require connectivity between these areas, oil and gas operations should avoid new surface disturbing and disruptive activities across GRSG breading areas (leks), nesting habitat, brood rearing areas, and winter concentration areas used in mild to severe winters (i.e., all winter range).

Waivers, Exceptions & Modifications (See Cross-Cutting Issues)

### 16.1.3 Controlled Surface Use for Disturbance Cap
### Greater Sage-grouse PHMA/WEST DECKERRHMA

Stipulation: To protect Greater-Sage Grouse habitat including all seasonal habitats, projects are subject to disturbance and density thresholds.

Objective: To reduce anthropogenic disturbance and habitat degradation within PHMA and West Decker RHMA.

Waivers, Exceptions and Modifications (See Cross-Cutting Issues)

### 16.1.4 No Surface Occupancy
### Greater Sage-grouse Leks in GHMA/Musselshell RHMA

Stipulation: To protect Greater Sage-grouse breeding activities, surface occupancy and use is prohibited within 0.6 mile of the perimeter of active leks and lek complexes in General Habitat Management Areas (GHMA) and Musselshell RHMA.

Objective: To maintain the integrity of Greater Sage-Grouse GHMA/Musselshell RHMA and support sustainable Greater-Sage Grouse populations.

Waivers, Exceptions & Modifications (See Cross-Cutting Issues)

### 16.1.5 No Surface Occupancy
### Greater Sage-grouse Crucial Winter Range GHMA/Musselshell RHMA

Stipulation: To protect Greater Sage-grouse winter concentration area, surface occupancy and use is prohibited for oil and gas exploration and development in crucial winter range in General Habitat Management Areas (GHMA) and Musselshell RHMA.

Objective: Maintain the integrity of crucial winter habitat to support sage-grouse populations during severe winters. Crucial winter range is where a high proportion of the species population is located during severe winter conditions (e.g., maximum snow depths in the deepest 2 of 20 years).

Waiver: The Authorized Officer may consider and grant a waiver to if the area mapped as possessing the attributes protected by the stipulation is determined during coordination with the state wildlife agency to lack those attributes and if the area associated with the site proposed for the waiver is no longer in PHMA through the appropriate planning process (i.e., plan maintenance or amendment).

Prior to waiving the NSO stipulation for a given area, the potential waiver shall be subject to public review for at least a 30-day period

Exception: The Authorized Officer may consider and grant an **exception** to the NSO stipulation associated within GHMA Crucial Winter Range if one of the following criteria apply – after documenting the review of available information associated with the site proposed for the exception – both internally compiled and as provided by state, local, or tribal governments, project proponents, other federal agencies, or interested stakeholders:

If it can be demonstrated that the proposed development and surface occupancy would not impair the function or utility of the site for current for subsequent use as seasonal habitat based on at least one of the following:

- The location of the proposed authorization is determined to be non-habitat/unsuitable (as determined by a biologist with GRSG experience using methods such as the Habitat Assessment Framework), and lacks the ecological potential to become marginal or suitable habitat, and does not provide important connectivity between habitat areas, and the project includes design features to prevent indirect disturbance to or disruption of adjacent seasonal habitats that would impair their biological function.
- Topography/areas of non-habitat create an effective barrier to impacts.
- By co-locating the proposed authorization with existing disturbance, no additional impacts would be realized above those already associated with the existing major infrastructure, including indirect disturbance to or disruption of adjacent seasonal habitats that would impair their biological function.
- The proposed location would be undertaken as an alternative to a similar action occurring on a nearby parcel (for example, due to landownership patterns), and development on the parcel in question would have less of an impact on GRSG or its habitat than on the nearby parcel; this exception must also include measures sufficient to allow the BLM to conclude that such benefits will endure for the duration of the proposed action's impacts.

To approve this exception, the Authorized Officer must document, in coordination with the state wildlife agency, that the proposed action satisfies at least one of the criteria listed above.

Prior to granting an exception to an NSO stipulation the potential exception shall be subject to public review for at least a 30-day period.

If the area associated with the proposed exception has met one of the adaptive management triggers (hard or soft), no exceptions would be considered until the causal factor analysis is completed.

### 16.1.6 Controlled Surface Use
### Greater Sage-grouse Seasonal Habitats in GHMA/Musselshell RHMA

Stipulation: Surface occupancy and use will be avoided unless the project proponent can clearly demonstrate that the impacts can be adequately addressed through application of the mitigation hierarchy, including conservation actions, needed design features, and offsets. Prior to surface-disturbing or disruptive activities a plan to maintain functionality of breeding, nesting sage-grouse, brood rearing and/or winter habitats for Greater Sage-Grouse will be prepared by the proponent and implemented upon approval by the authorized officer. The plan shall address how short-term and long-term direct and indirect effects to seasonal habitats will be mitigated based on current science and research.

Objective: To protect the integrity of Greater Sage-grouse General Habitat Management Areas and Musselshell RHMA, promote movement and genetic diversity to, and maintain seasonal habitats to support sustainable populations. Plans to address impacts will in general:

- Utilize the Conservation Buffer distances (Appendix X, and other approved resources) and incorporate Required Design Features (Appendix Y, or other as applicable), such as:
  - The timing of construction (i.e., no surface use is allowed from December 1 through March 15 in winter range and March 15 - July 15 in breeding and nesting habitats)
  - The timing of operations and maintenance (e.g., limit early morning and evening visits to wells near leks during the breeding season)
  - Locate surface disturbing and disruptive activities, such as linear features, infrastructure related to energy development, tall structures (e.g., communication or transmission towers, transmission lines), and low structures (e.g., fences, rangeland structures), to avoid and minimize impacts to seasonal habitats and movement corridors
  - Mitigate noise and related disruptive activities including those that do not result in habitat loss near leks and winter concentration areas

Waiver: The AO may waive this stipulation if no portion of the leasehold is within a General Habitat Management Area.

Exception: The BLM determines that impacts to GRSG and its habitat are minimized such that the proposal will maintain the functionality of SG habitat, while meeting the General Habitat goals and objectives.

Modification: The AO may modify the area subject to the stipulation if an environmental analysis finds a portion of the GHMA is nonessential or no longer Greater Sage-Grouse habitat.

### 16.1.7 Controlled Surface Use
### Greater Sage-grouse Cedar Creek RHMA

Stipulation: Surface occupancy and use would be allowed with design features to minimize disturbance to sage-grouse habitat within the Cedar Creek Greater Sage-Grouse Restoration Habitat Management Area.

Objective: To minimize disturbance to sage-grouse habitat and maximize restoration efforts while allowing for the permitted uses, the project proponent will prepare a plan to maintain functionality of habitats for

Greater Sage-Grouse. The plan will be prepared prior to surface-disturbing or disruptive activities and implemented upon approval by the authorized officer. Plans to address impacts will in general:

- Utilize the buffer distances and analysis provided in Appendix X
- Incorporate Required Design Features (Appendix Y, or other as applicable)
- Timing of construction to avoid disruption to seasonal habitats
- Timing of operations and maintenance to minimize disruption to seasonal habitats
- Placing of linear features, related infrastructure, and surface disturbance in relation to leks.
- Noise and related disruptive activities including those that do not result in habitat loss

Exception: The AO may grant an **Exception** if the proposed action will meet the goals and objectives for sage-grouse habitat.

Modification: The AO, in coordination with MFWP, may modify the boundaries of the stipulated area if portions of the leasehold are no longer sage-grouse habitat and future use by sage-grouse is unlikely.

Waiver: This stipulation may be waived if:

- sage-grouse are no longer a BLM special status species,
- no reasonable alternative development scenario exists, or
- the habitat has been altered to the point sage-grouse no longer occupy the site and there is no reasonable likelihood of sage-grouse reoccupying the site.

Exception: The BLM may approve actions in RHMA that are within the applicable lek buffer distance identified above only if:

- The BLM determines that impacts to GRSG and its habitat are minimized such that the project will cause minor or no new disturbance (ex. co-location with existing authorizations);
- Any residual impacts within the lek buffer-distances are addressed through compensatory mitigation measures sufficient to ensure a net conservation gain as outlined in the Mitigation Strategy (Appendix X).

Modification: The AO may modify the area subject to the stipulation if an environmental analysis finds a portion of the RHMA is nonessential or no longer Greater Sage-Grouse habitat after coordination with the state fish and wildlife entity.

Waiver: The AO may waive this stipulation if no portion of the leasehold is within a Restoration Habitat Management Area.

### 16.1.8 Controlled Surface Use Greater Sage-grouse CHMA

Stipulation: Surface occupancy and use will be avoided unless the project proponent can clearly demonstrate that the impacts to potential stopover sites can be adequately mitigated. Prior to such activities a plan to mitigate impacts will be prepared by the proponent and implemented upon approval by the AO.

Objective: To maintain the integrity of sage-grouse habitat and provide habitat for the movement and genetic diversity to support connected sage-grouse populations. Plans to address impacts will in general:

- Incorporate Required Design Features (Appendix Y, or other as applicable)
- Timing of construction to avoid disruption to movements between seasonal habitats
- Avoidance of placing of linear features, related infrastructure, and surface disturbance in existing or potential sagebrush ecosystems.
- Noise and related disruptive activities during spring and fall movement periods

Exception: The BLM may approve actions in CHMA if the BLM determines the proposed action will meet the objectives for sage-grouse stopover sites, through findings such as:

- The BLM determines that impacts to potential GRSG stopover sites are minimized such that the project will cause minor or no new disturbance (ex. co-location with existing disturbance);
- Any residual impacts are addressed through compensatory mitigation measures as outlined in the Mitigation Strategy (Appendix X).

Modification: The AO, in coordination with the state Fish and Wildlife entity, may modify the boundaries of the stipulated area if portions of the leasehold are no longer sage-grouse habitat and future use by sage-grouse is unlikely.

Waiver: The AO, in coordination with the state Fish and Wildlife entity, may waive this stipulation if no portion of the leasehold is within a Connectivity Habitat Management Area.

### 16.1.9 Timing Limitation
### Greater Sage-grouse HMAs

Stipulation: To protect Greater Sage-grouse populations utilizing important seasonal habitats, no surface use is allowed from December 1 through March 15 in winter range, March 15 - July 15 in breeding and nesting habitats and during migratory periods for stopover sites. This stipulation does not apply to operation and maintenance of production facilities.

Objective: The protection of sage-grouse leks, breeding and nesting habitat (e.g., 3.1 miles from leks), winter range, and stopover sites necessary for the long-term maintenance of sage-grouse populations.

Waivers, Exceptions & Modifications: (See Cross-Cutting Issues)

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# Appendix 17

## Analysis of Key Research Natural Areas in Oregon

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# Appendix 17. Analysis of Key Research Natural Areas in Oregon

## 17.1 Introduction and Background

This appendix provides excerpts and background information from the 2015 (and 2019) BLM Oregon Greater Sage-grouse (GRSG) final environmental impact statements (EIS) and plan amendment efforts, as well as newer information about the BLM Oregon Key Research Natural Areas (RNA) needed to support the current planning and analysis process presented in the body of this draft EIS. This current effort is limited to RMP-level actions needed to provide guidance for subsequent implementation-level actions.

The 2015 Oregon GRSG ARMPA allocated all or portions of 13 Key RNAs in Oregon as unavailable to livestock grazing. The 2019 RMPA reversed that decision and made all or portions of those 13 Key RNAs available to livestock grazing. These decisions affected approximately 22,000 acres within 13 existing, district designated, RNAs. The 2019 RMPA was and remains enjoined by the United States District Court for the District of Idaho and the 2015 ARMPA decision for these 13 Key RNAs remains in effect. None of the other BLM state GRSG ARMPAs, either in 2015 or in 2019, included Key RNA designations or change in availability of livestock grazing.

In addition, two existing RNAs were designated as Key RNAs in the 2015 planning process. However, these two additional Key RNAs were previously excluded from livestock grazing and neither the 2015 nor 2019 RMP amendment processes proposed changing these underlying district-level land use plan decisions. Both the Foster Flat Key RNA in the Burns District and Guano Creek-Sink Lakes Key RNA in the Lakeview District were, and will remain, allocated as unavailable for livestock grazing.

The BLM Oregon is addressing Key RNAs in this current planning effort to update Key RNA affected environment and clarify or modify existing GRSG management direction.

The following excerpts from the 2015 EIS provide background, context, and history regarding the intents and purposes of the RNAs.

## 17.2 2015 Final EIS Excerpts

The following excerpt from Chapter 3 of the 2015 Oregon GRSG Final EIS describes Research Natural Areas (from Special Designations 3.16.5 Areas of Critical Environmental Concern (ACEC); page 3-134 to 3-135).

RNAs are a unique type of ACEC created to: preserve examples of all significant natural ecosystems for comparison with those influenced by humans; provide educational and nondestructive research for ecological and environmental studies; and preserve gene pools of typical and endangered plants and animals. RNAs are areas that are part of a national network of reserved areas under various ownerships that contain important ecological and scientific values and are managed for minimum human disturbance. RNAs are intended to represent the full array of North American ecosystems with their biological communities, habitats, natural phenomena, and geological and hydrological formations. In RNAs, natural processes are allowed to predominate and are primarily used for nonmanipulative research and baseline data gathering on relatively unaltered plant community types.

Under certain circumstances, deliberate manipulation may be used to maintain the unique features for which the RNA was established. Because natural processes are allowed to dominate, RNAs also make excellent controls for similar communities that are being managed and for long-term vegetation monitoring for climate change. In addition, RNAs provide an essential network of diverse habitat types that will be preserved in their natural state for future generations.

RNAs have important biological or physical attributes that are identified and designated in cooperation with the Pacific Northwest RNA Committee (Forest Service, BLM, and Washington and Oregon) following the Oregon Natural Areas plan (Oregon Natural Heritage Advisory Council 2010).

One of the guiding principles in managing RNAs is to prevent unnatural encroachments or activities that directly or indirectly modify ecological processes or conditions. Permitted activities that could impair scientific or education values of the RNAs (e.g., energy development, logging, road building, livestock grazing, and recreation) are generally limited, restricted, or not allowed to provide areas in the RNA that have intact ecological conditions and processes. These areas can be used for long-term baseline plant community monitoring; they are areas where few management activities have influenced the plant community for which the RNA was established. Management practices necessary to maintain or restore ecosystems can be allowed and perhaps are necessary to maintain the values, especially invasive plant control.

## 17.3 ALTERNATIVES

Under Alternative 1 all or portions of 13 Key RNAs, approximately 21,931 acres total, would be excluded from livestock grazing as described in the 2015 GRSG ARMPA (Appendix 9, Table 3-25, Oregon Key RNA Acreages). According to the COT report, making these areas unavailable to grazing would provide areas where natural successional processes will proceed for long-term monitoring and research of the plant communities important for GRSG (BLM, 2015 FEIS, p. 4-24). Managing the Key RNAs as unavailable for grazing could increase the ecological protection in areas where livestock grazing is removed, although vulnerability to wildfire may increase as fine fuel loads build in the absence of grazing (BLM, 2015 FEIS, p. 4-100). In addition, RNAs that are excluded from livestock grazing would provide a non-grazed comparison to grazed areas, which could facilitate certain research. The BLM would continue to manage ACECs to protect their relevant and important values (BLM, 2015, FEIS, p. 4-272).

Under Alternative 2 of the following 13 Key RNAs would be available to livestock grazing, subject to applicable laws, regulations, policies, and other BLM Oregon Resource Management Plan decisions: Black Canyon, Dry Creek Bench, East Fork Trout Creek, Fish Creek Rim, Foley Lake, Lake Ridge, Mahogany Ridge, North Ridge Bully Creek, Rahilly-Gravelly, South Bull Canyon, South Ridge Bully Creek, Spring Mountain, and Toppin Creek Butte (BLM 2019a, p. 1-6). Livestock grazing impacts on GRSG would vary depending on the extent of vegetation removal, type of habitat grazed, and duration and timing of the grazing period. Impacts to sage-grouse preferred forbs and insects are uncertain, and that uncertainty would continue. Opportunities for comparison of ungrazed to grazed areas would be fewer (BLM 2018, p. ES-8). The BLM would continue to manage ACECs to protect their relevant and important values (BLM 2015, FEIS, p. 4-272).

Alternatives 3, 4, and 5 are based upon changed habitat management area boundaries. In 2022, ODFW informed BLM that they were going to update core and low density HMAs. Using ODFW's published methodology to estimate core and low density HMA, the BLM drafted maps of what would likely be considered core and low density HMAs.

Under Alternative 3, all proposed PHMA and GHMA from BLM's mapping effort would become PHMA and be excluded from livestock grazing, including all of the 13 Key RNAs.

Under Alternative 4, the proposed PHMA and GHMA from BLM's mapping effort would become the updated PHMA and GHMA. This alternative would retain the 2015 decision that makes all or portions of the 13 Key RNAs unavailable to livestock grazing.

Under Alternative 5, all, some, or none of the Key RNA area would be unavailable to livestock grazing as shown below and described in Chapter 2, Table 2-36. Under Alternative 5, the entirety of the Key RNAs identified in 2015 are Key RNAs and all of these Key RNAs would be retained. Alternative 5 would also update management direction to reflect this interpretation. Special Designation (SD) 4 would be changed to: manage Key RNAs, or large areas within the RNAs, as baseline reference areas for sagebrush plant communities they represent that are important to Greater Sage-grouse. Active or passive restoration actions are allowed within Key RNAs to support maintenance or improvement of identified vegetation communities and to meet GRSG habitat objectives.

Oregon has not proposed any additional ACECs so does not have an Alternative 6.

Under Alternatives 1 and 4 in 13 of the 15 Key RNAs, 21,931 acres would be unavailable to livestock grazing, while under alternative 3, 45,660 additional acres would be unavailable to livestock grazing in the same areas; this would allow plant communities in these areas to undergo natural succession and be available for comparison with other areas that had more human influence for future research needs. Up to an additional 800 acres next to, but outside of, nine Key RNAs and within the existing pasture boundaries would be included in the area unavailable to livestock grazing. The inclusion of these extra acres outside of the Key RNA boundaries would take advantage of existing pasture fencing, reducing the amount of new fence needed. This would reduce or minimize impacts to nearby leks. All other RNAs that are available to livestock grazing would continue to be available. Under these alternatives fencing would be present in and adjacent to Key RNAs. These fences could impact the ability to distribute livestock, at additional cost to livestock operators and leases. Similarly, modifications to existing water improvements and limitations on new water improvements may create additional limitations and costs for livestock operators and lessees; however, the ability to distribute livestock outside of Key RNAs should generally be maintained, and impacts should be limited from these actions (Oregon Greater Sage-Grouse Proposed RMPA/Final EIS, June 2015 (blm.gov), p. 4-203). Making portions of RNAs that contain plant communities important to GRSG unavailable to grazing could provide the BLM with areas for baseline vegetation monitoring without the influence of BLM-permitted activities. OHV use would continue to be allowed or restricted as currently designated. This could allow natural succession processes to proceed without the influence of livestock grazing, making these areas available for use as comparative controls to treated areas. Most Key RNAs would not experience adverse impacts from other typical management actions due to the existing restrictions and limitations on other uses that have been previously put into place to protect RNAs. (Oregon Greater Sage-Grouse Proposed RMPA/Final EIS, June 2015 (blm.gov), p. 275). Whether removal of grazing would reduce the risk of invasive plant spread into the Key RNAs is uncertain, as there are many vectors for invasive plants besides livestock, but reducing the physical disturbance from grazing is likely to reduce one of those vectors (Oregon Greater Sage-Grouse Proposed RMPA/Final EIS (blm.gov), 2018, p. 4-4).

Under Alternative 2, grazing management would be governed by the livestock grazing provisions in the 2019 ARMPA, which changed Objective Livestock Grazing 2 and deleted Management Direction Livestock 1 from the 2015 ARMPA to make all or portions of 13 key Research Natural Areas (Key RNAs) available to livestock grazing. The Key RNAs would be required to meet rangeland health standards and other applicable BLM

regulations and policies (Oregon Greater Sage-Grouse Proposed RMPA/Final EIS (blm.gov), 2018, p. 4-6). Grazing impacts would vary within and among the key 13 RNAs, depending on site productivity, timing of grazing, stocking intensity, and duration of grazing within each RNA (Oregon Greater Sage-Grouse Proposed RMPA/Final EIS (blm.gov), 2018, p. 4-6) Alternative 2 would result in 21,931 fewer undisturbed acres within Oregon available for research in plant communities important to GRSG to determine the impact of livestock grazing on GRSG and their habitats Oregon Greater Sage-Grouse Proposed RMPA/Final EIS (blm.gov), 2019, p. 4-7). Although the USFWS (2015) has determined improper livestock grazing can have adverse effects on GRSG habitat, properly-managed grazing may benefit the species. Under Alternative 2, the RNAs would remain subject to management, to promote the key characteristics of the RNAs, including regulation of grazing, to maintain and promote the key characteristics of the RNAs. The Key RNAs are so small in size relative to the size of the species' range that any impacts of livestock grazing on GRSG populations using these areas are expected to be minimal and undetectable. Finally, making the Key RNAs unavailable to livestock grazing would not address any threats to GRSG habitat identified in the COT report (USFWS 2013) that may exist within the boundaries of the RNAs. (Oregon Greater Sage-Grouse Proposed RMPA/Final EIS (blm.gov), 2019, p. 4-7).

Effects of Alternative 5 are discussed below. The summarized impact analyses in Chapter 4 for the Key RNAs in Oregon is supported by and based on the more detailed RNA specific information presented in the following section.

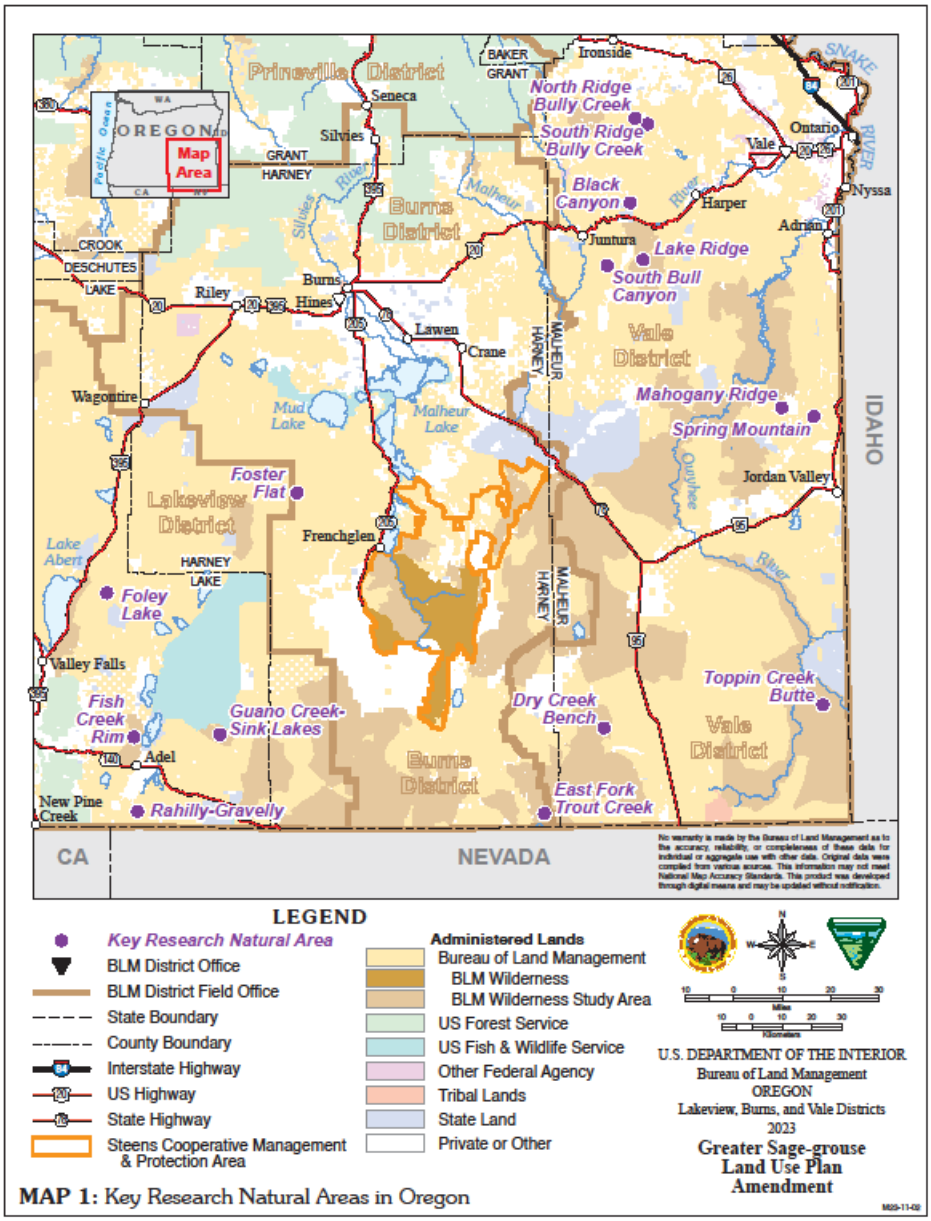
Under all alternatives, the BLM would require changes to livestock grazing/management in the 13 RNAs if a rangeland health assessment identifies livestock grazing as a causal factor in the failure to meet rangeland health standards. BLM may also require changes to livestock grazing/management for various reasons in accordance with its grazing regulations (43 CFR 4100 [2006]).

## 17.4 Key ACEC and RNA Descriptions

The key ACEC/RNAs in Oregon were identified as containing native sagebrush (*Artemisia* sp.) shrublands, grasslands, and other habitats that provide plant communities that sage-grouse use for breeding, nesting, brood rearing, foraging, and wintering. The plant community types that the RMPA/FEIS (BLM 2015a, p. 3-138 to 3-139) identified as important for sage-grouse are:

- Mountain big sagebrush (*Artemisia tridentata* spp. *vaseyana*)/grasslands
- Basin big sagebrush (*A. tridentata* spp. *tridentata*)/grasslands
- Wyoming big sagebrush (A. t. spp. *wyomingensis*)/grasslands
- Mountain mahogany (*Cercocarpus ledifolius*) and bitterbrush (*Purshia tridentata*) shrublands and grasslands
- Low sagebrush (*Artemisia arbuscula*)/grasslands
- Black sagebrush (*A. nova*)/grasslands
- Rigid sagebrush (*A. rigida*)/grasslands
- Silver sagebrush (*A. cana*)/grasslands
- Three-tip sagebrush (*A. tripartite*)/grasslands
- Shadscale, greasewood, and bud sagebrush (A. canescens, A. confertifolia, Sarcobatus vermiculatus, Artemisia spinescens)/desert scrub
- Vernal pools, playas, lake margins
- Black cottonwood (*Populus tricocarpa*), willow (*Salix* sp.) and aspen (*Populus tremuloides*) riparian areas, wet meadows, seeps, and springs

**Map 1. Key Research Natural Areas in Oregon**




## 17.4.1 Key ACECs

Three "key" ACECs were identified in the Proposed RMPA/Final EIS, all within the Lakeview Field Office: Abert Rim, High Lakes, and Red Knoll (BLM 2015a, p. 2-45; Table 2-6 of BLM 2015b, p. 2-18). Current livestock grazing management would continue within all three key ACECs under all alternatives.

## 17.4.2 Key RNAs (District)

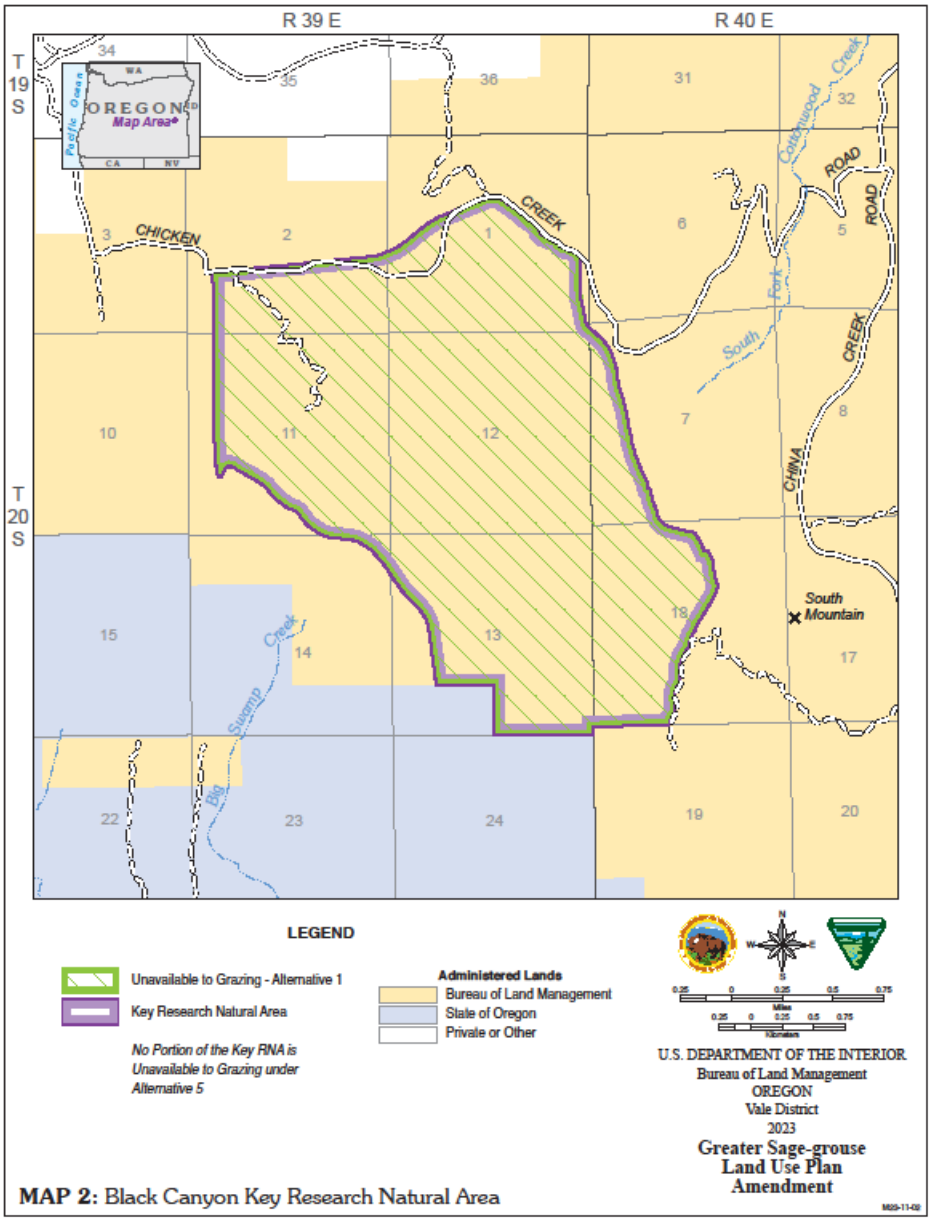
### *Black Canyon (Vale District)*

*Alternative 5 Proposed Management Changes*

Retain Black Canyon Key RNA designation of the entire ACEC/RNA

Reallocate all portions of the Key RNA as available to grazing.

**Map 2. Black Canyon Key Research Natural Area**




*Affected Environment*

The 2,600[1] acre Black Canyon ACEC/RNA, located north of the Malheur River above Jonesboro, Oregon, occupies the drainage of Black Canyon, a steep south-facing canyon that drains the uplands directly above the mainstem of the Malheur River. The drainage consists of an intermittent to perennial stream flowing just enough to develop riparian vegetation in the steep canyon. The uplands surrounding the drainage are sparsely

[1] Updated boundaries of some Key RNAs since publication of the 2015 Oregon ARMPA have resulted in minor change to acreages. No official boundary changes, however have been made.

vegetated due to the shallow soils and dry south-facing aspect. Elevations range from approximately 2,760 to 5,900 feet.

Although there are flat benches conducive to livestock grazing in the upper elevations of the Key RNA, the permittee does not currently push livestock to these areas, resulting in little to no use by livestock within the Key RNA boundaries.

Specific management under the 2002 SEORMP ROD, as amended:
OHV use will be limited to designated roads and trails. The ACEC/RNA is managed as VRM Classes II and III. Plant collecting requires a permit. Livestock use will continue based on existing permit stipulations and approved AMPs, unless modified under subsequent land use planning. Any proposed changes in grazing, including time and intensity of use, will be evaluated for impacts on the relevant and important values and will be permitted if values will be maintained or enhanced. Where adverse impacts are identified, existing livestock use will be adjusted using a variety of methods that could include fencing, reduction in livestock numbers, and changes in grazing season. Proposed projects in the area will be evaluated for impacts and permitted where relevant and important values will be maintained or enhanced.

Summary of Key RNA and Relevant and Important values evaluated for ACEC/RNA designation
2002 Southeastern Oregon RMP (SEORMP) ACEC/RNA Designation:
The relevant and important values of the ACEC/RNA are the following vegetation cells identified by the Oregon Natural Heritage Program (ONHP): stiff sagebrush/Sandberg bluegrass, western juniper/big sagebrush/bluebunch wheatgrass, riparian community dominated by coyote willow with Pacific willow, and first to third order stream system in sagebrush zone.

2015 GRSG ARMPA:
The Black Canyon ACEC/RNA was designated a Key RNA as a reference area for sagebrush plant communities that are important for Sage-grouse. Special Designation (SD4) was to manage the Key RNA for minimum human disturbance, allowing natural succession to proceed.

Updated Vegetation Communities and Sage-Grouse Habitats
Site visits indicate that vegetation communities in the Key RNA include old-growth western juniper/Wyoming big sagebrush/bluebunch wheatgrass, Wyoming big sagebrush/Idaho fescue (*Festuca idahoensis*), and stiff sagebrush/Sandberg bluegrass plant associations, as well as riparian community dominated by coyote willow and Pacific willow. Upland areas consist of shale rock outcroppings and steep canyons.

Vegetative communities in this Key RNA that are important to GRSG habitat continue to be present. These are Wyoming big sagebrush/Idaho fescue (*Festuca idahoensis*), and stiff sagebrush/Sandberg bluegrass plant associations and the riparian community. These communities represent the Cool-Moist/Warm Dry sagebrush, Shallow-Dry Sagebrush, and Riparian communities important for GRSG. Use by sage-grouse within the Key RNA has not been documented, nor were signs of GRSG presence observed during site visits in 2023. The Key RNA is within 2015 ARMPA designated GRSG Priority and General Habitat Management Area (PHMA, GHMA); the nearest lek is more than three miles away.

The old-growth western juniper/Wyoming big sagebrush/bluebunch wheatgrass community is not suitable habitat for sage-grouse because the western juniper provides perch opportunities for predators.

Other Resources

The Black Canyon Key RNA is wholly within the Trail Creek lands with wilderness characteristics unit OR-034-031. The 11,890-acre unit possesses naturalness and outstanding opportunities to experience solitude. The entire Black Canyon Creek drainage is within the unit. Some drainages possess varying woody riparian vegetation along portions of their canyon channels, dominated by coyote willow and Pacific willow. Existing human imprints within the unit consists of 5.3 miles of motorized primitive routes, 17.5 miles of rangeland fence, three earthen reservoirs, and four developed springs.

The Key RNA is utilized by deer and pronghorn antelope year-round and is designated as deer and elk winter range.

The Visual Resource Management Class (VRM) in the Key RNA is mostly Class III and some Class II and Class IV.

*Rationale supporting proposed management changes:*

Rationale for retaining the Key RNA:

The vegetative communities identified as important for GRSG habitat within the Key RNA continue to be in good condition. Management would continue to protect the relevant and important values.

Benches of sagebrush provide suitable nesting and winter habitat for GRSG.

The Key RNA retains the following vegetation types important for GRSG: Ecotone between cool-moist and warm-dry sagebrush, shallow-Dry Sagebrush, and Riparian-Wetlands.

Research opportunities continue to remain due to the remote and rugged nature of the area, as well as limited use by livestock throughout the Key RNA.

Rationale for reallocating the area as available to livestock grazing:

The Key RNA portion of the pasture is largely inaccessible to livestock grazing due to topography. The existing pasture boundary, which encompasses the Key RNA on three sides, includes two areas that remain allocated to grazing. New fence construction to exclude livestock would be in an area identified by the BLM as possessing wilderness characteristics.

Due to the deep canyons and rugged terrain that characterize the Key RNA, the current and historical livestock use is limited. Current conditions are conducive to meeting scientific research objectives without the need to make the area unavailable to grazing, thus eliminating the need for fence construction.

The Key RNA provides opportunities to gather baseline data on relatively unaltered plant community types important to GRSG without additional fencing as it is largely undisturbed. The cost/benefit of constructing a fence (or increased management actions to exclude livestock) relative to the level of livestock use in the pasture is unwarranted.

*Environmental Consequences*

Rugged and steep terrain, as well as pockets of old growth juniper provide limited suitable habitat for GRSG. The terrain of the Key RNA naturally excludes livestock access from all but the south-eastern boundary. Because of limited livestock presence or use occurring within the Key RNA, vegetative communities that are important to GRSG habitat would continue to be available to provide baseline data on relatively unaltered plant community types important to GRSG.

Allocating the 2600-acre area as available to livestock grazing would avoid the need to either construct fencing or to implement management actions that require the permittee to manage livestock to avoid incursion into the Key RNA in the absence of fence construction. There would be no impacts to wildlife, including sage-grouse, under Alternative 5 from fencing or active livestock management because none would occur. There would be no ground disturbance associated with fencing and no associated potential increase in weeds. There would be no impacts to visual resources because there would be no fencing.

Compared with Alternative 1, Alternative 5 would have similar impacts to livestock grazing due to limited livestock presence or use occurring in the Key RNA boundaries. The wilderness characteristic of Naturalness would not be negatively impacted by the presence of 1.6 miles of new human intrusions (fence) on the landscape. Outstanding Opportunities for Solitude would not be negatively impacted because active management by livestock operators to exclude livestock from an unfenced Key RNA would not occur nor would the short-term disturbance caused by fence construction. Fence related conflicts (e.g. bird collisions and entrapments) would not occur. Furthermore, the additional 330 acres that retained the available to livestock grazing allocation would not be absorbed and co-managed with the Key RNA as unavailable to livestock use. Under Alternative 5, the BLM could focus management responses on actions that maintain or improve GRSG habitat conditions outside the Key RNA rather than focusing on actions that ensure livestock do not enter an area already witnessing limited use. Removal of livestock grazing under Alternative 1 is unlikely to improve the habitat quality of the area, as it is currently in good ecological condition based upon professional opinion and site visits.

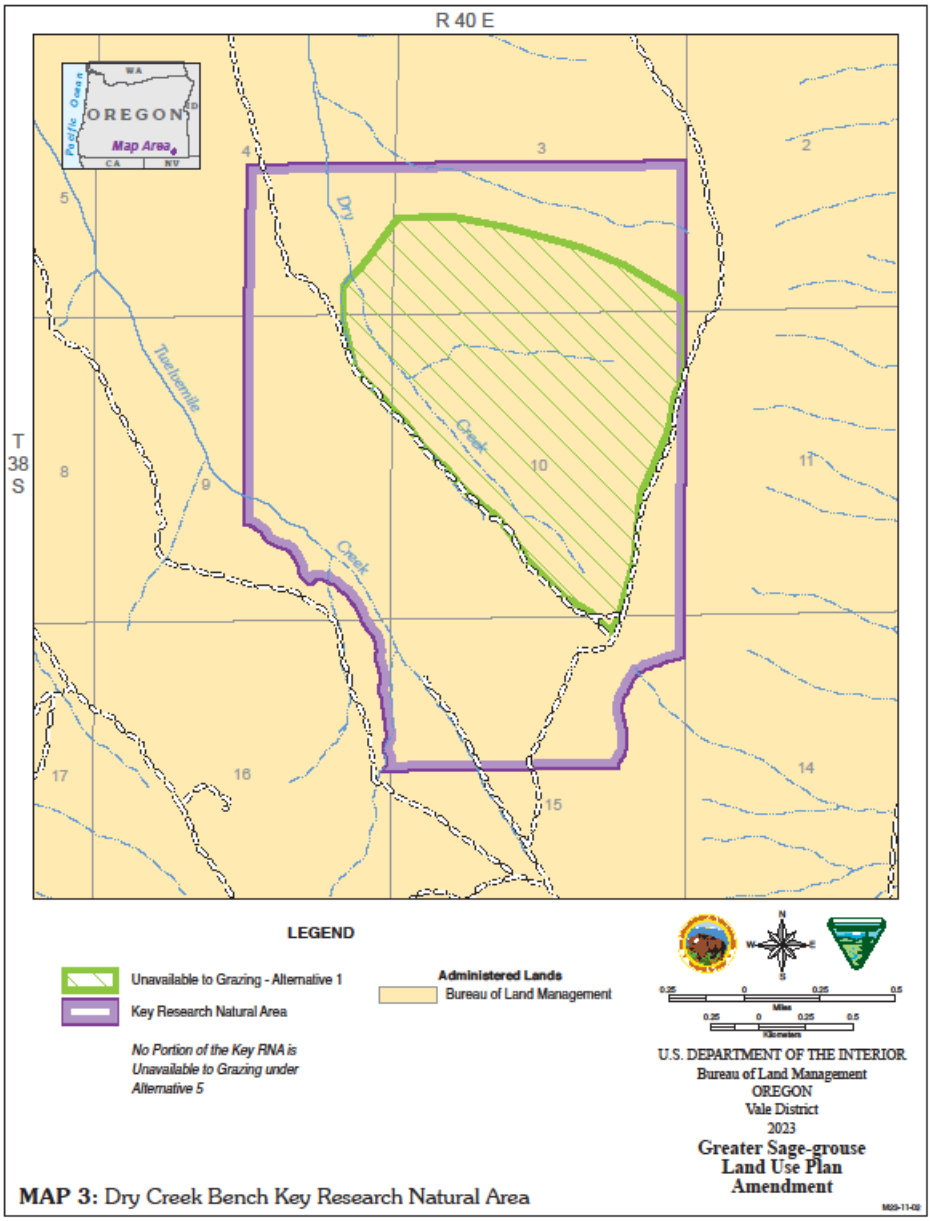
***Dry Creek Bench (Vale District)***

*Alternative 5 Proposed Management Changes*

Retain Key RNA designation of the entire ACEC/RNA

Reallocate all portions of the Key RNA as available to grazing

**Map 3. Dry Creek Bench Key Research Natural Area**




*Affected Environment*

The 1,635-acre ACEC/RNA is located on the northern edge of the Oregon Canyon Mountains, taking in the upper basin of Dry Creek about 20 miles northwest of McDermitt, Nevada. Terrain of the Key RNA naturally excludes livestock access from all but the south-eastern boundary. The area has sizeable patches of mountain mahogany in relatively good condition in association with Saskatoon serviceberry. The mountain mahogany stands in this area are extensive, compared to other stands in the basin, and cover large areas within the steep drainages as well as on the small plateaus that lie at the edge of the drainages. Use by sage-grouse within the Key RNA has not been documented, nor were signs of GRSG presence observed during site visits in 2023. The ACEC/RNA is located in the Twelvemile Wilderness Study Area, and classified as VRM class I. The area is known big horn sheep habitat and range. The 2012 Holloway Fire burned through

the ACEC/RNA impacting some but not all of the patches of mountain mahogany. The vegetation has been recovering from the fire with grasses and forbs coming back the following year, while mountain mahogany is slower growing and will take time for seedlings to mature.

The 1,635 acre Key RNA, including the 622-acre area excluded from livestock grazing, is in the Green Ponds pasture of the 15-Mile Community allotment (allotment #OR01201). The 15-Mile Community Allotment has seven grazing authorizations associated with it. The allotment currently has a use area agreement in place that formalizes use areas between the livestock operators.

Specific management under the 2002 SEORMP ROD, as amended:

OHV use is limited to existing roads and trails. The ACEC/RNA is managed as VRM Class II. Plant collecting requires a permit. Road maintenance will be limited to the existing roadway, and shoulder/ barrow ditch construction will be limited to that necessary to control runoff, minimize soil erosion, and ensure public safety and serviceability of the road. Livestock use will continue based on existing permit stipulations and approved AMPs, unless modified under subsequent land use planning. Any proposed changes in grazing, including time and intensity of use, will be evaluated for impacts on the relevant and important values and will be permitted if the values will be maintained or enhanced. Existing livestock use will be adjusted where adverse impacts are identified using a variety of methods, that could include, but is not limited to, fencing, reduction in livestock numbers, and changes in grazing season. Proposed projects in the area will be evaluated for impacts and permitted where relevant and important values will be maintained or enhanced.

Summary of Key RNA and Relevant and Important values evaluated for ACEC/RNA designation

2002 SEORMP ACEC/RNA Designation:

The relevant and important values of this ACEC/RNA are the mountain mahogany/whortleleaf snowberry/Idaho fescue and mountain mahogany/big sagebrush/Idaho fescue Basin and Range Province vegetation cells identified by the ONHP.

2015 GRSG ARMPA:

The Dry Creek Bench ACEC/RNA was designated a Key RNA as a reference area for sagebrush plant communities that are important for Sage-grouse. Special Designation (SD4) was to manage the Key RNA for minimum human disturbance, allowing natural succession to proceed.

Updated Vegetation Communities and Sage-Grouse Habitats:

Vegetation communities in this ACEC/RNA include mountain mahogany/mountain big sagebrush woodland with mountain snowberry (*Symphoricarpus oreophilis*) and various bunchgrasses, and mountain mahogany/mountain big sagebrush/Idaho fescue plant associations. Although not mentioned in the 2015 ARMPA as a community present, low sagebrush/Idaho fescue and mountain big sagebrush/bluebunch wheatgrass are present within the proposed Key RNA as observed through site visits. These communities represent the Cool-Moist sagebrush and Shallow-Dry sagebrush communities.

The mountain mahogany plant community does not represent an important GRSG habitat type because the density of mountain mahogany within the Key RNA boundaries and its elevated structure can pose an increased likelihood of predation by raptors. The Key RNA is within GRSG PHMA in SFA; the nearest lek is 1.8 miles away. A total of four pending leks are within four miles of the Key RNA.

Other Resources

The visual resource management is Class I.

The Dry Creek Bench Key RNA is wholly located in the 28,000-acre Twelvemile Creek WSA. It is one of five WSAs that make up the Trout Creek Mountains Group of WSAs. The WSA is located approximately 26 miles Northwest of McDermitt Nevada. The Twelvemile Creek WSA consists of two fault block plateaus, steeply scarped on the east and sloping gently to the northwest. The elevation ranges from 6,000 to 6,800 feet. The predominant plant communities are typical of sagebrush/grass ecosystems, with low sagebrush dominant on the shallower rocky soils, Wyoming big sage dominant on deeper soils. The Twelvemile Creek WSA has outstanding opportunities for experiencing both solitude and primitive and unconfined recreation. Supplemental values include geologic, scenic, archaeological, big game Habitat, and diverse plant community.

Dry Creek Bench Key RNA is utilized by mule deer and pronghorn antelope year-round, designated as deer winter range, and is within bighorn sheep occupied habitat. Rugged topography in the area could constrict wildlife movement between deep drainages and steep terrain, focusing movement on flatter benches.

*Rationale Supporting Proposed Management Changes:*

Rationale for Retaining Key RNA:

The area continues to be in desirable condition for the vegetative communities identified, and management will continue to protect the relevant and important values. Site visits indicate that mountain mahogany stands that were not impacted by the 2012 Holloway fire are dense and continuous, with mountain big sagebrush on the periphery of the mahogany stands. Mountain mahogany impacted by the 2012 wildfire are standing dead, creating perches for raptor species that may occur in the area. However, the Key RNA boundaries as identified in the 2015 ARMPA allow for recognition of the mountain big sagebrush that occurs within the mountain mahogany community type. Sagebrush communities provide suitable nesting and winter habitat for GRSG.

Retaining the Key RNA designation would continue to recognize the following vegetation types important for GRSG: Cool-moist sagebrush and shallow-dry sagebrush.

Research opportunities continue to remain due to the remote and rugged nature of the area, as well as limited use by livestock throughout the Key RNA.

Rationale for reallocating the area as available to livestock grazing:

The pasture in which the Key RNA is situated has historically received limited use by livestock including the area excluded from livestock grazing; this portion of the pasture's vegetative community is in outstanding condition. Additional actions or disturbance to exclude livestock is not warranted to protect sagebrush habitats or enhance research and monitoring objectives identified under the 2015 ARMPA because there is limited adequate available water and the remote, rugged nature of the area naturally limits livestock use in this Key RNA. Additionally, livestock grazing management prescribed under the 2015 Biological Opinion this pasture currently receives a minimum 2-year rest followed by a maximum 2-year consecutive grazing use, and grazing use is allowed for a maximum of 61 days during the period of May 15 to July 30.

Retaining the Dry Creek Bench Key RNA designation would continue to allow natural processes to predominate and research and baseline data gathering on relatively unaltered plant communities important for GRSG. The cost/benefit of constructing a fence (or increased management actions to exclude livestock) relative to the amount of livestock use in the pasture is unwarranted.

The Key RNA is located in a WSA. Reallocating the area as available to livestock grazing would avoid the potential conflicts fence (exclosure) construction in the WSA would have. Concerns from the public regarding impacts to bighorn sheep were identified through the public scoping process for completing site-

specific analysis (BLM 2023 Group 3 - WSAs - Key RNA Environmental Assessment - Public Comment (blm.gov)) for implementing the removal of grazing from the Key RNA. The area is in pristine condition, and in a seral state that is expected to occur post-wildfire, as indicated by the presence of green rabbitbrush within the big sage communities that were affected by the 2012 Holloway wildfire. Although impacts to vegetation and soils may be short-term in nature with the construction of a potential fence to further aid in deterring livestock from using the area excluded from livestock grazing, the fence would impact the pristine (naturalness) nature of the area.

*Environmental Consequences*

Fencing

Under both Alternatives 1 and 5, limited livestock presence or use occurring within the Key RNA, vegetative communities that are important to GRSG habitat would continue to be available to provide baseline data on relatively unaltered plant community types important to GRSG.

Reallocating livestock grazing to the Key RNA in Alternative 5 would eliminate the need to either construct fencing or to implement as new terms and conditions of the grazing permit that the permittee manage livestock to avoid incursion into the Key RNA.

Impacts to wildlife, including sage-grouse, of reallocating livestock grazing under Alternative 5 would eliminate the need for additional presence of livestock operators for managing livestock away from unfenced boundaries or the need for additional fence construction that may result in short-term disturbance to individuals and fence related conflicts (e.g. bird collisions and entrapments). Under Alternative 1, the proposed exclosure fencing would be located more than 1.2 miles from occupied/pending leks, would not be considered a high risk for sage-grouse collisions, and would not negatively impact sage-grouse. However, removal of grazing from this area would not likely improve the habitat quality of the area, as it is currently in good ecological condition. In addition, rugged and steep terrain provide limited suitable habitat for GRSG.

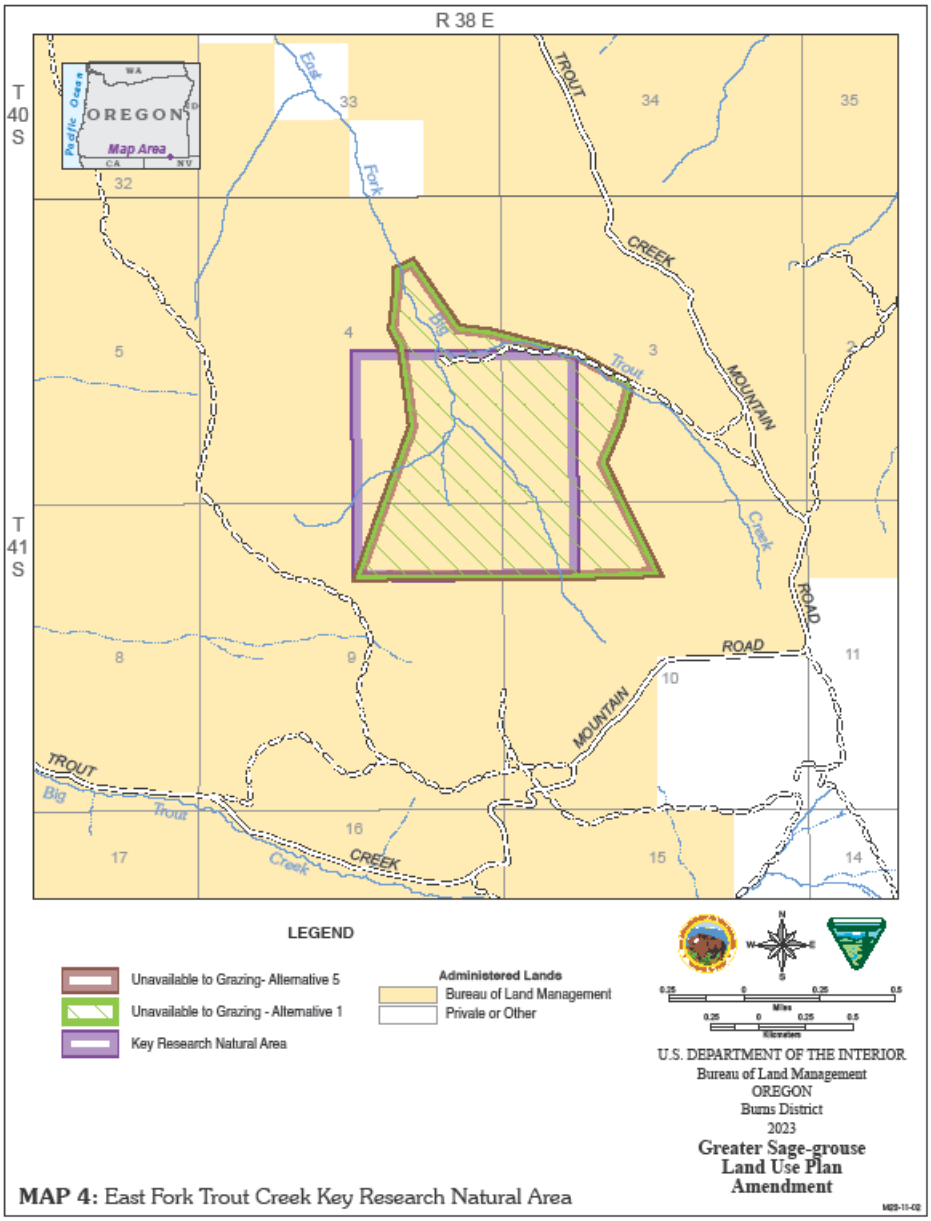
The wilderness characteristic of Naturalness would not be impacted because new fence construction would not occur in Alternative 5. Outstanding Opportunities for Solitude and primitive unconfined recreation would not be impacted as short-term impacts to solitude caused by fence construction and long-term impacts to solitude caused by active management to exclude livestock from Key RNA would not occur. There are no existing unnatural conditions on the landscape attributed to the livestock grazing that has occurred prior to the Key RNA being unallocated to grazing, therefore there would be no additional impacts to wilderness characteristics by reallocating grazing in the KRNA.

### *East Fork Trout Creek (Burns)*

*Alternative 5 Proposed Management Changes*

No proposed changes from 2015 ARMPA; Key RNA would remain unavailable for livestock grazing through a rangeline agreement, which removed the Key RNA from the Headwaters Pasture and designated it as an area unavailable to livestock grazing.

**Map 4. East Fork Trout Creek Key Research Natural Area**




*Affected Environment*

The East Fork Trout Creek RNA is located in Southeast Oregon, about 25 miles southeast of Fields, Oregon and 20 miles east of Denio, Nevada. It is situated at the headwaters of the East Fork of Trout Creek in the Trout Creek Mountains. The East Fork Trout Creek RNA contains 361 acres of BLM managed land. The elevation of the RNA ranges from 7,350 feet to 8,000 feet and the yearly rainfall averages from 16 to 35 inches per year. Temperatures range from a maximum of 90 degrees Fin the summer to an occasional low of minus 20 degrees F in the winter. A 4 strand barbed wire fence runs for 0.75 mile through the west part of the RNA, running from north to south. The fence will continue to be maintained because it is a pasture boundary. This fence splits the RNA into two pieces. The piece north-west of the fence is in the East Fork Pasture and is still open to grazing. The portion of the RNA to the south-east of the fence was previously in

the Headwater Pastures, and grazing was limited to 5 days per year. This portion of the RNA has now been made into its own pasture and has been unavailable to grazing through a rangeline agreement with livestock operators. Grazing is still authorized in the Headwaters Pasture which no longer includes the RNA.

Specific management under the 2005 Andrews Management Unit RMP ROD, as amended
OHV use is limited to existing roads and trails.

Summary of Key RNA and Relevant and Important values evaluated for ACEC/RNA designation
2005 Andrews Management Unit ROD/RMP ACEC/RNA Designation:
The relevant and important values include several plant community types. The ONHP vegetation cells represented in this area include a riparian community dominated by quaking aspen and Scouler willow, a high-elevation wet meadow dominated by sedges, and a first-to-third order stream system originating in the subalpine zone.

2015 GRSG ARMPA
The East Fork Trout Creek ACEC/RNA was designated a Key RNA as a reference area for sagebrush plant communities that are important for Sage-grouse.

Updated Vegetation Communities
The vegetation in the RNA (as described in the 2007 East Fork Trout Creek RNA/ACEC Management Plan) consists of three major plant communities, a riparian community, a mountain big sagebrush (*Artemisia tridentata s. vaseyana*) community and a quaking aspen community. The riparian community is made up of two first order streams with associated meadow and willow (*Salix spp.*) types along the stream route. Meadow types are quite extensive in some areas where springs emerge from the ground and saturate the soil. Sedges and Rushes (*Juncus spp.*) dominate these saturated areas with occasional willow patches. Other species that occur in the meadow type include: aspen, alder, false hellebore (*Veratrum californicum*), monkeyflower (*Mimulus guttatus*), clover (*Trifolium longipes*), cinquefoil (*Potentilla gracilis*), willow herb (*Epilobium watsonii*), and buttercup (*Ranunculus macounii*). The mountain big sagebrush community covers the most area within the RNA. This type covers the dryer upland areas around and between the riparian areas and the aspen groves. Portions of this type include late-lying snow accumulation zones where very little sagebrush grows. Mountain big sagebrush is the dominant shrub in this community and needle grass (*Achnatherum* spp.) and mountain brome (*Bromus carinatus*) are the dominant grass species. Other species include wax currant (*Ribes cereum*), service berry (*Amelanchier alnifolia*), Snowberry (*Symphoricarpos rotundifolius*), lupine (*Lupinus* spp.), Idaho fescue (*Festuca idahoensis*), and phlox (*Phlox* spp.).

The quaking aspen community covers nearly one third of the natural area and includes the Scouler willow vegetation type. Much of this community is comprised of very dense canopy cover with poorly vegetated understory. Other areas are more sparsely covered with trees and have well vegetated understories. Some of the species include: yarrow (*Achillea millefolium*), columbine (*Aquilegia formosa*), bedstraw (*Galium triflorum*), miner's lettuce (*Mantia perfoliata*), Solomon's seal (*Smilacina stellata*), stinging nettle (*Urtica dioica*), rose (*Rosa woodsii*), snowberry, and creeping wildrye (*Leymus triticoides*). No special status plant species are known to occur within the natural area.

Other Resources
Some of the common wildlife species found in the RNA include mule deer, pronghorn antelope, cougar, coyote, bobcat, badger, Belding ground squirrel, beaver, weasel, golden eagle, raven, cottontail, snowshoe hare, and spotted frog. The East Fork of Trout Creek supports a population of hybrid rainbow/cutthroat trout up to 10 inches in length. Special status animal species that could be present in the RNA include GRSG,

ferruginous hawk, Northern goshawk and spotted frog. Many species of migratory birds nest in and around the natural area.

The fire return interval for the area in and around the RNA could be up to 100 years at the top end but the best estimate is between 35 and 50 years. The fine fuels from perennial grasses have increased in the last 15 years due to the change in livestock use (limited to no more than 5 days per grazing season).

The RNA is located entirely within the Mahogany Ridge Wilderness Study Area (WSA). The area will be managed according to WSA IMP guidelines.

Two separate stream forks form the headwaters of the East Fork Trout Creek. Each fork originates as two first order streams coming together to form a second order stream. When the two second order streams flow together in the lower part of the RNA they form a third order stream. All of the first order streams originate at 7,600 feet or higher in elevation. In all, about 1.2 miles of the East Fork Trout Creek and its tributaries are present within the natural area.

*Rationale Supporting Proposed Management Changes*

The area is encompassed within the 1.2 mile lek buffer and within a WSA. In addition, there are SSS Flora located adjacent to the RNA. The Key RNA has been removed from the pasture and a fence is not needed to exclude grazing from the area identified as unavailable to livestock grazing as topography and water sources in lower elevations of the Headwaters Pasture typically prevent livestock from grazing within the RNA. By utilizing a rangeline agreement in lieu of a fence, the BLM removed any resource conflicts that fence construction might present.

*Environmental Consequences*

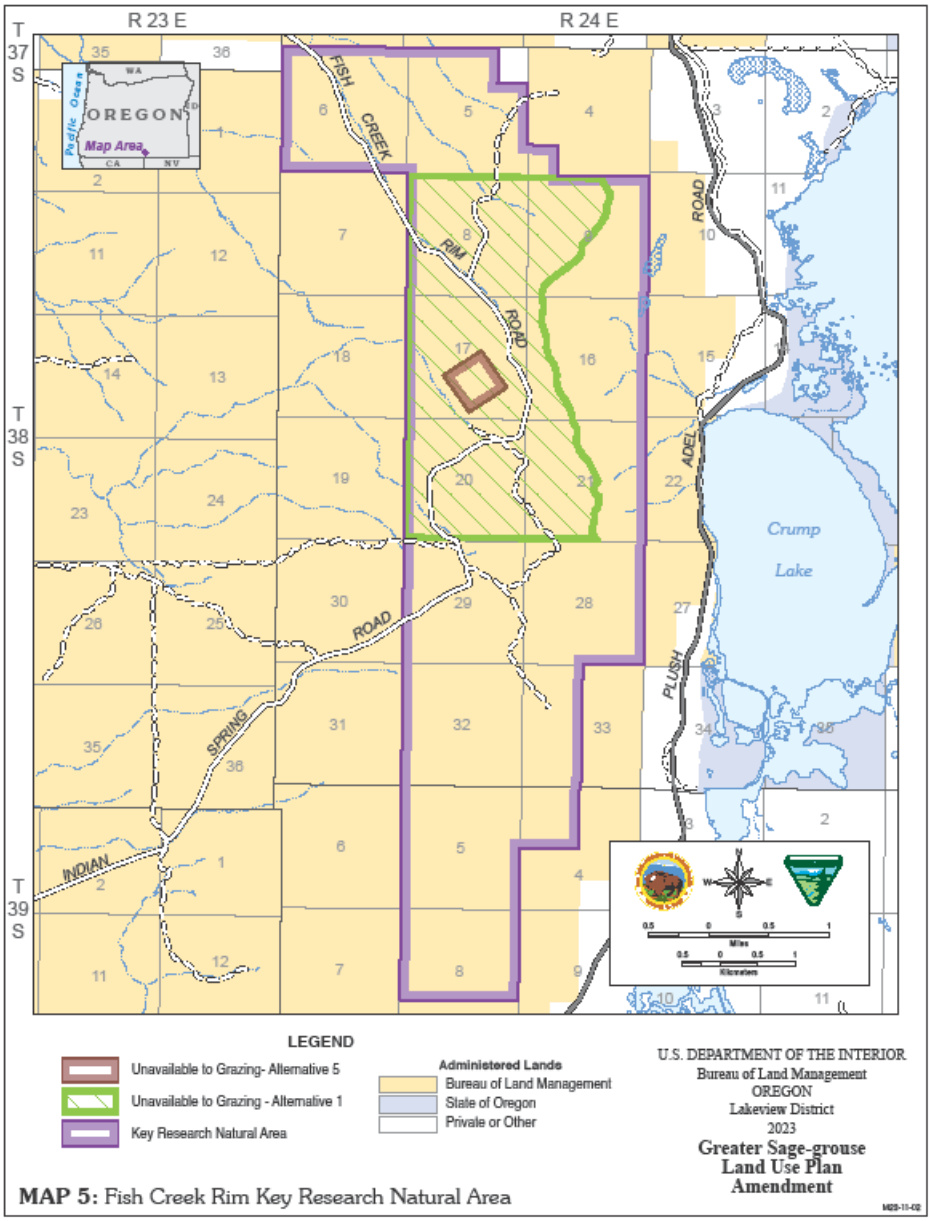
Since there are no changes in grazing management proposed in this planning effort there would be no potential changes in environmental effects when compared to Alternative 1.

***Fish Creek Rim (Lakeview)***

*Alternative 5 Proposed Management Changes*

Retain the Key RNA designation for the entire ACEC/RNA but modify/reduce the area unavailable to livestock grazing use to 95 acres within a low sagebrush/grassland community.

**Map 5. Fish Creek Rim Key Research Natural Area**




*Affected Environment*

The 8,725-acre Fish Creek Rim ACEC/RNA is located about 22 miles northeast of Lakeview. The 2015 Proposed RMPA/Final EIS described the plant communities of the Fish Creek Rim ACEC/RNA as representing mountain mahogany/mountain big sagebrush, low sagebrush/Idaho fescue, low sagebrush/Sandberg's bluegrass, mountain big sagebrush/bitterbrush/Idaho fescue, and a snowbrush/bittercherry shrub (*Ceanothus velutinus/Prunus emarginata*) complex (BLM 2015a, p. 3-140). Approximately 2,700 acres of the ACEC/RNA contains these specific plant communities ("cells" identified in Vander Schaaf 1992; BLM 2000, p. III-30). Sage-Grouse use has not been documented in all of these communities. Wyoming big sagebrush, small stands of quaking aspen and white fir (*Abies concolor*), and dense western juniper stands are also found within the ACEC/RNA boundary (BLM 2000, p. III-30). Only Wyoming

big sagebrush, mountain big sagebrush, and low sagebrush communities represent potential sage-grouse habitat.

Specific management under the Lakeview RMP/ROD

OHV use is limited to existing roads and trails.

Summary of Key RNA and Relevant and Important values evaluated for ACEC/RNA designation

Lakeview RMP ACEC/RNA designation

The Fish Creek Rim ACEC/RNA was designated in the Lakeview RMP/ROD to protect relevant/important natural system (plant communities) and cultural resource values (BLM 2000, 2001, 2003b).

During the development of the *Lakeview RMP/ROD* (BLM 2003b), the BLM expanded the Fish Creek Rim ACEC/RNA (from the original 2,700-acre proposal to 8,725 acres) solely to include important cultural values in the added acreage. These values included the presence of stone rings/occupation sites, lithic scatter, rock art sites, and hunting blinds (BLM 2000, p. III-29; 2003a, p. 2-55).

2015 GRSG ARMPA

The 2015 Proposed RMPA/Final EIS described the plant communities of the Fish Creek Rim ACEC/RNA as representing mountain mahogany/mountain big sagebrush, low sagebrush/Idaho fescue, low sagebrush/Sandberg's bluegrass, mountain big sagebrush/bitterbrush/Idaho fescue, and a snowbrush/bittercherry shrub (*Ceanothus velutinus/Prunus emarginata*) complex (BLM 2015a, p. 3-140). Approximately 2,700 acres of the ACEC/RNA contains these specific plant communities ("cells" identified in Vander Schaaf 1992; BLM 2000, p. III-30).

Updated Vegetation Communities

Based on ecological site inventory (ESI) data, the most dominant vegetation communities in the Fish Creek Rim ACEC/RNA include low sagebrush/squirreltail, low sagebrush/Idaho fescue, mountain mahogany/mountain big sagebrush/bluegrass, and juniper-encroached mountain big sagebrush/squirreltail associations.

The Fish Creek Rim ACEC/RNA has extensive current and historical whitetop species (*Lipidium draba, L. appelianum, and L. chalepense*) weed sites along the road system, Canada thistle (*Cirsium arvense*) near water developments, and scattered patches of cheatgrass (*Bromus tectorum*) throughout the area.

Other Resources or Issues

Small riparian/wetland areas occur around several livestock water developments and within existing exclosures around Cleland and Cox Springs (BLM in Prep).

The Fish Creek Rim ACEC/RNA includes a diversity of wildlife habitats. The area contains occupied bighorn sheep habitat, mule deer winter habitat, year-round antelope habitat. While the Key RNA lies within a sage-grouse PAC (Hagen *et al.* 2011) and includes PHMA and GHMA, there are no known leks within the RNA (BLM 2015a) and documented use within the RNA is limited. Telemetry data collected in the area from 2009-2017 as part of various studies, documented spring, summer, and winter use in portions of the RNA, but the majority of use occurred west of the Key RNA, and no use was documented within the grazing exclosure considered under this Alternative (Olsen *et al.* 2021a, Olsen *et al.* 2021b, and unpublished data).

During the development of the *Lakeview RMP/ROD* (BLM 2003b), the BLM expanded the Fish Creek Rim ACEC/RNA (from the original 2,700-acre proposal to 8,725 acres) to include important cultural values in the surrounding area, which is not sage-grouse habitat. These values included the presence of stone

rings/occupation sites, lithic scatter, rock art sites, and hunting blinds (BLM 2000, p. III-29; 2003a, p. 2-55). A small portion of the Fish Creek Rim Wilderness Study Area (WSA) (OR-1-117; 1,786 acres) overlaps a portion of the Fish Creek Rim Key RNA. A small portion of the Monument Flat wilderness characteristics unit (OR-015-117A) also overlaps a portion of the Fish Creek Rim Key RNA.

Fish Creek Rim ACEC/RNA is managed under two different VRM classifications. The Fish Creek Rim WSA portion is managed as VRM Class I. The remainder of the ACEC/RNA is managed as VRM Class II.

The Fish Creek Rim ACEC/RNA falls within portions of the 22,011-acre Lynch-Flynn (00520), 3,548-acre Crump Individual (00201), 3,054-acre Lane Individual (00524), and 8,073-acre Hickey Individual (00202) Allotments. The proposed grazing exclosure falls within a portion of the East Pasture of the Lynch-Flynn Allotment. A rangeland health assessment was completed for this allotment in 2003 and updated in 2013 (BLM 2003c, 2013c). During these assessments no rangeland health issues were identified within the proposed grazing exclosure area.

*Rationale supporting Proposed Management Changes:*
Portions of the original exclosure boundary (Alternative 1) traversed terrain/topography where the BLM determined, based on further analysis and field inventory, it would be difficult to construct exclosure fencing. The modified exclosure boundary would reduce amount of fencing needed within sage-grouse habitat from an estimated 4.6 miles to 1.6 miles, none of which would be located within 1.2 miles of any leks. This modification eliminates the need for new fencing within the Fish Creek Rim WSA.

The mountain mahogany plant community does not represent an important sage-grouse habitat type because of the high density and decadent condition of the mountain mahogany stands and lack of sagebrush understory within this portion within the Key RNA boundary. White fir and western juniper stands do not represent important sage-grouse habitats because GRSG are a sagebrush-obligate species and these are forest or woodland habitats rather than sagebrush habitats. In addition, other existing native plant communities within the Key RNA boundary are severely degraded by western juniper encroachment.

Portions of the existing low sagebrush/grassland community would be located outside the modified exclosure creating both grazed and ungrazed (control) sites in the same area suitable for future research related to the effects of grazing.

*Environmental Consequences*
Making this portion of the Fish Creek Rim ACEC/RNA unavailable to grazing use could help protect the relevant and important values by eliminating soil and vegetation disturbance in a portion of the Key RNA. This would allow natural succession processes to occur in the absence of most human-caused disturbances and provide an area for future baseline monitoring and research purposes.

Native plant communities and soils within the proposed exclosure area would no longer be subject to livestock grazing or trampling effects. However, since there are no water sources currently subject to heavy utilization within the proposed exclosure area, there would be very little change in condition over the long-term.

Fencing
Under Alternative 5, about 1.0 acres total of native plant communities and soils could be impacted by increased trampling/trailing along a new fence. Construction of the exclosure and subsequent livestock trailing along the fence would create new ground disturbance within an area that has been relatively

undisturbed in the past. Any time equipment and people are working in new areas there is a potential risk of introducing new noxious weeds/invasive species into native communities from equipment and people doing the work. However, the risk of weed introduction or expansion would be slightly less than Alternative 1 due to less proposed exclosure fence building, livestock trailing, and associated ground disturbances.

Under this alternative the potential effects of removing livestock would occur on about 95 acres (2,655 acres less than Alternative 1) within low sagebrush/grassland wildlife habitat. Impacts would be limited to the habitat in this area and would not affect other wildlife habitat types present within the Key RNA.

There would be less fencing and associated wildlife impacts compared to Alternative 1. All fencing would pose a low collision risk to sage-grouse and would be constructed with wildlife-friendly specifications.

Unlike Alternative 1, the proposed exclosure fence under Alternative 5 would fall entirely outside of the Fish Creek Rim WSA and, therefore, result in no changes in grazing use or other impacts on WSA values.

This alternative would add about 1.6 miles of new fencing within the Monument Flat wilderness characteristics inventory unit. This new exclosure fence would be noticeable within close proximity but would not be substantially noticeable across the unit as a whole. The removal of grazing under this alternative would have minor positive impacts to vegetation communities and naturalness within the exclosure. This fence would not diminish the size of the unit or cause the unit to no longer meet the minimum wilderness characteristics criteria. For this reason, this alterative would comply with the 2010 Settlement Agreement (BLM 2010b).

No fencing or changes in grazing use would occur within the VRM Class I (Fish Creek Rim WSA) area. As a result, there would be no impacts to scenic values within VRM Class I areas. The exclosure fencing would have minor, negative impacts on the scenic quality in the rest of the Fish Creek Rim ACEC/RNA, but these effects would be consistent with VRM Class II management objectives.

Compared to Alternative 1, the proposed exclosure modification would substantially reduce negative economic effects to affected livestock operators. There would be a loss of about 95 acres available for grazing use and associated available forage. However, this loss would be substantially less than Alternative 1: approximately 4 AUMs from the allotment (compared to the estimated 110 AUMs under Alternative 1). This smaller reduction in AUMs represents less than 1% of the permitted use, could be absorbed by spreading the AUMs across other pastures within the allotment, and would not require reducing the permitted number of AUMs or modifying the existing grazing permit.

Compared to Alternative 1, the permittee would not need to pay for additional forage costs (renting private pasture or feeding additional hay) or experience a loss in livestock production and associated revenue. There would be substantial one-time fence construction costs to the BLM. Currently, fence construction costs are estimated at about $10,000 per mile (material and labor) or about $16,000 total. Assuming that local contractors would be hired to construct the fence, there would be a small benefit to the local economy. There would also be additional operational costs to the permittee associated with the annual maintenance of the new exclosure fence.

Compared to Alternative 1, the modified exclosure boundary would avoid all five existing livestock water sources and eliminate the need to mitigate for lost livestock watering sites.

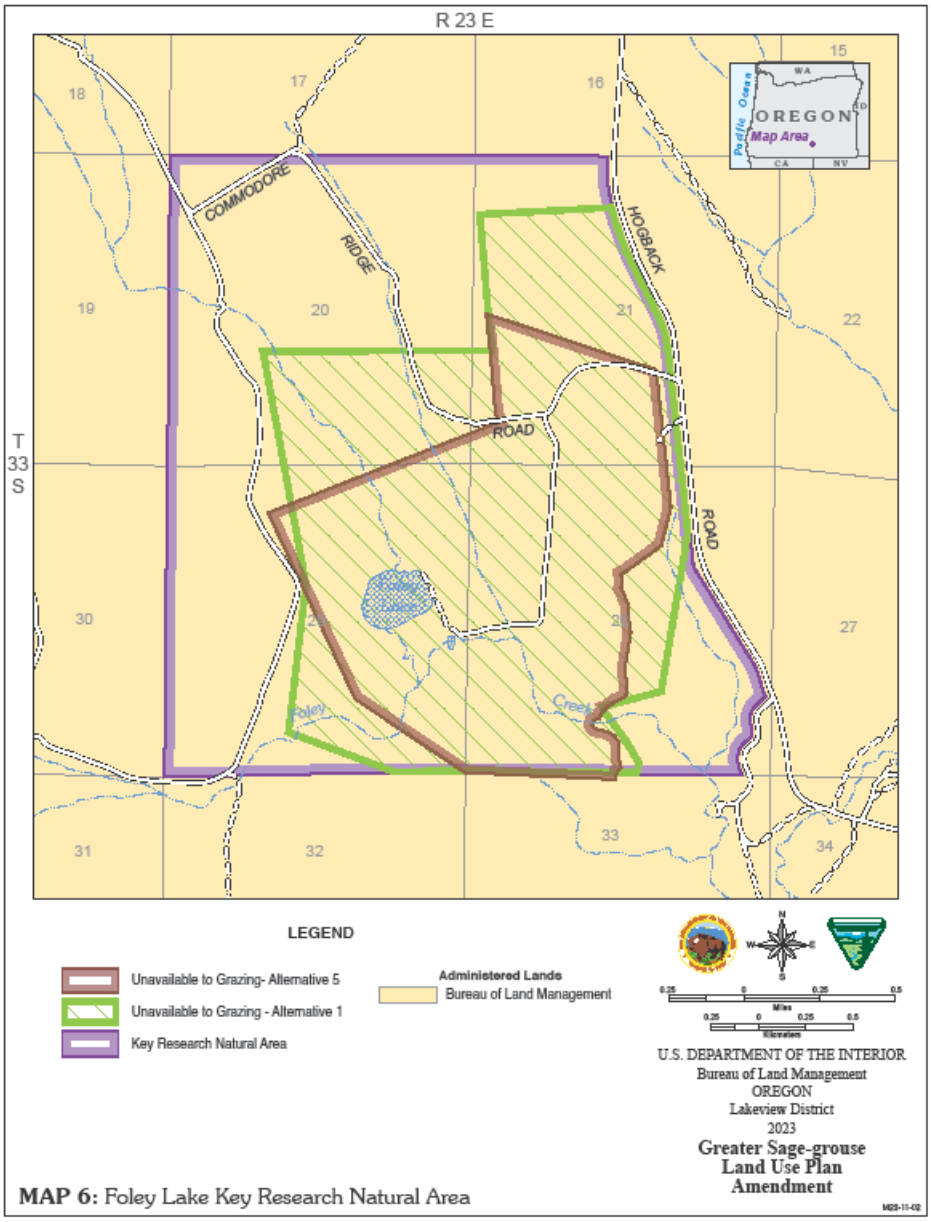
***Foley Lake (Lakeview)***

*Affected Environment*

Specific Management under the Lakeview RMP/ROD

OHV use is limited to existing roads and trails.

**Map 6. Foley Lake Key Research Natural Area**




Summary of Key RNA and Relevant and Important values evaluated for ACEC/RNA designation

Lakeview RMP/ROD ACEC/RNA designation

The 2,229-acre Foley Lake ACEC/RNA is located about 37 miles northeast of Lakeview and was designated in the Lakeview RMP/ROD to protect relevant/important natural system (plant communities) and cultural resource values (BLM 2000, 2001, 2003b). In the *Lakeview RMP/ROD* the BLM expanded the original Foley

Lake ACEC/RNA proposal (from 1,035 acres to 2,229 acres) solely to include important cultural resource values in the added acreage. These include the presence of stone rings, rock art, burial sites, rock shelters, and lithic scatters (BLM 2000, p. III-37 to III-38; 2003b, p. 2-56).

2015 GRSG ARMPA
West and East Portions

The Foley Lake ACEC/RNA falls within portions of the 130,345-acre Coyote-Colvin (00517) and 86,518-acre Juniper Mountain (00515) Allotments. There is an existing allotment boundary fence running in a north-south direction through the center of this RNA. Potential management changes would impact two livestock operators. For this reason, the following discussion for Foley Lake RNA is broken out into an eastern and western portion.

*West Portion Foley Lake (Coyote Colvin Allotment)*
Alternative 5 Proposed Management Changes
Retain the Key RNA designation for the entire RNA but reduce the area unavailable to livestock grazing use in the western portion to 521 acres within the Coyote-Colvin Allotment that contains silver sagebrush/grassland, Wyoming big sagebrush/grassland, and black sagebrush/grassland plant communities. Approximately one mile of the existing allotment boundary fence could be removed from the middle of the Key RNA once the new exclosure fences are completed.

Affected Environment
Updated Vegetation Communities
Foley Lake itself lies in a small basin on the gently sloping backside of the Abert Rim fault within a larger Wyoming big sagebrush/grassland landscape. Black sagebrush is the predominant shrub in the ACEC/RNA with low sagebrush common on lithic soils. Wyoming big sagebrush occurs on deeper soils and silver sagebrush on the large vernally wet playa and (Foley) lake margin. (BLM 2015a, p. 3-140).

The Proposed RMPA/Final EIS described the plant communities of the Foley Lake ACEC/RNA contains a black sagebrush/Sandberg bluegrass shrubland and low sagebrush/bunch grass (Sandberg bluegrass, bottle brush squirreltail, Idaho fescue), silver sagebrush/Sandberg's bluegrass plant associations (BLM 2015a, p. 3-140), however, a smaller portion of this area (approximately 1,035 acres) actually contains those specific plant communities (Vander Schaaf 1992).

Based on ESI data, the most dominant vegetation communities in the western portion of the Foley Lake ACEC/RNA include Wyoming big sagebrush/squirreltail and black sagebrush/field smartweed plant associations. Silver sagebrush associated with the margins of Foley Lake also occur in this portion of the ACEC/RNA.

There are no known noxious weeds documented in the Foley Lake Key RNA. However, cheatgrass has been documented recently in the understory.

Other Resources
The Foley Lake ACEC/RNA provides habitat for a variety of other sagebrush-associated birds, mammals, and reptiles (BLM In Prep.). The western portion of the RNA is pronghorn habitat (BLM 2019b).

While two pygmy rabbit burrows were located near or within the proposed western exclosure area in recent years, the majority of the exclosure area is not typical pygmy rabbit habitat due to the shallow, rocky soils or an area of high pygmy rabbit use (BLM 2019b).

The western portion of the Foley Lake ACEC/RNA is managed as VRM Class III.

The western portion of the Foley Lake Key RNA falls within the Twin Lakes Pasture of the Coyote-Colvin Allotment. A rangeland health assessment was completed for this allotment in 2000 and updated in 2016. No rangeland health issues were identified in the Twin Lakes Pasture during either assessment (BLM 2000c, 2016).

Rationale supporting Proposed Management Changes:
Portions of the original exclosure boundary (Alternative 1) traversed terrain/topography (eg. steep slopes, rocky surfaces). The modified exclosure boundary would reduce amount of fencing needed within sage-grouse habitat from an estimated 3.2 miles under Alternative 1 to 2.4 miles, none of which would be within 1.2 miles of occupied or pending leks.

The modified exclosure boundary would include all of the silver sagebrush/grassland community associated with Foley Lake, most of the surrounding black sagebrush/grassland community, and some of the Wyoming big sagebrush/grassland community. This would allow both grazed and ungrazed (control) sites located in the same area for future research related to the effects of grazing on black sagebrush and Wyoming big sagebrush communities.

The modified exclosure boundary avoids cultural sites located during field inventories of the original Alternative 1 alignment.

Environmental Consequences
Making the western portion of the Foley Lake ACEC/RNA unavailable to grazing use could help protect the relevant and important values by eliminating soil and vegetation disturbance. This would allow natural succession processes to occur in the absence of most human-caused disturbances and provide an area for future baseline monitoring and research purposes.

Foley Lake waterhole and several existing natural water sources would be included within the exclosure and would no longer be available as livestock water sources for cattle grazing in the Twin Lakes Pasture. Excluding these water sources would change livestock distribution, and grazing use would be less in the area immediately surrounding the exclosure and more concentrated in other areas of the Twin Lakes Pasture with water. Water would need to be hauled (at permittee's expense) to temporary troughs near two existing waterholes in the north end of the Twin Lakes Pasture on years when livestock water is limited which could create expanded disturbances due to increased cattle concentration and semi-truck use. These existing watering sites are located along existing roads and are not within 1.2 miles of leks or other important sage-grouse habitats (BLM 2019b).

Vegetation disturbance would occur from semi-trucks turning around near the water trough sites (outside the Key RNA).

Removal of grazing would remove one potential weed-spreading vector within the exclosure area. However, other vectors (wildlife, vehicles, wind and water) would continue and potentially spread weed species. The lack of spring grazing could allow more invasive annual grasses to flower and produce seed. Monitoring data has shown that removal of livestock from areas where weeds are present (such as riparian areas and exclosures) often leads to more robust weed infestations and allows the invasive species to negatively impact native vegetation (BLM 2019b). There are two special status plant species (Columbia yellowcress and Mesamint) currently located within two existing small exclosures on the west side of Foley Lake RNA. The larger exclosure would eliminate all potential livestock trampling/grazing impacts to these special status plants

within the western portion of the Foley Lake ACEC/RNA. However, most of the Columbia yellowcress and Mesamint populations are located within two smaller existing grazing exclosures, so the larger exclosure proposed under Alternatives 1, 4, and 5 would do little to further remediate this potential threat (BLM 2019b).

In the absence of spring grazing within the proposed exclosure, areas with high amounts of annual grasses would continue to degrade the landscape and create a less fire-resistant landscape. There would be an increase in fine fuels and a potential increase in the risk of catastrophic wildfire occurrence within this exclosure (BLM 2019b) when compared to Alternative 2. Should a wildfire occur and impact the proposed grazing exclosure, the exclosure area could be subject to increased cheatgrass dominance and could require active vegetation management such as herbicide treatment or native grass seeding.

Fencing

There would be some surface disturbance to upland native vegetation communities, soils and biological crusts from vehicle traffic during fence construction and removal and future maintenance of the proposed exclosure fence. The new fence would create approximately 1.5 acres of additional vegetation disturbance in the Key RNA associated with construction and subsequent livestock trailing (BLM 2019b).

Under Alternative 5, exclosure fencing would be located more than 1.2 miles from occupied/pending leks, would not be considered a high risk for sage-grouse collisions, and would not negatively impact sage-grouse or its habitat. Removal of grazing from this area would not likely improve the habitat quality of the area, as it is currently in good ecological condition and is meeting applicable rangeland health standards (BLM 2000c, 2016, BLM 2019b).

Closure of the western portion of the RNA would not prevent the use of Foley Lake as a water source by mule deer, pronghorn, bighorn sheep, or other wildlife. An exclosure fence could alter behavior and use patterns of big game species, but those effects would be mitigated to the extent feasible by building the fence to standard wildlife passage specifications (BLM 2019b).

Construction of an exclosure fence would not impact pygmy rabbits at a population level and would not improve pygmy rabbit habitat or encourage movement of more pygmy rabbits into the exclosure area (BLM 2019b).

Visual Resources and SocioEconomics

The proposed exclosure fence would negatively affect the existing visual quality within the area, but would meet the existing visual resource management (VRM Class III) objectives for the surrounding area.

Excluding the western portion of the Foley Lake RNA would remove approximately 21 AUMs of forage available for livestock grazing use in the Twin Lakes Pasture of the Coyote-Colvin Allotment compared to 31 AUMs under Alternative 1. The modified exclosure boundary would reduce negative socio-economic effects to the permittee compared to Alternative 1. This would represent about a 0.41% reduction in total AUMs in the allotment which could be absorbed by transferring the use to other pastures within the allotment without the need to change the authorized level of grazing use, change the grazing permit, or reduce livestock production. Compared to Alternative 1, the permittee would not need to pay for additional forage costs or experience a loss in livestock production and associated revenue.

However, there would be additional annual operational costs to the permittee associated with future fence maintenance (estimated at $300-600 per year) and water hauling. There would also be additional one-time costs to the BLM associated with exclosure fence construction (about $10,000 per mile) totaling about

$24,000. Assuming that local contractors would be hired to construct the fence, there would be a small benefit to the local economy.

*East Portion Foley Lake (Juniper Mountain Allotment)*

Alternative 5 Proposed Management Changes

Retain the Key RNA designation for the entire ACEC/RNA but reduce the area unavailable to livestock grazing use in the eastern portion to 276 acres within the Juniper Mountain Allotment that contains black sagebrush/grassland and Wyoming big sagebrush/grassland plant communities. Approximately one mile of the existing allotment boundary fence could be removed from the middle of the Key RNA once the new exclosure fences are completed.

Affected Environment

Updated Vegetation Communities

Foley Lake itself lies in a small basin on the gently sloping backside of the Abert Rim fault within a larger Wyoming big sagebrush/grassland landscape. Black sagebrush is the predominant shrub in the ACEC/RNA with low sagebrush common on lithic soils. Wyoming big sagebrush occurs on deeper soils and silver sagebrush on the large vernally wet playa and (Foley) lake margin. Bud sagebrush (*Artemisia spinescens*) is also present (BLM 2015a, p. 3-140).

The 2015 Proposed RMPA/Final EIS described the plant communities of the Foley Lake ACEC/RNA as representing black sagebrush/Sandberg bluegrass shrubland and low sagebrush/bunch grass (Sandberg bluegrass, bottle brush squirreltail, Idaho fescue), silver sagebrush/Sandberg's bluegrass plant associations (BLM 2015a, p. 3-140), however, a smaller portion of this area (approximately 1,035 acres) actually contains those specific plant communities (Vander Schaaf 1992).

Based on ESI data, the most dominant vegetation communities in the eastern portion of the Foley Lake ACEC/RNA include Wyoming big sagebrush/squirreltail and black sagebrush/squirreltail and smartweed plant associations. No wetland or riparian areas occur within the east half of the Foley Lake ACEC/RNA (BLM In Prep).

There are no known noxious weeds documented in the Foley Lake Key RNA. However, cheatgrass has been documented recently in the understory. No special status plants occur within the east half of the Foley Lake ACEC/RNA.

The eastern portion of the ACEC/RNA lies within sage-grouse Warners PAC, mid-scale HAF (Warner-Meizner), and fine-scale HAF (Warner) boundaries. The entire ACEC/RNA area is classified as PHMA and as seasonal breeding, summer, and winter sage-grouse habitat. However, there are no documented leks located within the Key RNA boundary. Telemetry data collected from 2009-2017 for various studies failed to document sage-grouse use in the Foley Lake RNA, though summer usage was documented to the northwest and southwest of the RNA. Usage of the RNA has been observed indirectly in recent years (e.g. fecal pellets) (unpublished data).

Other Resources

The eastern portion of the Foley Lake ACEC/RNA provides habitat for a variety of other sagebrush-associated birds, mammals, and reptiles (BLM In Prep.).

The proposed exclosure fence alignment was surveyed for cultural/historic resources. During survey, three isolated artifacts were identified that were not considered to be significant.

The eastern portion of the Foley Lake ACEC/RNA is managed as VRM Class III.

The eastern portion of the Foley Lake Key RNA falls within the Flint Hills Pasture of the Juniper Mountain Allotment. A rangeland health assessment was completed for this allotment in 2004 (BLM 2004). No rangeland health issues were identified in the assessment for the Flint Hills Pasture of the allotment which contains the proposed grazing exclosure area.

Rationale supporting Proposed Management Changes:
The proposed exclosure fence would be at least 1.2 miles from nearest (unoccupied) lek on the north and avoid creating a livestock trailing safety problem along County Road 3-10 (Hogback Road), a main, well-traveled county road on the east. The proposed boundary also takes advantage of existing topographic features (steep rim) on the south which would reduce the total amount of fencing needed. Overall, the exclosure boundary would require 1.3 miles of fencing within sage-grouse habitat, as compared to an estimated 2.3 miles (under Alternative 1).

The proposed exclosure boundary includes some of the black sagebrush/grassland and Wyoming big sagebrush/grassland communities. This would allow both grazed and ungrazed (control) sites to be located in same area for future research related to the effects of grazing on black sagebrush/ grassland and Wyoming big sagebrush/grassland communities.

Environmental Consequences
Making the eastern portion of the Foley Lake ACEC/RNA unavailable to grazing use could help protect the relevant and important values by eliminating soil and vegetation disturbances. This would allow natural succession processes to occur in the absence of most human-caused disturbances and provide an area for future baseline monitoring and research purposes.

Native plant communities and soils within the proposed exclosure would no longer be subject to livestock grazing or trampling effects. Since there are no water sources within the proposed exclosure area subject to heavy utilization or compaction, most of this change would occur along the existing 1.5 miles of fence along the western boundary of the Key RNA and along the 1 mile of the Hogback Road on the eastern boundary. There would be a net reduction in cattle trailing/trampling effects on native plant communities and soils on about 0.8 acres.

While the disturbance along the proposed exclosure fence would represent an area of increased risk of potential cheatgrass invasion/expansion that could impact special status plants over the long-term, no special status plants were located within any of the proposed fence alignment that would be directly impacted.

The effects of removing livestock grazing would occur on about 279 acres of upland shrubland/grassland wildlife habitat (218 less acres than Alternative 1). The proposed new fencing and associated wildlife impacts would be less than Alternative 1. All of the proposed exclosure fencing would be located more than 1.2 miles from leks. The collision risk posed by this proposed fencing would be comparable to Alternative 1.

Based on cultural resource field inventory, the proposed exclosure fence would avoid impacting significant cultural sites.

This proposed exclosure would negatively affect the existing visual quality within the area, but would meet the VRM Class III management objectives.

Under this alternative there would be a loss of about 279 acres available for grazing use and an associated loss of available forage. This loss would be about 12 AUMs (compared to 20 AUMs under Alternative 1). This smaller reduction in AUMs represents about 0.5% of the permitted use, could be absorbed by spreading the AUMs across other pastures within the Juniper Mountain Allotment, and would not require reducing the permitted number of AUMs or modifying the existing grazing permit. Compared to Alternative 1, the permittee would not need to pay for additional forage costs or experience a loss in livestock production and associated revenue.

However, there would be additional annual operating costs to the permittee associated with the future maintenance of about 1.3 miles of new exclosure fence (estimated at $300-600 per year). There would also be additional one-time costs to the BLM associated with exclosure fence construction (about $10,000 per mile) totaling about $13,000. Assuming that local contractors would be hired to construct the fence, there would be a small benefit to the local economy.

***Foster Flat (Burns)***

*Alternative 5 Proposed Management Changes*

The Foster Flat Key RNA was allocated as unavailable for livestock grazing prior to the 2015 OR GRSG ARMPA via the underlying 1992 Three Rivers Resource Management Plan ROD/RMP. Neither the 2015 nor the 2019 RMP amendment processes proposed nor made any changes to the prior district decision. Alternative 5 would not make any changes to management of this RNA, and it would remain unavailable to grazing.

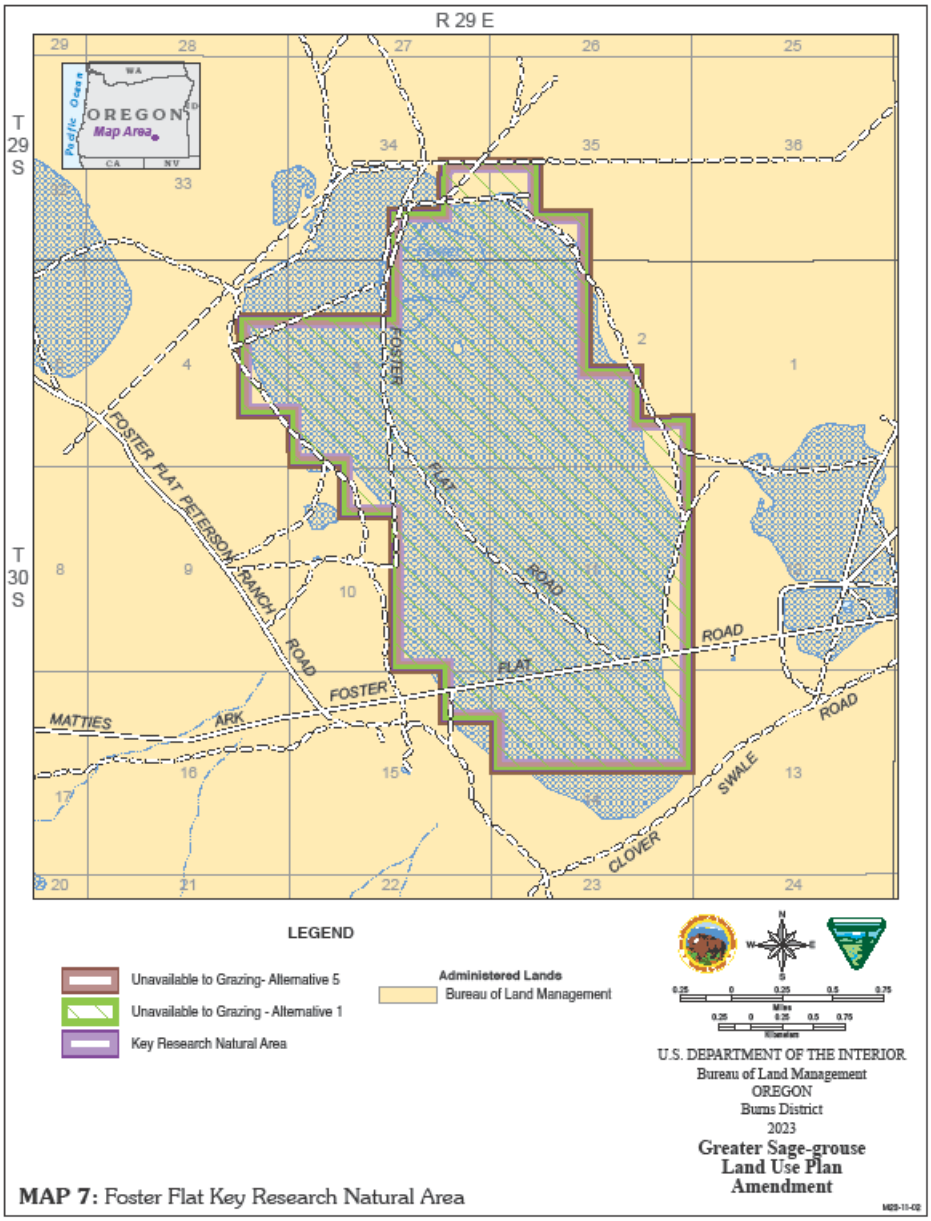
*Affected Environment*

Foster Flat RNA/ACEC is located in Harney County approximately 42 miles south of Burns, Oregon, and 20 miles west of Highway 205 near the Burns District boundary with Lakeview District. The proposed Foster Flat RNA/ACEC is 2,690 acres in size. It is in East Warm Springs Allotment (No. 7001) and in the Warm Springs HMA. The elevation of the RNA/ACEC is approximately 5,000 feet.

<u>Specific management under the 1992 Three Rivers Resource Management Plan ROD/RMP</u>

The primary management goal of the Foster Flat RNA/ACEC is to the manage the area to preserve the characteristics of the ecosystem and to provide areas for ecological studies, monitoring and research, and education. The primary management action undertaken was construction of perimeter boundary fencing. The perimeter boundary fence excluded livestock and wild horse access the water source and vegetation in the northwestern corner of Foster Flat. The area is open to OHV use.

**Map 7. Foster Flat Key Research Natural Area**




Summary of Key RNA and Relevant and Important values evaluated for ACEC/RNA designation

Foster Flat RNA/ACEC was designated to represent silver sagebrush/Nevada bluegrass communities and provide an area for ecological studies, monitoring and research, and education opportunities.

1992 Three Rivers Resource Management Plan ROD/RMP

ACEC/RNA designation

Foster Flat RNA/ACEC was designated to represent silver sagebrush/Nevada bluegrass communities. This community is found in playas throughout the Great Basin in sites which are flooded for a period of months during the winter and early spring, but which dry up rapidly as the weather warms. Foster Flat covers a large area that is essentially devoid of topographic relief and is dominated by silver sagebrush. The silver

sagebrush/Nevada bluegrass community covers approximately 800 acres in the central portion of the playa area. At slightly lower elevation on the playa is a silver sagebrush/rush community which stays wetter longer than the Nevada bluegrass association. The slightly higher elevation areas of the playa contain silver sagebrush/green rabbitbrush. There are also areas of basin wildrye, creeping wildrye or silver sagebrush with no understory. It is ringed by a slightly raised rim that is dominated by greasewood and big sagebrush.

2015 GRSG ARMPA

The Foster Flat RNA, was designated a Key RNA as a reference area for sagebrush plant communities that are important for Sage-grouse. Special Designation (SD4) was to manage the Key RNA for minimum human disturbance, allowing natural succession to proceed.

Updated Vegetation Communities

Large playa (dry lakebed) containing silver sagebrush/Baltic rush (*Juncus balticus*), silver sagebrush/Sandberg's blue grass, low sagebrush/Sandberg's bluegrass associations, grading into slightly higher areas and hummocks of basin or Wyoming big sagebrush/bluebunch wheatgrass associations.

*Rationale Supporting Proposed Management Changes*

No management changes are proposed.

*Environmental Consequences*

Since there are no changes in grazing management proposed in this planning effort there would be no potential changes in environmental effects when compared to Alternative 1.

***Guano Creek – Sink Lakes (Lakeview)***

*Alternative 5 Proposed Management Changes*

The Guano Creek-Sink Lakes ACEC/RNA falls within the much larger Guano Creek wilderness study area (WSA), the majority of which was made unavailable to livestock grazing use through an Act of Congress in 1998. For this reason, no changes in grazing use are proposed under Alternative 5.

*Affected Environment*

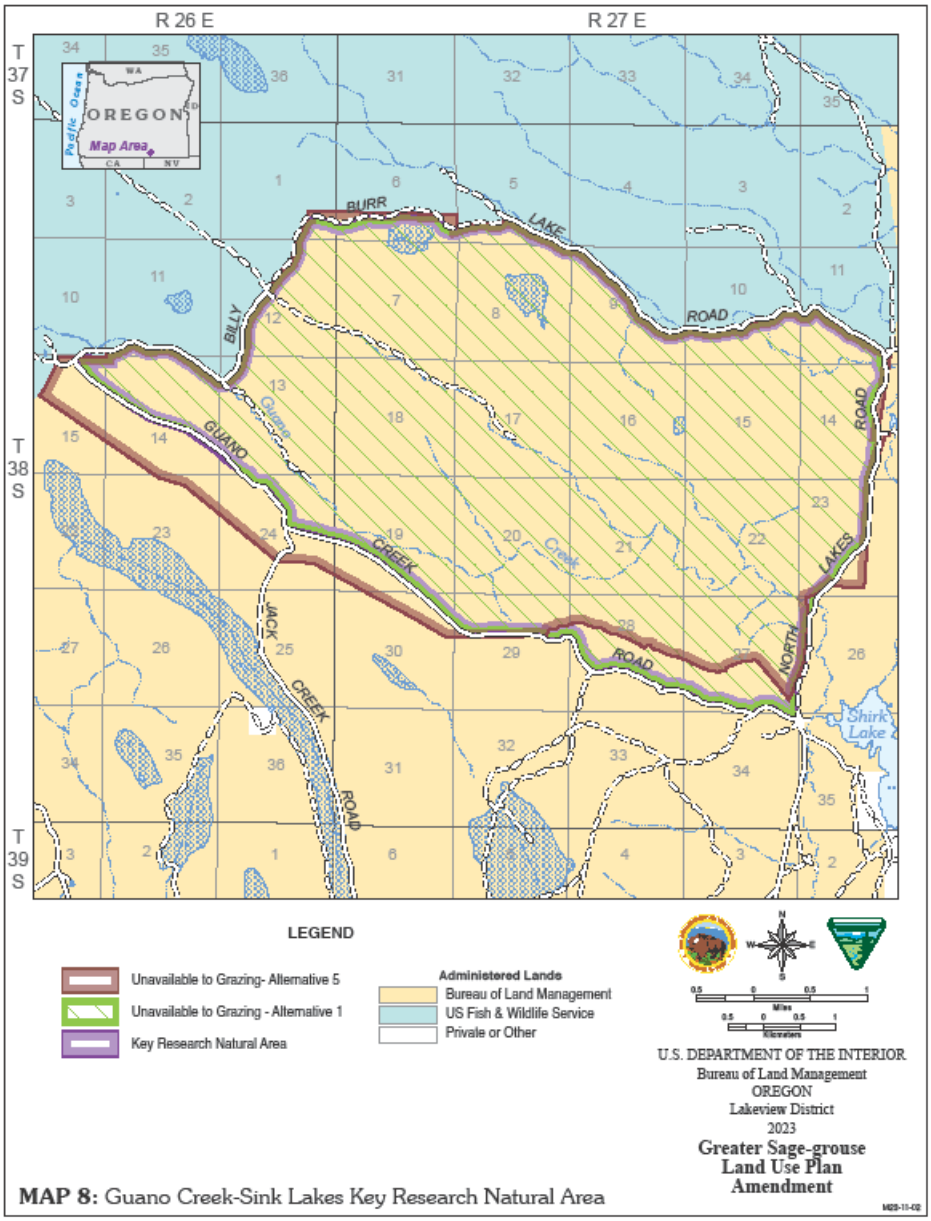
Specific management under the Lakeview RMP/ROD

OHV use is limited to existing roads and trails.

Summary of Key RNA and Relevant and Important values evaluated for ACEC/RNA designation

The 11,823-acre Guano Creek-Sink Lakes ACEC/RNA complex is located about 39 miles northeast of Lakeview and was designated in the Lakeview RMP/ROD to protect relevant/important natural system (plant communities) values (BLM 2000, 2001, 2003b).

**Map 8. Guano Creek-Sink Lakes Key Research Natural Area**




Lakeview RMP/ROD
2015 GRSG ARMPA
Updated Vegetation Communities

The Guano Creek-Sink Lakes ACEC/RNA complex contains Wyoming big sagebrush/needle-and-thread (*Hesperostipa comata*) and low sagebrush/Sandburg's bluegrass scabland communities, as well as low elevation vernal ponds (aquatic ecosystem). Three vernal ponds (including Billy Burr Lake), which are dry playas in drought years and vernal pools during wet years, are present. The playas are ringed by silver sagebrush and the surrounding uplands contain low sagebrush/grasslands. The dry playa lake beds differ in their vegetative composition and may be dominated by tansy-leaf evening primrose (*Camissonia tanacitifolia*). The middle lake

is characterized as a silver sagebrush/Nevada bluegrass (*Poa nevadensis*) playa community. Common riparian vegetation occurs along portions of Guano Creek (BLM 2000, 2001, Vanderschaff 1992).

*Rationale Supporting Proposed Management Changes*
No management changes are proposed.

*Environmental Consequences*
Since there are no changes in grazing management proposed in this planning effort there would be no potential changes in environmental effects when compared to the Alternatives 1 and 2.

***Lake Ridge (Vale)***
*Alternative 5 Proposed Management Changes*
Retain Key RNA designation of the entire ACEC/RNA

Reduce the area excluded from grazing to 13 acres.

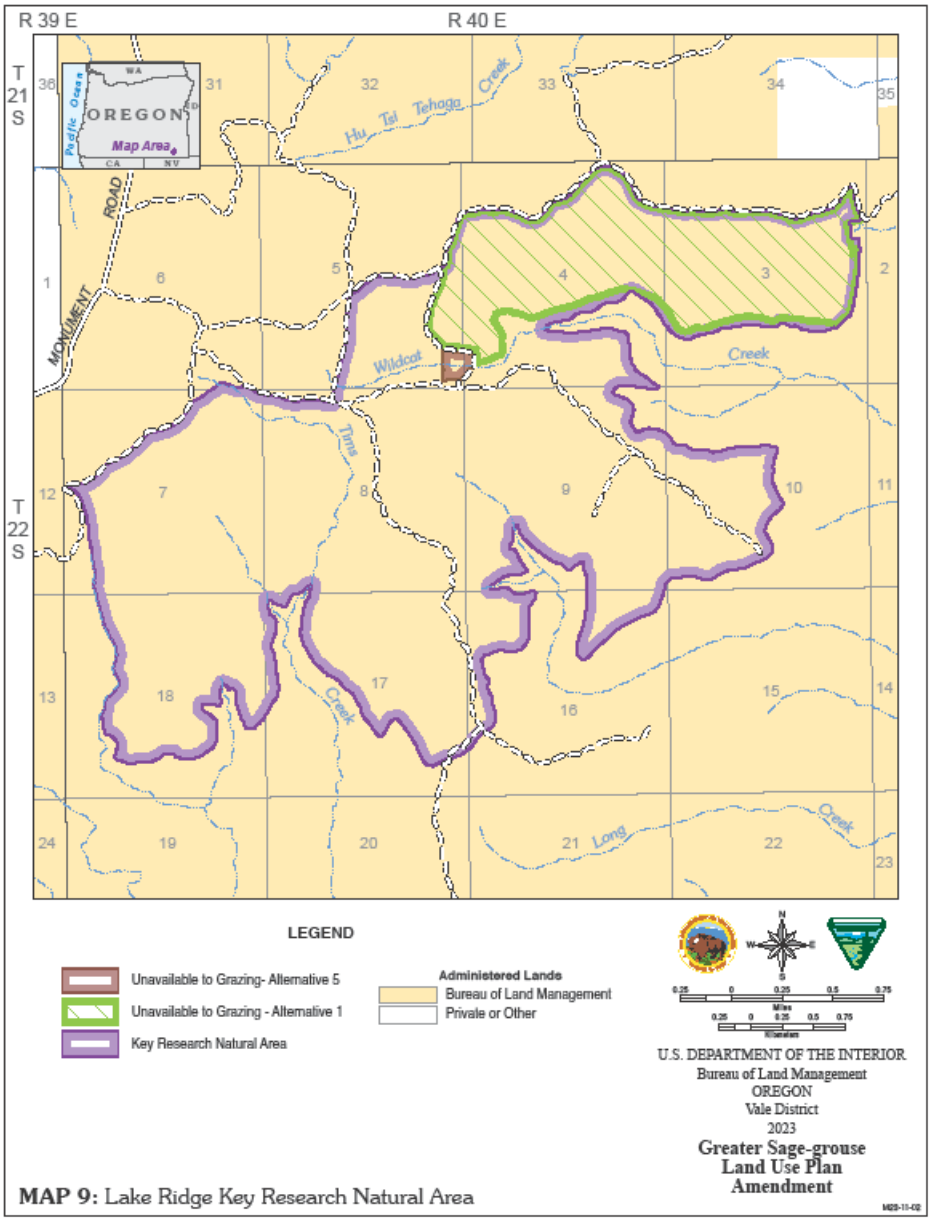
*Affected Environment*
The 3,857-acre Lake Ridge ACEC/RNA is located southeast of Juntura, Oregon, along Tim's Peak Road on a broad plateau dissected by steep canyons, with Tim's Peak rising to the north. A naturally occurring waterhole provides a perennial source of water. The ACEC/RNA is dominated by low sagebrush plant communities with both low sagebrush/bluebunch wheatgrass and low sagebrush/Idaho fescue present. Much of the ACEC/RNA is located in portions of both the Gold Creek and Camp Creek WSAs, where surface disturbing activities requiring reclamation are generally precluded until Congress makes a decision on Wilderness designation.

The Key RNA and area excluded from livestock grazing is in the Simmons Gulch pasture (55,402 acres) of the Harper allotment. There are six grazing authorizations (grazing permits) for the Harper allotment.

<u>Specific management under the 2002 SEORMP ROD, as amended:</u>
OHV use is limited to existing roads and trails. Plant collecting requires a permit. The entire area is managed under VRM Class I. Road maintenance will be limited to the existing roadway, and shoulder/barrow ditch construction will be limited to that necessary to control runoff, minimize soil erosion, and ensure public safety and serviceability of the road. Leasable minerals activities will be open with special stipulations subject to seasonal/timing restrictions, restricted or no uses in avoidance areas for sage grouse. Livestock use will continue based on existing permit stipulations and approved AMPs, unless modified under subsequent land use planning. Any proposed changes in grazing, including time and intensity of use, will be evaluated for impacts on the relevant and important values and will be permitted if values will be maintained or enhanced. Existing livestock use will be adjusted where adverse impacts are identified using a variety of methods, that could include, but is not limited to, fencing, reduction in livestock numbers, and changes in grazing season. Proposed projects in the area will be evaluated for impacts and permitted where relevant and important values will be maintained or enhanced.

<u>Summary of Key RNA and Relevant and Important values evaluated for ACEC/RNA designation</u>
2002 SEORMP ACEC/RNA Designation:
The relevant and important values identified in this ACEC/RNA are the low sagebrush/bluebunch wheatgrass community and low sagebrush/Idaho fescue community vegetation cells identified by ONHP.

**Map 9. Lake Ridge Key Research Natural Area**




2015 GRSG ARMPA:
The Lake Ridge ACEC/RNA was designated a Key RNA as a reference area for sagebrush plant communities that are important for Sage-grouse. Special Designation (SD4) was to manage the Key RNA for minimum human disturbance, allowing natural succession to proceed.

<u>Updated Vegetation Communities and Sage-Grouse Habitats</u>
Vegetation communities represented in this ACEC/RNA include low sagebrush/bluebunch wheatgrass, low sagebrush/Idaho fescue, and silver sagebrush/Sandberg bluegrass plant associations.

Plant community types important for GRSG habitat continue to be present. These plant communities in this Key RNA are low sagebrush/bluebunch wheatgrass, low sagebrush/Idaho fescue, and silver

sagebrush/Sandberg bluegrass plant associations, and were observed to be present during site visits in 2023. These plant associations represent the Shallow-Dry Sagebrush community.

Other Resources or Issues

The visual resource management is Class I.

All but approximately 5% (180 acres) of the Key RNA overlaps WSAs. The remainder of the Key RNA (approximately 3,677 acres) is located within an area identified by BLM as possessing wilderness characteristics. The 2023 Proposed SEORMP Amendment (June, 2023) would prioritize the protection of the Prava Peak wilderness characteristics unit, which is contiguous with two adjacent WSAs.

The proposed 13-acre exclosure is wholly within the Prava Peak lands with wilderness characteristics unit OR-034-042. The 20,654-ac unit possesses naturalness and is contiguous with three WSAs, and shares their outstanding opportunities to experience solitude, and primitive unconfined recreation. Elevations range from about 4,140 to 5,690 feet (Monument Peak). Existing human imprints in the unit are: 14 earthen reservoirs, four developed springs, 23.2 miles of rangeland fence, one rangeland fenced enclosure, and 43.5 miles of 22 primitive route segments, all which appear substantially unnoticeable to the average visitor. Supplemental values in the unit include GRSG leks and their habitat. The Prava Peak OR-034-042 inventory documentation can be found at https://www.blm.gov/programs/planning-and-nepa/plans-in-development/oregon-washington/vale-wci.

The Camp Creek WSA consists of 19,200 acres. The northwestern portion of the WSA is characterized by tableland, while the rest of the WSA is dissected by steep canyons. The elevation ranges from 2,700 to 5,300 feet. The dominant vegetation on the tablelands is low sagebrush and bluebunch wheatgrass, with some bitterbrush and Idaho fescue. The canyon bottoms support pockets of riparian vegetation. The Key RNA is within GRSG PHMA and four occupied leks are within 4 miles, two of which are within 1.2 miles of the Key RNA.

The Key RNA is utilized by deer during spring and summer, pronghorn antelope year-round, and is designated as elk winter range.

*Rationale Supporting Proposed Management Changes*

Rationale for Retaining Key RNA:

The area continues to be in a desirable condition for the vegetative communities identified under the 2002 SEORMP and 2015 ARMPA; management will continue to protect the relevant and important values.

The Key RNA as identified in the 2015 ARMPA is predominately comprised of low sagebrush communities that provide suitable nesting and winter habitat for GRSG.

Values associated with the Shallow-Dry vegetation type would be retained.

Rationale for modifying the area excluded from grazing

A 13-acre exclosure area that would be excluded from livestock use is within the Key RNA but is located outside the WSA. The proposed exclosure is located and designed to avoid resource conflicts while still providing an undisturbed baseline reference area for the plant communities present. The exclosure would be located more than 1.2 miles from occupied or pending GRSG leks, and avoid potential conflicts resulting from fence construction within a WSA that could occur under Alternative 1.

Fence construction within a WSA requires careful consideration. Reallocating the area as available to livestock grazing would avoid impacts to wilderness characteristics in the Camp Creek WSA. Under Alternative 5, BLM proposes to allocate as unavailable to grazing a 13-acre area in the existing Key RNA, but to the west of the WSAs to meet the 2015 objectives for an undisturbed reference area. Construction of a new fence exclosure would be one way of achieving these objectives. The proposed area excluded from grazing and potential fence would be located in a Wilderness Characteristic unit that is prioritized for protection under the 2023 Proposed SEORMP Amendment; fencing would be constructed to limit or avoid impacts to the protected unit.

*Environmental Consequences*

Retaining the Lake Ridge Key RNA designation would continue to achieve the 2015 ARMPA objectives to monitor and – as a component of BLM's 2002 SEORMP designation of the ACEC/RNA – provide opportunities to conduct appropriate research on the plant communities important for GRSG.

Fencing and potentially affected wildlife, including GRSG

If the exclosure is fenced, such fencing would be located more than 1.2 miles from occupied/pending leks, would not be considered a high risk for sage-grouse collisions, and would not negatively impact sage-grouse. However, removal of grazing from the 13-acre exclosure would not likely improve the habitat quality of the area, as it is currently in good ecological condition. Due to limited livestock presence or use occurring in the Key RNA boundary, vegetative communities that are important to GRSG habitat would continue to be present under both Alternatives 1 and 5. When compared to Alternative 1, impacts to wildlife, including sage-grouse, of reallocating livestock grazing under Alternative 5 would eliminate the need for additional presence of livestock operators for managing livestock away from unfenced boundaries.

Lands with Wilderness Characteristics

Because the 13-acre exclosure would be outside of the WSA under Alternative 5, the short-term and long-term impacts to the wilderness characteristics of naturalness, solitude, and primitive and unconfined recreation would be eliminated when compared with Alternative 1.

The proposed 13-acre exclosure that would be excluded from livestock grazing would be located in the Prava Peak wilderness characteristics unit which, under the 2023 Southeastern Oregon Proposed RMP Amendment (PRMPA) and Final Environmental Impact Statement (FEIS) is proposed for prioritized protection. Approximately one-half mile of new fence would be constructed in the Prava Peak wilderness inventory unit to create a 13-acre exclosure. If an exclosure fence is constructed, short term negative impacts to naturalness could be caused by the soil surface and vegetative disturbance associated with the construction. These impacts would be expected to fade within one to three years with new vegetation growth. Long-term negative impacts to naturalness would be the additional human imprint of the completed fence in the Prava Peak unit. However, design features to minimize impacts to lands with wilderness characteristics would be implemented. The addition of an exclosure fence would result in a minimal, long-term additional impact to the characteristic of naturalness within the Prava Peak unit. The extent of the additional fence —individually and collectively with the other existing human imprints present in the Prava Peak unit—would result in the Prava Peak unit, overall, still being affected primarily by the forces of nature with the imprint of man's work being substantially unnoticeable to the average visitor.

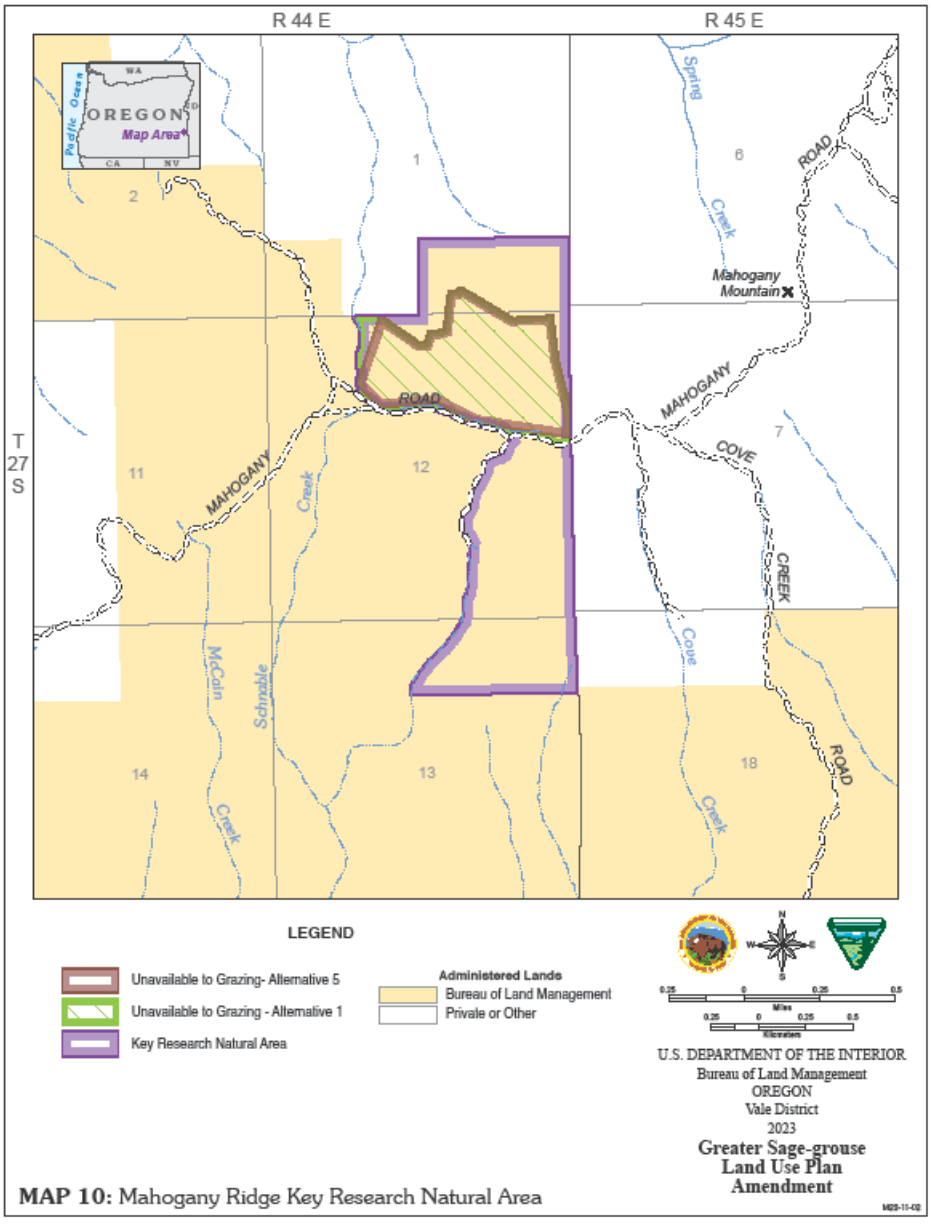
***Mahogany Ridge (Vale - South Unit Only)***

*Alternative 5 Proposed Management Changes*

Retain the Mahogany Ridge Key RNA boundary.

Reduce the area excluded from grazing from 155 acres to 140 acres. The 155-acre area excluded from grazing under the 2015 ARMPA would be modified to 140 acres to facilitate implementation of the grazing exclosure area.

**Map 10. Mahogony Ridge Key Research Natural Area**



*Affected Environment*

The 682-acre Mahogany Ridge ACEC/RNA is comprised of two areas; the Key RNA is limited to the southern unit (444 acres) and is located on the slope of Mahogany Mountain, west of U.S. Highway 95 and north of Jordan Valley, Oregon. The ACEC/RNA includes undisturbed stands of mountain mahogany on parcels of the northern and western slopes of Mahogany Ridge. It fills a vegetation cell need for mountain mahogany-sagebrush and mountain mahogany-Oregon grape complex identified by ONHP and includes a higher-elevation mountain big sagebrush mountain mahogany/slender wheatgrass-bluebunch wheatgrass community. The unit is bounded on the east and north by private land ownership.

The Mahogany Ridge ACEC/RNA is located within the East Mahogany pasture of the Mahogany Mountain Allotment.

Specific management under the 2002 SEORMP ROD, as amended:

OHV use will be limited to designated roads and trails. Road maintenance will be limited to the existing roadway, and shoulder/barrow ditch construction will be limited to that necessary to control runoff, minimize soil erosion, and ensure public safety and serviceability of the road. The area is VRM Class II. Plant collecting requires a permit. Development of leasable minerals is subject to the No Surface Occupancy stipulation. Livestock use will continue based on existing permit stipulations and approved AMPs, unless modified under subsequent land use planning. Any proposed changes in grazing use, including time and intensity of use, will be evaluated for impacts on the relevant and important values and will be permitted if values will be maintained or enhanced. Where adverse impacts are identified, existing livestock use will be managed using a variety of methods, including fencing, reduction in livestock numbers, and changes in grazing season. Proposed projects will be evaluated for impacts and permitted where relevant and important values will be maintained or enhanced.

Summary of Key RNA and Relevant and Important values evaluated for ACEC/RNA designation

2002 Southeastern Oregon RMP (SEORMP) ACEC/RNA Designation:

The relevant and important values in the ACEC/RNA include habitat for the broad-tailed hummingbird and other neotropical migratory birds, a special status plant species (Owyhee clover), and the mountain mahogany-big sagebrush vegetation communities identified by ONHP.

2015 GRSG ARMPA:

The Mahogany Ridge ACEC/RNA was designated a Key RNA as a reference area for sagebrush plant communities that are important for Sage-grouse. Special Designation (SD4) was to manage the Key RNA for minimum human disturbance, allowing natural succession to proceed.

Updated Vegetation Communities and Sage-Grouse Habitats

Mountain mahogany/mountain big sagebrush woodland and lesser amounts of a mountain mahogany/Oregon grape (Mahonia repens) plant community are present on northerly slopes. Areas with mountain big sagebrush/Idaho fescue associations also occur in the Key RNA.

Vegetation communities represented in this Key RNA, that are important to GRSG habitat, continue to be present. These communities are mountain big sagebrush/Idaho fescue associations. These communities represent the Cool-Moist sagebrush community.

The mountain mahogany/mountain big sagebrush woodland and lesser amounts of a mountain mahogany/Oregon grape (*Mahonia repens*) plant communities in this Key RNA are not suitable habitat for sage-grouse because the dominant growth structure of mountain mahogany is more tree like, providing no

understory cover and providing perch opportunities for predators. These represent the Mountain Shrub vegetation community. However, no adjustments in the Key RNA boundaries, and only minor changes to the area excluded from grazing are proposed at this time.

The Key RNA is within PHMA and is part of the Cow Lakes Priority Area of Conservation. It is included within the boundary of sage-grouse spring nesting, summer brood-rearing, and winter habitat. The nearest occupied or pending lek and the only lek within 4 miles of the Key RNA is approximately 3.4 miles away.

Other Resources or Issues

The visual resource management category of the Key RNA is Class II.

With the exception of a boundary road between two wilderness characteristics units (The Tongue (OR-034-054) and Schnable Creek (OR-034-057)) the southern portion (444 acres) of the Mahogany Ridge Key RNA is within an area possessing wilderness characteristics. The area excluded from grazing under the 2015 ARMPA is wholly in The Tongue wilderness characteristics unit. Neither wilderness characteristics unit is proposed for prioritized protection under the 2023 Southeastern Oregon PRMPA and Final Environmental Impact Statement (FEIS).

The Mahogany Ridge Key RNA is located on the edge of bighorn sheep core herd range and is winter range for deer. It is utilized by deer and elk year-round. ODFW's Oregon Connectivity Assessment and Mapping Project (OCAMP) categorized this area as a Priority Wildlife Connectivity Area (PWCA) – Region. Regions are the top 1% of connectivity priorities and represent the highest-value habitat for facilitating species movement. In addition, this area has a priority Recommended Conservation Action of 'Protect', the strongest conservation measure for maintaining wildlife connectivity. Because of the limited number of mountain mahogany stands in southeast Oregon among an abundance of shrublands and grasslands, this KRNA is important nesting and migration habitat for neotropical migratory birds, as is highlighted in the relevant and important values identified in the 2002 ACEC/RNA designation.

*Rationale Supporting Proposed Management Changes:*

Rationale for Retaining Key RNA:

The area continues to be in a desirable condition for the updated vegetative communities identified under the 2015 ARMPA. Management will continue to protect the relevant and important values.

Sagebrush communities of the Key RNA provide for suitable nesting, brood-rearing and winter habitat for GRSG.

Site visits indicate that the vegetation types identified for the Key RNA designation in 2015 are present. The area retains the Cool-Moist Sagebrush and Mountain Shrub Vegetation Type.

Rationale for modifying the area excluded from grazing:

Under Alternative 5, 140 acres would be excluded from grazing to avoid or reduce resource conflicts, including Bighorn sheep migration and use, and to establish an administratively manageable location for a potential new fenceline. The location of the fenceline is proposed to facilitate construction and maintenance of the fence, limit the number of gates by avoiding road crossings, and minimize disturbance to resources.

*Environmental Consequences*

Fencing and GRSG

Construction of an exclosure fence could disturb nesting sage-grouse if construction occurs during the breeding season. However, the nearest pending or occupied lek is 3.4 miles away. Restricting activity during

the breeding season to 2 hours after sunrise to 2 hours before sunset would minimize any disturbance to any sage-grouse that may be present in the area. The location of the proposed fence was not modeled for sage-grouse collision risk since it is more than 1.2 miles from any leks. While sagebrush is present for nesting and forage, the Key RNA is in a V-shaped valley with rock outcrops and mountain mahogany stands that present perching locations for raptors, decreasing security for sage-grouse. Abundant habitat to the south and west of the Key RNA provides higher quality nesting and brood-rearing habitat, which is not represented in the area designed as a "Key RNA" under this and other alternatives. Thus sage-grouse collision risk in this valley is minimal.

Fencing and other potentially affected wildlife

Due to the physical location within the pasture of the Mahogany Ridge Key RNA and area allocated as unavailable to grazing, avoidance of excluding important water sources for livestock management and distribution, there would be no impacts to grazing as a result of retaining the Key RNA or the modification to the area that is unavailable to grazing.

The 1.0-mile fence surrounding the proposed exclosure area would have minor effects on the movement of big game through the area. The risk to big game movement would be minimized by using wildlife-friendly fence designs; big game would be able to move more easily under, over, and through the fence. Since this is an ODFW high priority PWCA, the addition of both white and black fence markers could increase fence visibility and reduce collision risk for both big game and birds. Constructing the fence would cause temporary disturbance to approximately 0.73 acres of upland habitat important to migratory birds. Minor damage to sagebrush within the disturbance area could destroy nesting habitat for a variety of birds, including sage-grouse and migratory birds. However, if a fence were constructed, it would be built by hand, which generally does not damage much vegetation, particularly with the modified boundary being adjacent to existing roads. If constructed during nesting season, some individuals could be displaced at the time, but the effects of 0.73 acres of temporary minor habitat disturbance to the overall population of migratory birds would be negligible.

Lands with Wilderness Characteristics

The modified location of the boundary of the area that is unavailable to grazing facilitates livestock grazing management and reduces impacts to wilderness characteristics. Impacts to wilderness characteristics in The Tongue units would be reduced with the smaller enclosure. Impacts to naturalness would occur, but be limited to near boundary roads or internal primitive trails. If management actions (e.g., herding) other than fence construction were employed to exclude livestock from the unavailable area, there would be no impact to naturalness. Outstanding Opportunities for Solitude would not be impacted as short-term impacts to solitude caused by fence construction and long-term impacts to solitude caused by active management to exclude livestock from Key RNA would not occur.

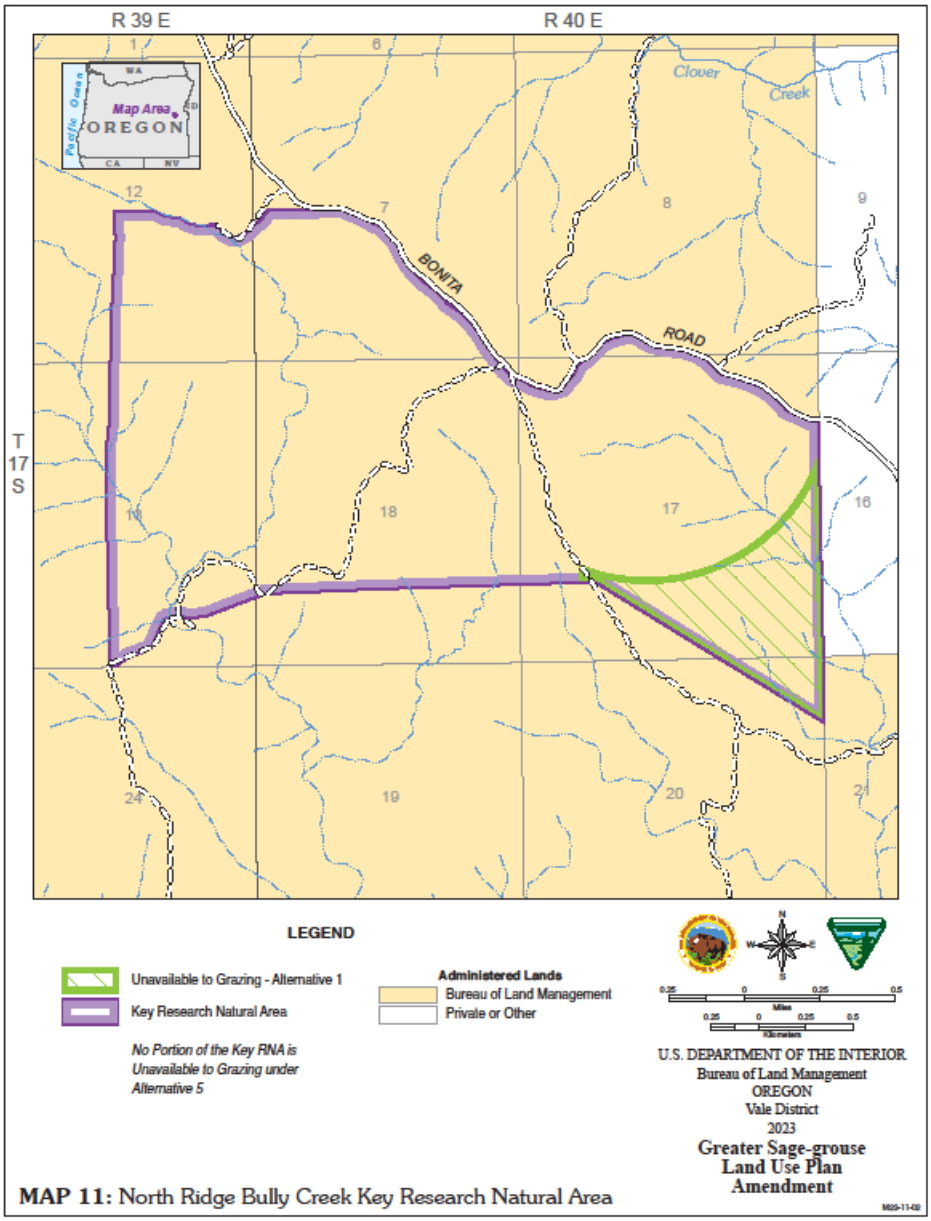
***North Ridge Bully Creek (Vale)***

*Alternative 5 Proposed Management Changes*

Retain the area designated as a Key RNA.

Reallocate all portions of the Key RNA as available to grazing

**Map 11. North Ridge Bully Creek Key Research Natural Area**




*Affected Environment*

The 1,569-acre North Ridge Bully Creek ACEC/RNA is located west of Westfall, Oregon, along the ridge that separates Clover Creek drainage to the north and Bully Creek drainage to the south. The ACEC/RNA encompasses a number of grassland communities that occur both as distinct communities as well as intermixed within a larger mosaic of types.

A 164-acre area of the Key RNA is allocated as unavailable to livestock grazing. The Key RNA is wholly within the North Ridge pasture of the Richie Flat allotment.

Specific management under the 2002 SEORMP ROD, as amended:

OHV use is limited to existing roads and trails. Plant collecting requires a permit. The ACEC/RNA is VRM Class III. Road maintenance will be limited to the existing roadway, and shoulder/barrow ditch construction will be limited to that necessary to control runoff, minimize soil erosion, and ensure public safety and serviceability of the road. Livestock use will continue based on existing permit stipulations and approved AMPs, unless modified under subsequent land use planning. Any proposed changes in grazing outside of the current authorization, including time and intensity of use, would be analyzed through the appropriate process. Such analysis would evaluate impacts on the associated relevant and important values so that, if permitted, values would be maintained or enhanced. Existing livestock use will be adjusted where adverse impacts are identified using a variety of methods, including, but not limited to, fencing, reduction in livestock numbers, and changes in grazing season. Proposed projects in the area will be evaluated for impacts and permitted where relevant and important values will be maintained or enhanced.

Summary of Key RNA and Relevant and Important values evaluated for ACEC/RNA designation

2002 Southeastern Oregon RMP (SEORMP) ACEC/RNA Designation:

The relevant and important values identified in this ACEC/RNA are the Wyoming big sagebrush/Thurber needlegrass community and big sagebrush-threetip sagebrush/Idaho fescue community vegetation cells identified by ONHP.

2015 GRSG ARMPA:

The North Ridge Bully Creek ACEC/RNA was designated a Key RNA as a reference area for sagebrush plant communities that are important for Sage-grouse. Special Designation (SD4) was to manage the Key RNA for minimum human disturbance, allowing natural succession to proceed.

Updated Vegetation Communities and Sage-Grouse Habitats

Wyoming big sagebrush/Thurber's needlegrass, Wyoming big sagebrush/wild crab apple (*Peraphyllum ramosissimum*)/bluebunch wheatgrass, and threetip sagebrush/bluebunch wheatgrass are common plant communities throughout the RNA.

Vegetative communities in this Key RNA and that are important to GRSG habitat continue to be present. These are Wyoming big sagebrush/Thurber's needlegrass, Wyoming big sagebrush/wild crab apple (*Peraphyllum ramosissimum*)/bluebunch wheatgrass, and threetip sagebrush/bluebunch wheatgrass. These communities represent the Cool-Moist/Warm-Dry Sagebrush Communities. The Key RNA is within GRSG PHMA and four occupied or pending leks are within 1.2 miles of the Key RNA boundary. The North Ridge Bully Creek ACEC/RNA burned in the 2012 Bonita Fire and the 2015 Bendire Fire removing much of the sagebrush present. The North Ridge Bully Creek ACEC/RNA was aerially sprayed with the preemergent herbicide imazapic in October 2015, after the Bendire, fire to reduce invasive annual grasses in the area.

Other Resources

The visual resource management is Class III.

The Key RNA is utilized by deer during spring and summer, pronghorn antelope year-round, and is designated as elk winter range.

*Rationale Supporting Proposed Management Changes:*

Rationale for Retaining Key RNA:

The area continues to be in desirable conditions for the vegetative communities identified, and management will continue to protect the relevant and important values. Vegetative communities important to GRSG are present within the Key RNA boundaries, although shrub components have been impacted by past wildfires.

Management would retain identified vegetation community for research purposes.

Sagebrush communities of the Key RNA provide for suitable nesting, brood-rearing and winter habitat for Greater Sage-grouse.

Continued management would retain the Ecotone between Cool-Moist/Warm-Dry vegetation types.

Research opportunities continue to remain due to the remote and rugged nature of the area, as well as limited use by livestock throughout the Key RNA.

Rationale for reallocating the area as available to livestock grazing:

Implementation of a constructed boundary (e.g., fencing) to exclude livestock grazing or strategic placement of supplements to focus livestock use away from the area allocated as unavailable to livestock grazing under the 2015 ARMPA conflict with RDFs identified in Appendix C of the 2015 ARMPA (1.2 miles to occupied and pending lek for construction of new infrastructure and placement of supplement greater than 1.2 miles from an occupied lek, Livestock Grazing RDFs 1 and 7). Nor would such actions provide equal or better protection for GRSG or its habitat (BLM 2015b, Appendix C, p. C-1).

Allocating the area as available to livestock grazing would allow for the continuation of proper livestock distribution throughout the North Ridge pasture of the Richie Flat allotment. Livestock management prior to the 2015 ARMPA (Alternative 1) has not had a negative impact on the relative and important values identified for the RNA.

*Environmental Consequences*

Under Alternative 5, allocating the area as "available to livestock grazing" would allow for the continuation of proper livestock distribution throughout the North Ridge pasture of the Richie Flat allotment. Livestock management prior to the 2015 ARMPA has not had a negative impact on the relative and important values identified for the RNA. Compared to Alternative 1, increased presence and time and resources for managing livestock in the area would not be necessary and the potential impacts to other resource values and livestock grazing management for the area reallocated as available for livestock grazing would not occur.

Fencing and potentially affected wildlife, including GRSG

Impacts to wildlife, including sage-grouse, of reallocating livestock grazing under Alternative 5 would eliminate the need for additional presence of livestock operators for managing livestock away from unfenced boundaries. Vegetative communities that are important to GRSG habitat would continue to be present under both Alternative 1 and Alternative 5.

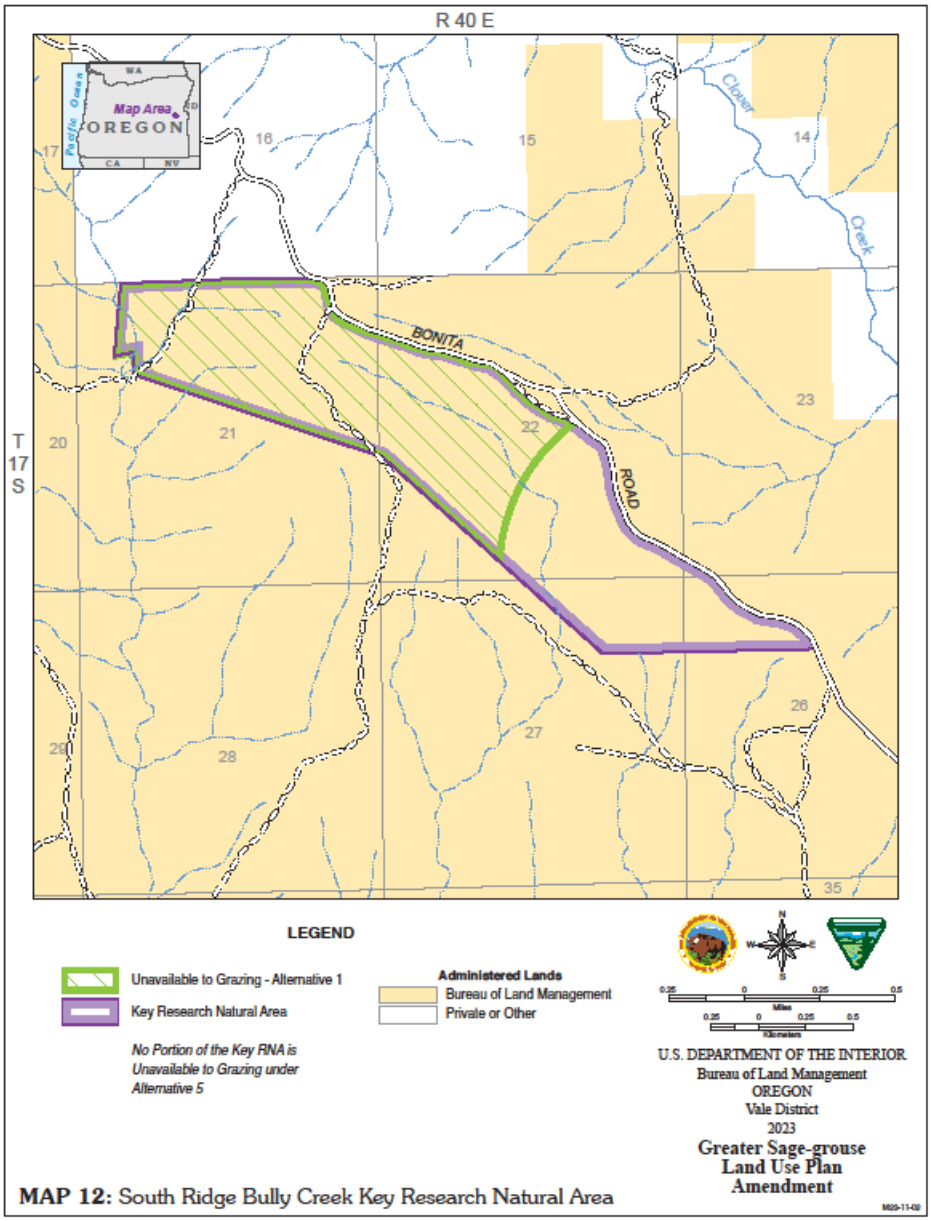
***South Ridge Bully Creek (Vale)***

*Alternative 5 Proposed Management Changes*

Retain the area designated as a Key RNA.

Reallocate all portions of the Key RNA as available to grazing.

**Map 12. South Ridge Bully Creek Key Research Natural Area**




*Affected Environment*

The 621-acre South Ridge Bully Creek ACEC/RNA is located west of Westfall, Oregon, along the ridge that separates Clover Creek drainage to the north and Bully Creek drainage to the south. The ACEC/RNA encompasses a number of grassland communities that occur as distinct entities intermixed within a larger mosaic of types in excellent ecological condition.

The South Ridge Bully Creek Key RNA and 397-acre area excluded from livestock grazing occurs within the South Ridge pasture of the Richie Flat allotment. The Key RNA is adjacent to the North Ridge Bully Creek Key RNA and North Ridge Bully Creek pasture.

Specific management under the 2002 SEORMP ROD, as amended:

OHV use will be limited to existing roads and trails. Plant collecting requires a permit. The ACEC/RNA is managed as VRM Class III. Road maintenance will be limited to the existing roadway, and shoulder/barrow ditch construction will be limited to that necessary to control runoff, minimize soil erosion, and ensure public safety and serviceability of the road. Livestock use will continue based on existing permit stipulations and approved AMPs, unless modified under subsequent land use planning. Any proposed changes in grazing, including time and intensity of use, will be evaluated for impacts on the relevant and important values and will be permitted if values will be maintained or enhanced. Where adverse impacts are identified, existing livestock use will be adjusted using a variety of methods that could include fencing, reduction in livestock numbers, and changes in grazing season. Proposed projects in the area will be evaluated for impacts and permitted where relevant and important values will be maintained or enhanced.

Summary of Key RNA and Relevant and Important values evaluated for ACEC/RNA designation

2002 Southeastern Oregon RMP (SEORMP) ACEC/RNA Designation:

The relevant and important values of the ACEC/RNA are the Wyoming big sagebrush/Thurber needlegrass community and Wyoming big sagebrush- wild crab apple (*Peraphyllum ramosissimum*)/Idaho fescue community vegetation cells identified by ONHP.

2015 GRSG ARMPA:

The South Ridge Bully Creek ACEC/RNA was designated a Key RNA as a reference area for sagebrush plant communities that are important for Sage-grouse. Special Designation (SD4) was to manage the Key RNA for minimum human disturbance, allowing natural succession to proceed.

Updated Vegetation Communities and Sage-Grouse Habitats

Vegetation communities represented in this Key RNA include Wyoming big sagebrush/Thurber's needlegrass, a Wyoming big sagebrush/wild crab apple/Idaho fescue, and threetip sagebrush/blue bunch wheatgrass (Idaho fescue) plant association.

Vegetative communities in this Key RNA and that are important to GRSG habitat continue to be present. These are Wyoming big sagebrush/Thurber's needlegrass, a Wyoming big sagebrush/wild crab apple/Idaho fescue, and threetip sagebrush/blue bunch wheatgrass (Idaho fescue) plant association. These communities represent the Cool-Moist/Warm-Dry Sagebrush Communities. The Key RNA is within GRSG PHMA and two occupied or pending leks are within 1.2 miles of the Key RNA boundary. The South Ridge Bully Creek ACEC/RNA burned in the 2012 Bonita Fire and the 2015 Bendire Fire removing much of the sagebrush present. The South Ridge Bully Creek ACEC/RNA was aerially sprayed with the preemergent herbicide imazapic in October 2015 after the Bendire fire to reduce invasive annual grasses in the area.

Other Resources

The visual resource management is Class III.

The Key RNA is utilized by deer during spring and summer, pronghorn antelope year-round, and is designated as elk winter range.

*Rationale Supporting Proposed Management Changes:*

Rationale for Retaining Key RNA:

The area continues to be in a desirable condition for the vegetative communities identified; management will continue to protect the relevant and important values. Vegetative communities important to GRSG are present, although shrub components have been impacted by past wildfires.

Retain identified vegetation community Key RNA designation for research purposes.

Sagebrush communities of the Key RNA provide for suitable nesting, brood-rearing and winter habitat for GRSG.

Continued management would retain the Ecotone between Cool-Moist/Warm-Dry vegetation types.

Rationale for reallocating the area as available to livestock grazing:
Allocating the area as available to livestock grazing would allow for the continuation of management practices which resulted in proper livestock management throughout the South Ridge pasture of the Richie Flat allotment, while continuing to allow for research opportunities.

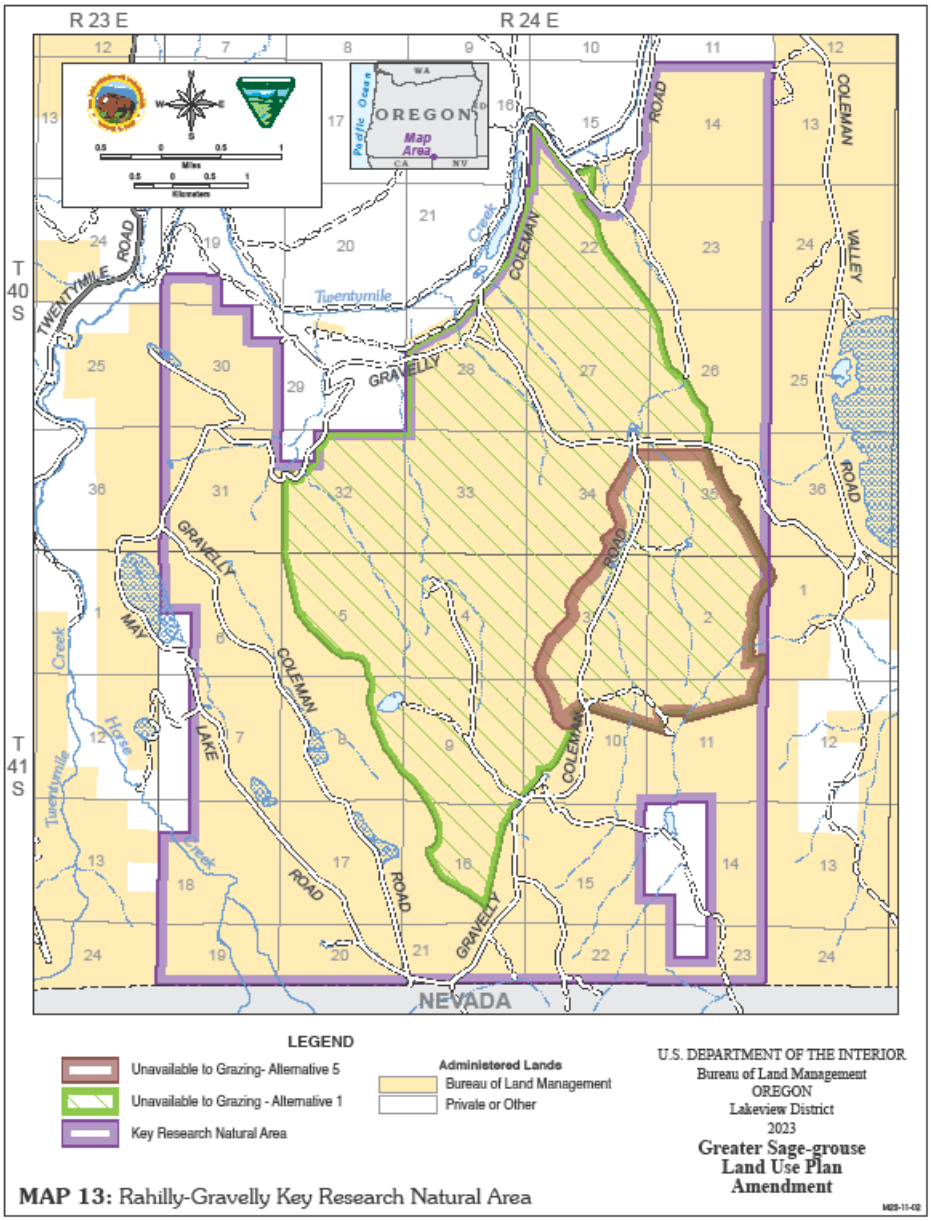
Implementation of a constructed boundary (e.g., fencing) to exclude livestock grazing or strategic placement of supplements to focus livestock use away from the area allocated as unavailable to livestock grazing under the 2015 ARMPA conflict with RDFs identified in Appendix C of the 2015 ARMPA (1.2 miles to occupied and pending lek for construction of new infrastructure and placement of supplement greater than 1.2 miles from an occupied lek, Livestock Grazing RDFs 1 and 7). Nor would such actions provide equal or better protection for GRSG or its habitat (BLM 2015b, Appendix C, p. C-1). Limited livestock access is expected to occur without construction of new fencing, which would not be in conformance with the 2015 ARMPA.

*Environmental Consequences*
Under Alternative 5, allocating the area as "available to livestock grazing" would allow for the continuation of management practices prior to 2023, which resulted in proper livestock management for throughout the South Ridge pasture of the Richie Flat allotment, while continuing to allow for research opportunities. Compared to Alternative 1, livestock operators would not need to increase their presence in the area where livestock use would no longer be allocated.

Fencing and potentially affected wildlife, including GRSG
Impacts to wildlife, including sage-grouse, of reallocating livestock grazing under Alternative 5 would eliminate the need for additional presence of livestock operators for managing livestock away from unfenced boundaries. No additional fencing would be constructed that may result in short-term disturbance to individuals and fence related conflicts (e.g. bird collisions and entrapments). Vegetative communities that are important to GRSG habitat would continue to be present under both Alternatives 1 and 5.

***Rahilly-Gravelly (Lakeview)***
*Alternative 5 Proposed Management Changes*
Retain the Key RNA designation for the entire ACEC/RNA but reduce the area excluded from livestock grazing to 2,025 acres within a portion of the Sucker Creek Pasture (Rahilly-Gravelly Allotment) that contains low sagebrush/Sandberg's bluegrass grassland and Wyoming big sagebrush/bluebunch wheatgrass grassland plant communities.

**Map 13. Rahilly-Gravelly Key Research Natural Area**




*Affected Environment*

The 18,734-acre Rahilly-Gravelly ACEC/RNA is located about 24 miles southeast of Lakeview.

Specific management under the Lakeview RMP/ROD

OHV use is limited to existing roads and trails.

Summary of Key RNA and Relevant and Important values evaluated for ACEC/RNA designation

Lakeview RMP/ROD

The 18,734-acre Rahilly-Gravelly ACEC/RNA was designated in the Lakeview RMP/ROD to protect relevant/important natural system (plant communities) and cultural resource values (BLM 2000, 2001, 2003b).

During the development of the *Lakeview RMP/ROD* (BLM 2003b), the BLM expanded the Rahilly-Gravelly ACEC/RNA (from the original 1,400-acre proposal to over 18,700 acres solely to include significant cultural values in the added acreage. These site types included stone rings, rock art, lithic scatters, rock cairns, hunting blinds, and occupation sites (BLM 2000, p. III-33 to III-34; 2003a, p. 2-55).

2015 GRSG ARMPA

The Proposed RMPA/Final EIS described the plant communities of the Rahilly-Gravelly ACEC/RNA as containing important sage-grouse plant communities including western juniper/Wyoming big sagebrush-bitterbrush woodland and some unusual shrublands described by the Oregon Biodiversity Information Center (ORBIC), such as a mountain big sagebrush/bitterbrush/wild crab apple and a mountain big sagebrush/bitterbrush/mountain snowberry/Thurber's needlegrass shrubland. The ACEC/RNA also contains Wyoming big sagebrush/bunchgrass, bluebunch wheatgrass, Thurber's needlegrass, and Sandberg's bluegrass associations, as well as areas of low sagebrush/grassland vegetation types (BLM 2015a, p. 3-142).

Updated Vegetation Communities

Approximately 1,400 acres of this ACEC/RNA contains the plant communities identified in the 2015 ARMPA and they are located within the Nevada Pasture (Vander Schaaf 1992; BLM 2000, p. III-33), not within the original (Alternative 1) exclosure area in the Sucker Creek Pasture. The Sucker Creek Pasture is the portion of the RNA with GRSG habitat and documented GRSG use.

Based on ESI data, the most dominant vegetation communities in the Rahilly-Gravelly ACEC/RNA include low sagebrush/Sandberg bluegrass, big sagebrush/cheatgrass, big sagebrush/Sandberg bluegrass, big sagebrush with no understory, and mountain big sagebrush/bluegrass. However, no mountain big sagebrush/bitterbrush/mountain snowberry/Thurber's needlegrass shrubland communities are present. In addition, western juniper is encroaching into, and degrading the habitat quality of the Wyoming big sagebrush/bitterbrush, big sagebrush, and some of the low sagebrush communities within the ACEC/RNA.

There are some cocklebur species (*Xanthium* sp.) and Canada thistle located around spring and water developments in the Rahilly-Gravelly Key RNA. Many of these sites are located in areas that already exclude livestock grazing. This RNA also has a documented site of Mediterranean sage *(Mediterranean sage)* that is a high management priority for containment/control.

The BLM sensitive plant species, Cooper's goldflower (*Hymenoxys cooperi* var *canescens ~ H. lemmonii*), occurs in four places within the ACEC/RNA (BLM 2000a). Cooper's goldflower grows in rocky soils in arid regions from southern California to New Mexico, north as far as Idaho and Oregon. Not much is known about the life history requirements of this species.

Other Resources

Small riparian/wetland areas occur around Terry Spring, Spearpoint Spring, several livestock water developments, and short reaches of Sucker Creek (BLM In Prep).

The Rahilly-Gravelly Key RNA lies within the Warner-Meizner mid-scale HAF, and the Warner fine-scale HAF boundaries, but is part of the Beaty PAC. The entire RNA is classified as PHMA and nearly all the area is mapped as seasonal breeding, summer, and winter sage-grouse habitat. Telemetry data collected across several years has documented spring, summer, and winter use within much of the Key RNA including the Sucker Creek Pasture (unpublished data). As of 2022 lek surveys, there were 3 occupied and 4 unoccupied leks within the Sucker Creek Pasture.

Juniper areas provide habitat for woodland nesting species and cover for big game, while the shrubland/grassland areas provide habitat and forage for sage-steppe associated species. The area includes mule deer winter range, bighorn sheep occupied habitat, and pronghorn winter range and migration (BLM In Prep.).

The Twelvemile-Horse Creek (OR-015-157 and CA-020-1005; 24,081 acres) and Sucker Creek (OR-015-120A; 7,118 acres) wilderness characteristics units overlap portions of the Key RNA.

The Rahilly Gravelly ACEC/RNA is managed as VRM Class III.

The Rahilly-Gravelly ACEC/RNA falls within the 33,571-acre Rahilly-Gravelly (00212) Allotment.

*Rationale supporting Proposed Management Changes:*
Portions of the original exclosure boundary (Alternative 1) were based on property lines that traversed terrain/topography (e.g., steep slopes, rocky surfaces) where the BLM determined, based on further analysis and field inventory, it would be difficult to construct exclosure fencing. The modified exclosure boundary would take advantage of existing topographic barriers (e.g. steep rims) and reduce the amount of fencing needed within sage-grouse habitat from an estimated 4.7 miles (under Alternative 1) to about 2.5 miles and move fencing further away from two occupied leks.

During the development of the *Lakeview RMP/ROD* (BLM 2003b), the BLM expanded the Rahilly-Gravelly ACEC/RNA (from the original 1,400-acre proposal to over 18,700 acres to include significant cultural values in the surrounding area. Not all of the plant communities described in 2015 ARMPA occur within the (Alternative 1) area excluded from grazing (Sucker Creek Pasture) or represent plant communities that are important Sage-Grouse habitat. There is no data supporting presence of a mountain big sagebrush/ bitterbrush/mountain snowberry/Thurber's needlegrass shrubland anywhere in in the Key RNA. The proposed exclosure area in the Sucker Creek Pasture contains Wyoming big sagebrush and low sagebrush plant communities.

*Environmental Consequences*
Alternative 5 would add about 2.5 miles of new fencing within two wilderness characteristics inventory units. This new fence would be noticeable within close proximity but would not be substantially noticeable across the units as a whole. The removal of grazing under this alternative would have minor positive impacts to vegetation communities and naturalness within the exclosure. This fence would not diminish the size of the units or cause the units to no longer meet the minimum wilderness characteristics criteria. For this reason, this alterative would comply with the 2010 Settlement Agreement (BLM 2010b) (BLM In prep.).

Making the Rahilly-Gravelly ACEC/RNA unavailable to grazing use could help protect the relevant and important values by eliminating soil and vegetation disturbance in a portion of the Key RNA. This would allow natural succession processes to occur in the absence of most human-caused disturbances and provide an area for future baseline monitoring and research purposes.

Native plant communities and soils within the proposed exclosure would no longer be subject to livestock grazing or trampling effects. The effects of heavy cattle grazing and trampling/compaction around five existing livestock water sources (100 acres) could be removed and the native vegetation and soils would improve in these areas over the long-term. However, the 2.5 miles of new exclosure fence would result in additional cattle trampling/trailing along the new fence. About 1.5 acres of native plant communities and soils would be impacted. In total there would be about 100 acres of improvement in native vegetation and soils offset by about 1.5 acres of new disturbance within the Key RNA.

If an exclosure fence were constructed, subsequent livestock trailing along the fence would create new ground disturbance within an area that has been relatively undisturbed in the past. There would be an increased potential risk of introducing new noxious weeds/invasive species into native communities during fence construction. However, the risk of weed introduction or expansion would be slightly less than Alternative 1 due to less proposed exclosure fence building, livestock trailing, and associated ground disturbances. While no special status plants were located within the proposed exclosure fence alignment and there would be no direct impacts to such species, the new disturbance would represent an area of potential cheatgrass invasion/expansion that could potentially impact the Cooper's goldflower in some portion of the exclosure over the long-term.

There would be less total fencing and less high-risk fence and associated wildlife impacts than under Alternative 1 as portions of natural rim rock would be used as part of the barrier. The western and northern portions of the fence would be moved further away from two occupied leks and the western fence would not be located in open terrain. High-risk fencing would include anti-strike markers and appropriate fence post spacing to reduce the potential collision risk. All of these design measures would decrease the risk of future collision by sage-grouse when compared to Alternative 1. There would be a loss of about 2,025 acres available for grazing use in the Sucker Creek Pasture, representing an estimated reduction of 144 AUMs. While this reduction in AUMs would be less than the amount proposed under Alternative 1 (586 AUMs), it would represent about 8.7% of the permitted AUMs for the Rahilly Gravelly Allotment, and could not be absorbed by spreading the AUMs across the other pastures of the allotment.

Visual Resources

A fenced exclosure would negatively affect existing visual quality, but would meet VRM Class III objectives.

The loss of AUMs from the pasture would likely represent a direct negative impact to the permittee, as they would have to reduce the number of cattle they could graze on the allotment (reduce herd size), find alternative pasture (if available and economically feasible), increase the amount of time they provide feed on their base property, or some combination of the three (BLM 2018, p 4-19). There may be additional costs involved with these alternatives that would also adversely impact the permittee.

Compared to Alternative 1 the permittee would not experience as much additional forage costs or experience as high a loss in livestock production and associated revenue but these effects may still be significant to the individual permittee's operation.

The proposed exclosure boundary would avoid several existing livestock water sources and reduce the need to mitigate for lost livestock watering sites when compared to Alternative 1 (BLM In prep.).

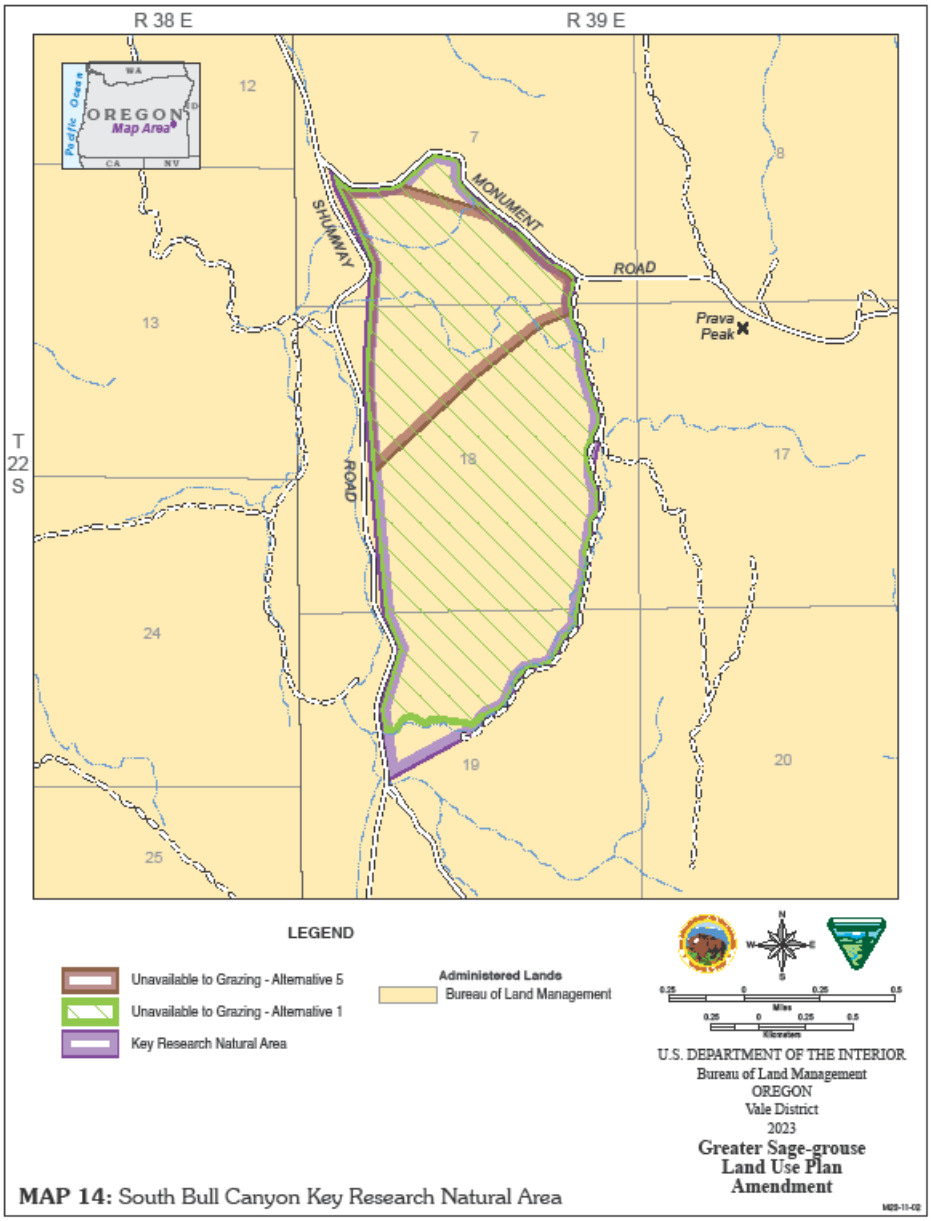
***South Bull Canyon (Vale)***

*Alternative 5 Proposed Management Changes*

Retain the designated Key RNA.

Reduce the area excluded from grazing to 257 acres.

**Map 14. South Bull Canyon Key Research Natural Area**




*Affected Environment*

The 770-acre South Bull Canyon ACEC/RNA is located south of the Malheur River, approximately six miles to the southeast of Juntura, Oregon, along the road that leads to Creston and Turnbull lakebeds. The landscape consists of a series of small drainages off of a low north-south ridge with relatively deep soils and

large surface rocks. The gently sloped hills are covered by a mix of plant communities in generally late seral conditions. The ACEC/RNA includes a range of vegetation communities and their subtle variations across the landscape. The Key RNA is located wholly within the 20,315-acre Prava Peak wilderness characteristics unit that is proposed for prioritized protection of those wilderness values under the Southeastern Oregon Proposed RMP Amendment (2023). South Bull Canyon ACEC/RNA is managed for visual resources as VRM Class III, but may become VRM Class II under the Southeast Oregon Proposed RMP Amendment.

The South Bull Canyon Key RNA and 749-acre area[2] excluded from livestock grazing occurs within the Upper Field pasture of the Boney Basin allotment. The terrain in the South Bull Canyon Key RNA has a number of hills and drainage features scattered throughout the 749 acres allocated as unavailable for livestock use. There are two livestock watering developments within the portion of the Key RNA excluded from livestock grazing, and another three water developments bordering on or directly adjacent to that unavailable area.

Specific management under the 2002 SEORMP ROD, as amended:

The area is VRM Class III. OHV use will be limited to designated roads and trails. Road maintenance will be limited to the existing roadway, and shoulder/barrow ditch construction will be limited to that necessary to control runoff, minimize soil erosion, and ensure public safety and serviceability of the road. The area will be closed to saleable minerals development, while remaining open for leasable and locatable minerals. Livestock use will continue based on existing permit stipulations and approved AMPs, unless modified under subsequent land use planning. Any proposed changes in grazing, including time and intensity of use, will be evaluated for impacts on the relevant and important values and will be permitted if values will be maintained or enhanced. Existing livestock use will be adjusted where adverse impacts are identified using a variety of methods, including but is not limited to, fencing, reduction in livestock numbers, and changes in grazing season. Proposed projects in the area will be evaluated for impacts and permitted where relevant and important values will be maintained or enhanced.

Summary of Key RNA and Relevant and Important values evaluated for ACEC/RNA designation

2002 SEORMP ACEC/RNA Designation:

The relevant and important value of the ACEC/RNA is the big sagebrush-antelope bitterbrush/Idaho fescue vegetation cell as identified by ONHP.

2015 GRSG ARMPA

The South Bull Canyon ACEC/RNA was designated a Key RNA as a reference area for sagebrush plant communities that are important for Sage-grouse. Special Designation (SD4) was to manage the Key RNA for minimum human disturbance, allowing natural succession to proceed.

Updated Vegetation Communities and Sage-Grouse Habitats

Wyoming big sagebrush-antelope bitterbrush/Idaho fescue plant association is represented in the South Bull Canyon ACEC/RNA.

[2] The South Bull Canyon ACEC/RNA was originally identified in the 2002 SEORMP ROD as containing 792 acres of public lands in the Malheur Field Office; the entire RNA was designated in the 2015 ARMPA as a Key RNA, of which 747 acres were allocated as unavailable to grazing. The original boundary was updated on the west to the existing pasture boundary (fenceline) and on the north and east to the existing primitive route. This adjustment resulted corrected the total acres in the ACEC/RNA to 770 acres. The adjustment also increased by two acres to 749 the area allocated as unavailable to grazing.

Vegetative communities in this Key RNA that are important to GRSG habitat continue to be present. These are Wyoming big sagebrush-antelope bitterbrush/Idaho fescue plant association. This community represents the Cool-Moist Sagebrush community. The southern portion of the South Bull Canyon ACEC/RNA burned in the 2016 Sheep Rock Fire. Due to the reduced abundance of these species post fire, 176 acres in the burned area was planted in the fall of 2017 with sagebrush and bitterbrush seedlings during Emergency Stabilization and Rehabilitation efforts. The entire South Bull Canyon ACEC/RNA was aerially treated with the preemergent herbicide imazapic in 2022 to reduce invasive annual grasses in the area.

The Key RNA is within PHMA and is in the Crowley Priority Area of Conservation. There are two occupied leks within 1.2 miles of the Key RNA; seven occupied leks within two miles; and nine occupied and one pending lek within four miles of the Key RNA.

Other Resources

The South Bull Canyon Key RNA is wholly within the Prava Peak (OR-034-042) lands with wilderness characteristics unit and is located in the northwest corner of the Prava Peak unit. The 20,654-acre unit possesses naturalness and is contiguous with three WSAs, and shares their outstanding opportunities to experience solitude, and primitive unconfined recreation. Elevations range from about 4,140 to 5,690 feet (Monument Peak). Existing human imprints in the unit are: 14 earthen reservoirs, four developed springs, 23.2 miles of rangeland fence, one rangeland fenced enclosure, and 43.5 miles of 22 primitive route segments, all of which appear substantially unnoticeable to the average visitor. Supplemental values in the unit include GRSG leks and their habitat. The Prava Peak unit may be prioritized for protection of the wilderness characteristics under the 2023 Southeastern Oregon PRMPA.

The visual resource management designation of the Key RNA is Class III under existing management, but may be designated as Class II under the Southeastern Oregon PRMPA.

The Key RNA is utilized by mule deer during spring and summer, pronghorn antelope year-round, and is designated as elk winter range. This area is not classified as an ODFW PWCA. Many migratory birds nest in the area, including many sagebrush obligates such as Brewer's sparrow and sagebrush sparrow, as well as other sagebrush-associated species such as golden eagles and loggerhead shrikes. Many more bird species move through the area during migration. Although habitat potential exists for pygmy rabbits, no known populations exist here.

*Rationale Supporting Proposed Management Changes:*

Rationale for Retaining Key RNA:

The area continues to be in a desirable condition for the vegetative communities identified; management would continue to protect the relevant and important values. Vegetative communities important to GRSG are present, although shrub components have been impacted by past wildfires.

Allocating the 513-acre area as available to livestock grazing would allow for the continuation of proper livestock distribution in the Upper Field pasture of the Boney Basin allotment.

Management would retain the ONHP-identified vegetations communities identified as relevant and important and the cool/moist vegetation communities identified under the 2015 ARMPA that are important for sage-grouse and for research purposes.

Sagebrush communities of the Key RNA provide for suitable nesting, brood-rearing and winter habitat for GRSG.

Rationale for modifying the area excluded from grazing:
The proposed, 257-acre livestock exclosure, still within the Key RNA, would locate fencing greater than 1.2 miles from occupied or pending GRSG leks. This fencing would be constructed by hand.

The exclosure would also reduce the amount of fencing in the wilderness characteristics unit. Reallocating livestock grazing to the remaining, unexclosed area of the Key RNA would reduce the impacts to wilderness characteristics from fence construction or non-infrastructure methods (e.g., new terms and conditions of the grazing permit that the permittee manage livestock to avoid incursion). Naturalness would not be impacted because new fence construction would not occur. Outstanding Opportunities for Solitude and unconfined primitive recreation would not be impacted as short-term impacts to solitude caused by fence construction and long-term impacts to solitude and primitive unconfined recreation caused by active management to exclude livestock from Key RNA would not occur. Either means of excluding livestock from the 257-acre exclosure area would comply with the 2023 SEOR PRMPA The exclosure would enable the BLM to exclude livestock while retaining opportunities for research designs that include control areas where livestock grazing is removed. Research opportunities would continue to remain due to the remote and rugged nature of the area, as well as limited use by livestock throughout the Key RNA. This Key RNA has one vegetation community present Wyoming big sagebrush-antelope bitterbrush/Idaho fescue plant association, this community is present in the smaller exclosure area. The smaller exclosure excludes the portion of the Key RNA that burned in 2016 and was planted with bitterbrush and sagebrush. The seed source for the plants is not from the vegetation within or directly adjacent to the Key RNA. The genetics are therefore different and may not represent the local genetics and could impact a research study.

*Environmental Consequences*
Fencing and other potentially affected wildlife, including GRSG
Under Alternative 5, allocating a portion of the area as "available to livestock grazing" would allow grazing on 513 acres of the Key RNA and allow for the continuation of proper livestock distribution in the Upper Field pasture of the Boney Basin allotment. If the 257-acre area identified to be unavailable for livestock grazing is fenced, impacts to livestock management would be minimized as available water sources would remain available for use, which allows for proper livestock distribution throughout the remaining portions of the Upper Field pasture. If the area is not fenced, then livestock management would be negatively affected as additional presence and resources of the grazing operator would be required in order to keep livestock out of the unfenced area. Impacts of increased management as a result of not fencing the 257-acre area unavailable to livestock grazing would be similar to Alternative 1.

A 1.85-mile fence surrounding the proposed exclosure would have minor effects on the movement of big game through the area. The Oregon Conservation Assessment Mapping Program did not consider this area a high priority for wildlife movement, and therefore it was not designated as a PWCA. The risk to big game movement would be minimized by using wildlife-friendly fence design, as big game would be able to move more easily under, over, and through the fence. Constructing the fence would cause temporary disturbance to approximately 1.34 acres of migratory bird habitat. Minor damage to sagebrush within the disturbance area could destroy nesting habitat, but fence construction by hand – particularly where the new fence construction is along the existing boundary road for the Key RNA - generally doesn't damage much vegetation. If constructed during nesting season, some individuals could be displaced at the time, but the effects of approximately 1.34 acres of temporary minor habitat disturbance to the overall population of migratory birds would be negligible.

Similar to migratory birds, if a fence is constructed during breeding or nesting season it could disturb sage-grouse nesting habitat or temporarily displace nesting sage-grouse. Minor damage to sagebrush could occur but fence construction by hand generally doesn't damage much vegetation. Restricting activity during those months to 2 hours after sunrise to 2 hours before sunset would minimize this disturbance. The proposed fence is not modeled as high collision risk for sage-grouse. However, if monitoring suggests collisions could occur, anti-strike fence markers would be added to further reduce the risk.

Returning grazing to the remaining 513 acres of the Key RNA would not cause measurable impacts to big game or migratory birds. No sage-grouse leks are located within the reallocated area and therefore this would not contribute to more livestock presence on leks.

The Long-term negative effects to naturalness caused by the addition of 1.85 miles of fence would be the additional human intrusions in the Prava Peak wilderness characteristics unit. If encounters with visitors occur during construction of the proposed fence, they may be temporarily disruptive to visitors who may be in the proximity, but this adverse impact would be brief.

The VRM in the project area is Class III. As a result of no fencing, there would be no impacts to scenic values within VRM Class III areas.

The Vale District BLM does not anticipate that there would be any loss or reduction to AUMs within the pasture due to the 257-acre exclosure. The majority of forage available to livestock, as well as reliable watering sources, are located outside of the fenced area and will continue to facilitate desired livestock distribution within the pasture.

Lands with Wilderness Characteristics

The proposed exclosure would reduce the amount of fencing in the wilderness characteristics unit compared to Alternative 1. Reallocating livestock grazing to the 513-acre unexclosed area of the Key RNA would avoid impacts to wilderness characteristics, including naturalness, from fence construction or non-infrastructure methods (e.g., new terms and conditions of the grazing permit that the permittee manage livestock to avoid incursion) in that area. Outstanding Opportunities for Solitude and unconfined primitive recreation would also not be impacted in the 513-acre area as short-term impacts to solitude caused by fence construction and long-term impacts to solitude and primitive unconfined recreation caused by active management to exclude livestock from Key RNA would not occur.

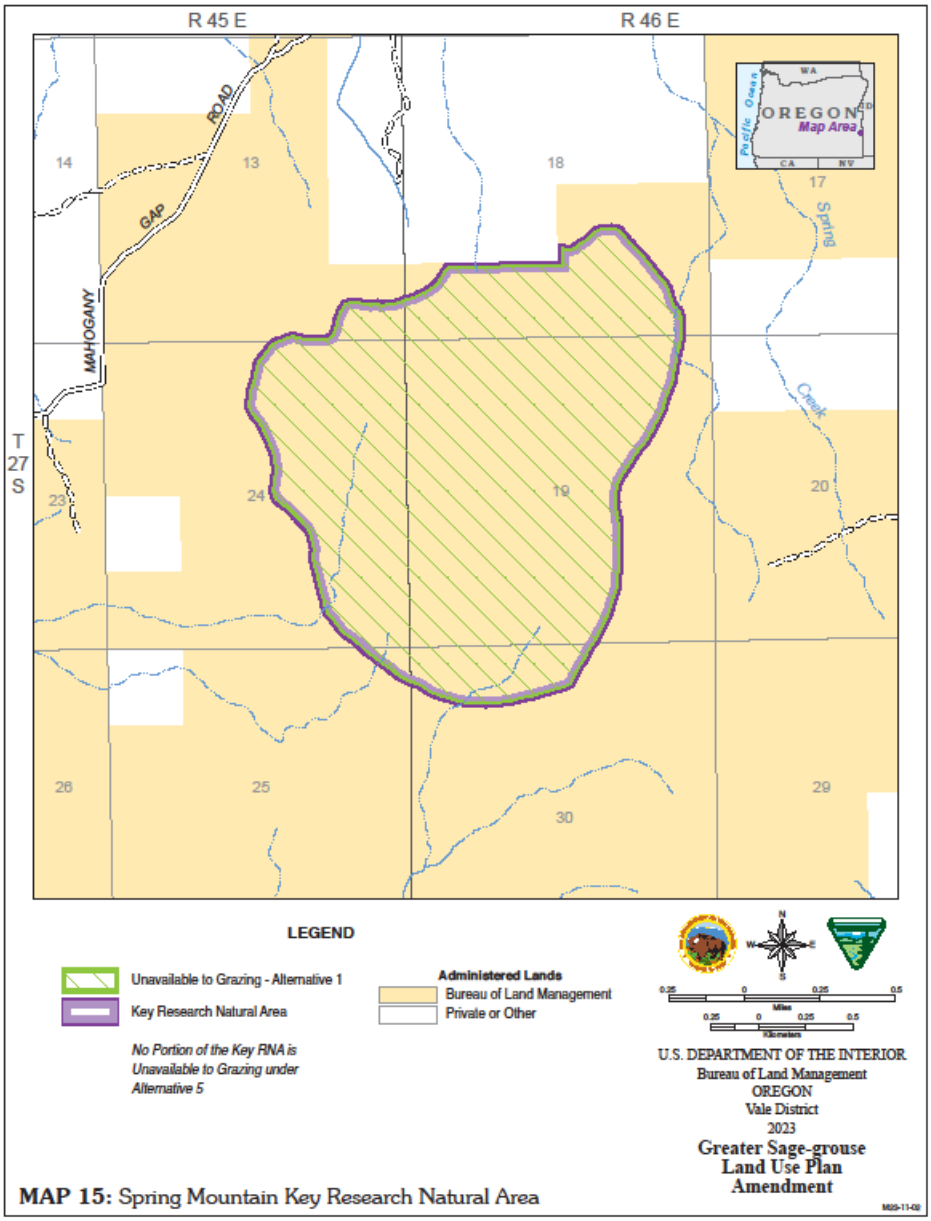
***Spring Mountain (Vale)***

*Alternative 5 Proposed Management Changes*

Retain the area designated as Key RNA.

Reallocate all portions of the Key RNA as available to grazing.

**Map 15. Spring Mountain Key Research Natural Area**




*Affected Environment*

The 996-acre Spring Mountain ACEC/RNA is located west of U.S. Highway 95 and north of Jordan Valley, covering a portion of the top of Spring Mountain east of Mahogany Mountain. The top of the mountain is a mix of mountain big sagebrush/Idaho fescue steppe in areas with deep soils. The northern portion of the ACEC/RNA is composed of steep, talus scree. This area supports stands of western chokecherry, whortleleaf snowberry, Saskatoon serviceberry, and Lewis' mockorange. The scree tops out to a larger, relatively flat tableland dominated by diverse, large low sagebrush scablands.

The Spring Mountain Key RNA is located in the Spring Mountain Native Range pasture of the Spring Mountain allotment. This area contains the majority of the access routes for livestock from one side of the

pasture to the other in the upper elevations. The developed Aspen Grove Spring is a critical water source along these routes for livestock. Steep and extremely rocky slopes descend over 1000 feet in elevation to the lower pasture boundaries. Access and travel along the steep rocky slopes are limited to livestock/wildlife and are extremely difficult. The north and east sides of the pasture have fenced private land inholdings that are either partially or entirely within the pasture boundary, further compounding access and travel issues. The Key RNA is centrally located in the northern portion of the "top" of Spring Mountain, creating numerous issues with access and travel routes for livestock.

The Key RNA occurs within the highest elevations of the Spring Mountain Native Range pasture, and in an area where topography allows for feasible movement of livestock within the Spring Mountain Native Range pasture, as well as to other pastures within the Spring Mountain allotment. Fencing in the Key RNA area would require maintenance on at least a semi-annual basis due to high elevation snow accumulation, big game presence and migration. To achieve the orderly administration of grazing management, throughout that season of use, livestock operators are authorized to move livestock through the Key RNA, utilizing existing trailing routes. Trailing occurs to access to BLM pastures within both the Spring Mountain and adjacent allotments, as well as private lands within the Spring Mountain allotment boundary.

Specific management under the 2002 SEORMP ROD, as amended:

The area is closed to OHV use. Plant collecting requires a permit. VRM class is Class III. Livestock use will continue based on existing permit stipulations and approved AMP's, unless modified under subsequent land use planning. Any proposed changes in grazing, including time and intensity of use, will be evaluated for impacts on the relevant and important values and will be permitted if values will be maintained or enhanced. Existing livestock use will be adjusted where adverse impacts are identified using a variety of methods, including but not limited to, fencing, reduction in livestock numbers, and changes in grazing season. Proposed projects in the area will be evaluated for impacts and permitted where relevant and important values will be maintained or enhanced.

Summary of Key RNA and Relevant and Important values evaluated for ACEC/RNA designation

2002 SEORMP ACEC/RNA Designation:

The relevant and important values of the ACEC/RNA are the mountain big sagebrush/Idaho fescue, low sagebrush/bluebunch wheatgrass, and riparian community dominated by peachleaf willow and coyote willow with quaking aspen/whortleleaf snowberry vegetation cells identified by ONHP. There are several quaking aspen patches associated with springs and north-facing talus slopes within the ACEC/RNA.

2015 GRSG ARMPA:

The Spring Mountain ACEC/RNA was designated a Key RNA as a reference area for sagebrush plant communities that are important for Sage-grouse. Special Designation (SD4) was to manage the Key RNA for minimum human disturbance, allowing natural succession to proceed.

Updated Vegetation Communities and Sage-Grouse Habitats

Vegetation communities represented in this Key RNA include mountain big sagebrush/Idaho fescue community, mountain big sagebrush/mountain snowberry/Idaho fescue, mountain mahogany/chokecherry scrub (Prunus virginiana), and relatively flat tableland, dominated by low sagebrush/bunchgrass scabland community. Quaking aspen and bitter cherry communities dominate the springs.

Vegetation communities represented in this Key RNA that are important to GRSG habitat continue to be present. These communities are Mountain big sagebrush/Idaho fescue community, mountain big sagebrush/mountain snowberry/Idaho fescue, relatively flat tableland, dominated by low

sagebrush/bunchgrass scabland community. These communities represent the Cool-Moist Sagebrush, Dry-Shallow Sagebrush, and Riparian communities.

The mountain mahogany/chokecherry scrub (*Prunus virginiana*) plant community in this Key RNA is not suitable habitat for sage-grouse because the growth structure of the dominant species is more tree like, providing no understory cover and providing perch opportunities for predators. This represents the Mountain Shrub community. The entirety of Spring Mountain ACEC/RNA burned in the 2007 Old Maid Fire. While there are some islands of sagebrush that did not burn in the fire, the majority of the ACEC/RNA lost the sagebrush component due to the fire. Monitoring shows a strong component of native grasses and forbs present in the ACEC/RNA.

Other Resources

The Spring Mountain Key RNA is wholly within the Spring Mountain lands with wilderness characteristics unit and is located in the northern portion of the Spring Mountain unit. The 18,311-acre Spring Mountain unit possesses naturalness, and outstanding opportunities to experience solitude. Elevations range from 4,565 to 5,987 feet within the unit. The unit contains the 5,987-foot tabletop mountain known as Spring Mountain. Existing human imprints in the unit include 10.9 miles of rangeland fence, 11.2 miles of 10 primitive routes,19 developed springs, 2 pipelines totaling 2.7 miles and an associated trough, all of which appears substantially unnoticeable to the average visitor. Supplemental values include the Spring Mountain ACEC/RNA.

The visual resource management is Class II.

The Key RNA is within PHMA and is part of the Cow Lakes Priority Area of Concentration. It is included within the boundary of GRSG spring nesting, summer brood-rearing, and winter habitat. One site within the Key RNA has been evaluated using the GRSG Habitat Assessment Framework (HAF). It had an abundance of perennial grasses but almost no sagebrush. The site was determined to be marginally suitable for spring nesting habitat and unsuitable for winter habitat. There are two pending leks approximately 1.2 miles from the Key RNA boundary; and 11 occupied and 4 total pending leks within 4 miles of the KRNA.

The Spring Mountain KRNA is essential year-round range for pronghorn. It is utilized by deer, elk, and pronghorn throughout the year. ODFW's Oregon Connectivity Assessment and Mapping Project (OCAMP) categorized this area as a Priority Wildlife Connectivity Area (PWCA) – Region. Regions are the top 1% of connectivity priorities and represent the highest-value habitat for facilitating species movement. In addition, this area has a priority Recommended Conservation Action of 'Protect,' the strongest conservation measure for maintaining wildlife connectivity.

Aspen Grove Spring is the only flowing spring within the Key RNA. It is developed with a trough for livestock water. Outside the Key RNA, the nearest springs include several developed springs, including Old Maid Spring to the southeast, Gap Spring the northwest, and Lunch and Chukar Spring to the northeast. Several undeveloped springs occur in the vicinity as well, most notably the undeveloped Old Maids Basin Spring Complex just south of the Key RNA. This spring complex was rated as Functioning-at-risk (FAR) using the Proper Functioning Condition protocol, with the main compromising characteristics being hummocks in spring heads, eroded banks, and a large headcut in the lotic portion. Even though it is rated FAR, the GRSG HAF site-scale evaluation of the spring complex rated it as suitable late brood-rearing habitat based on a high diversity and abundance of sage-grouse preferred forbs, and high perennial herbaceous plant cover mixed with areas of sagebrush and other shrubs in the uplands for shelter.

*Rationale Supporting Proposed Management Changes:*

Rationale for Retaining Key RNA:

The area continues to be in a desirable condition, notwithstanding being burned by wildfire in 2007. The area continues to recover and provides opportunities for research where natural recovery post-fire is occurring.

The entire Key RNA burned in 2007, eliminating the majority of the sagebrush; nonetheless, the area remains composed of diverse vegetation community types that are important to GRSG, including: Cool-Moist Sagebrush, Shallow-Dry Sagebrush, Mountain Brush/Shrub, and Riparian. Use by sage-grouse within the Key RNA has not been documented, nor were signs of GRSG presence observed during site visits in 2023.

Research opportunities continue to remain due to the remote and rugged nature of the area, as well as limited use by livestock throughout the Key RNA.

Rationale for reallocating the area as available to livestock grazing:

On-the-ground site specific visits revealed complex terrain that is challenging for the construction of new fencing. Fencing would require above-normal (annual) maintenance by BLM due to weather conditions (evidence of natural snowbanks are common) as well as a result of anticipated damage by elk and other big game. The area is reported to have significant use by elk traveling between Oregon and Idaho ranges.

Excluding livestock from the area currently allocated as unavailable to grazing without construction of new physical barriers would be less effective, require higher levels of BLM and permittee management, and result in negative impacts to livestock management beyond the Key RNA as it reduces the ability to allocate resources to other areas.

Reallocation would eliminate increased commitments of management investments (time, materials, etc.) for BLM and the livestock operators in the Key RNA and allotment. Both parties would have improved opportunities to better allocate resources to higher priorities within the allotment. Reallocation of grazing could reduce socio-economic effects to livestock operators by eliminating the potential adjustment of AUMs associated with Alternative 1.

The location of the area made unavailable to livestock use under Alternative 1 impacts trailing routes used for moving livestock between other portions of the Spring Mountain Native Range pasture as well as other pastures within the Spring Mountain allotment. Removing livestock use from this area is expected to have negative impacts to upland and riparian systems due to decreased opportunity to disperse livestock throughout the remainder of the pasture, because of the rugged nature of the areas adjacent to the area made unavailable to livestock grazing. Additional infrastructure (fences and water developments) may be necessary to aid in proper distribution and livestock management under Alternative 1. This infrastructure is expected to result in an increased level of disturbance in the short-term, including impacts to vegetation and soils, and long-term impacts to livestock management and upland and riparian resources due to the modified grazing distribution.

Under Alternative 1, excluding livestock from the area allocated as unavailable would require the issuance of livestock crossing permits on an annual basis; these permits would also be limited to a one-day crossing on identified routes for each requested application (up to an average of four times annually), depending on the annual grazing schedule and rotation. These limitations would be applied to conform with the objectives of the 2015 ARMPA.

The Alternative 1 allocation as unavailable to grazing eliminates livestock access to an existing critical water source to the grazing system; immediate, additional water development would be necessary. Under Alternative 1, Aspen Grove spring would no longer be available as a livestock water source and displaced livestock would need to find alternative water sources to replace it. This would increase livestock use on nearby developed and undeveloped springs, including Old Maids Basin Spring Complex. This increased livestock use would further damage this spring complex. Under Alternative 5 the increased livestock presence on the spring would not occur as normal livestock distribution and use patterns would be maintained. Reallocating the area as available to grazing would prevent the impacts from the loss of the critical Aspen Grove spring in the Spring Mountain Native Range pasture. If the area is not reallocated to allow livestock grazing, development of additional water sources would be needed to relieve pressure on other existing water sources, riparian resources, and the connected uplands when managing under Alternative 1. Allocating the area as available to livestock grazing would eliminate the need for fencing or other management actions that impact feasible livestock movement and distribution due to the limited number of developed water sources in the area. Research opportunities continue to remain due to the remote and rugged nature of the area, as well as limited use by livestock throughout the Key RNA.

Reallocating livestock grazing to the Key RNA would eliminate the need to either construct fencing or to implement as new terms and conditions of the grazing permit that the permittee manage livestock to avoid incursion into the Key RNA. The wilderness characteristic of Naturalness would not be impacted because new fence construction would not occur. Outstanding Opportunities for Solitude would not be impacted as short-term impacts to solitude caused by fence construction and long-term impacts to solitude caused by active management to exclude livestock from Key RNA would not occur.

Impacts to wildlife, including sage-grouse and large ungulates, of reallocating livestock grazing under Alternative 5 would include avoiding additional fencing or other management actions for livestock exclusion that would result in short-term disturbance to individuals and fence related conflicts (e.g. bird collisions and entrapments). The Oregon Department of Fish and Wildlife identified this area as important habitat for wildlife movement. Under Alternative 1, addition of a fence or increased presence of livestock operators would hinder or alter wildlife movement.

While some sagebrush communities are still present, the majority of the Key RNA is now grassland, which provides limited suitable habitat for GRSG. Livestock using the Key RNA if it were reallocated as available to grazing would concentrate in areas where the best forage is available, which would be the portions of the Key RNA with high perennial grass cover. Thus, the livestock would not concentrate on the remaining islands of sage-grouse habitat. Under Alternative 1, livestock displaced from the Key RNA would disperse to adjacent habitat, increasing livestock concentration in good quality sagebrush and riparian habitat nearby.

The benefit of constructing a fence (or increased management actions to exclude livestock) relative to the amount of additional infrastructure and/or management actions for the areas that remain available to livestock grazing within the Spring Mountain Native Range pasture are unwarranted.

*Environmental Consequences*

Fencing and other potentially affected wildlife, including GRSG

The area is reported to have significant use by elk traveling between Oregon and Idaho ranges. Alternative 5 would avoid additional fence construction, fence-related conflicts (e.g. bird collisions and entrapments) and other management actions for livestock exclusion that would result in short-term disturbance to wildlife

individuals, including sage-grouse and large ungulates. The Oregon Department of Fish and Wildlife identified this area as important habitat for wildlife movement.

Lands with Wilderness Characteristics

Reallocating livestock grazing to the Key RNA would eliminate the need for fencing or additional active livestock management (e.g., herding) to avoid livestock incursion into the Key RNA. The wilderness characteristic of Naturalness would not be impacted because new fence construction would not occur. Outstanding Opportunities for Solitude would not be impacted as short-term impacts to solitude caused by fence construction and long-term impacts to solitude caused by active management to exclude livestock from Key RNA would not occur.

### *Toppin Creek Butte (Vale)*

*Alternative 5 Proposed Management Changes*

Retain the area designated as Key RNA.

Reduce the area excluded from grazing in the Key RNA from 2,865 acres to 239 acres.

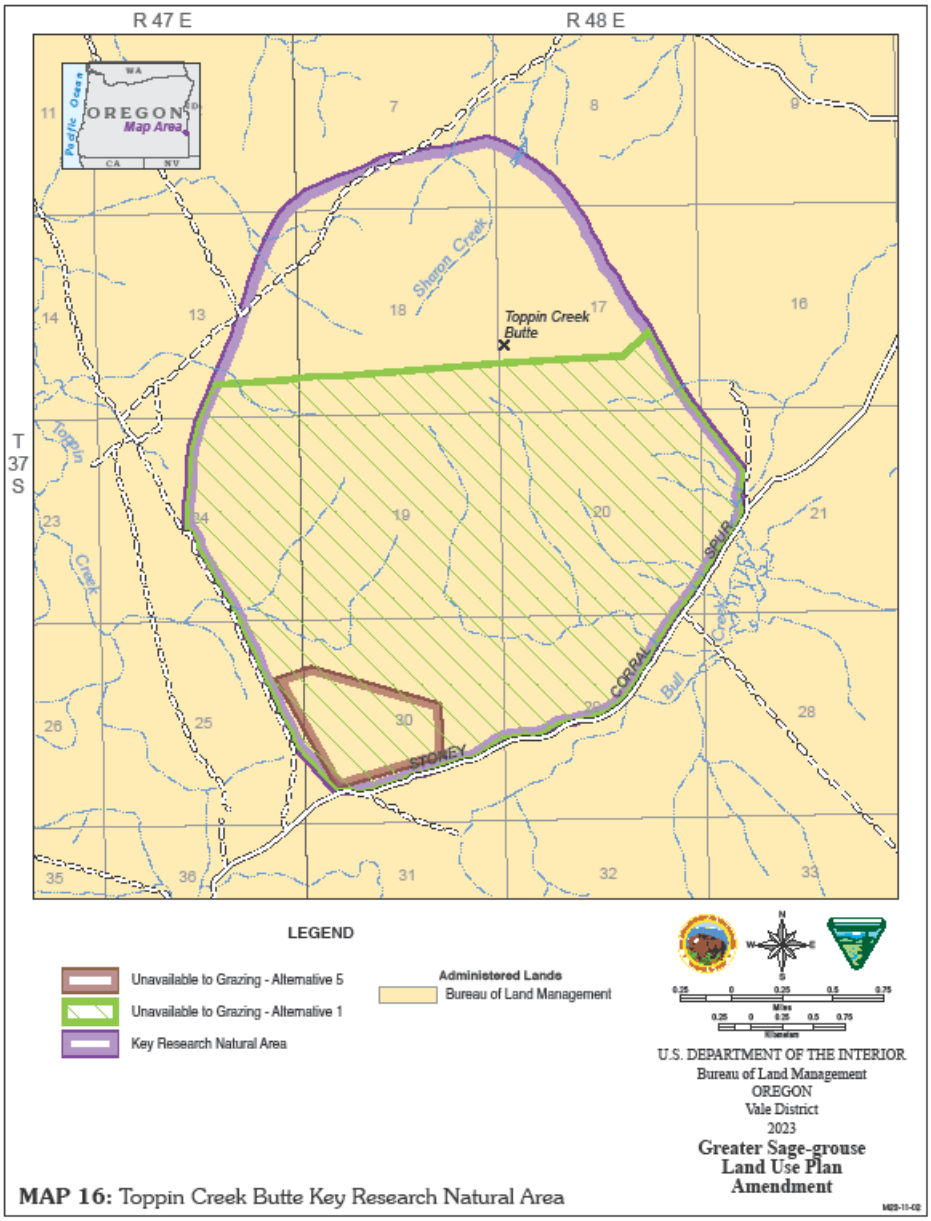
*Affected Environment*

The 3,996-acre Toppin Butte ACEC/RNA is located 30 miles northeast of McDermitt, Nevada, and adjacent to the Idaho state line. The topography includes a gently sloping hill with a rapidly draining soil. Little water has been available for livestock on the Butte, and the topography still limits livestock use on the upper slopes. Two playas at the base of Toppin Butte contain a bare playa vegetation community and a silver sagebrush community. The Key RNA is located in portions of Owyhee River Canyon WSA. The southern portion (2,865 acres) of the ACEC/RNA is allocated under the 2015 ARMPA as unavailable to grazing.

Specific management under the 2002 SEORMP ROD, as amended:

OHV use is limited to designated roads and trails. The area is VRM Class II. Plant collecting requires a permit. Road maintenance will be limited to the existing roadway, and shoulder/barrow ditch construction will be limited to that necessary to control runoff, minimize soil erosion, and ensure public safety and serviceability of the road. Surface-disturbance will be deferred while soils are wet, and any future rehabilitation will be with local source native plant species. Livestock use will continue based on existing permit stipulations and approved AMPs, unless modified under subsequent land use planning. Any proposed changes in grazing, including time and intensity of use, will be evaluated for impacts on the relevant and important values and will be permitted if the values will be maintained or enhanced. Existing livestock use will be adjusted where adverse impacts are identified using a variety of methods, including but is not limited to, fencing, reduction in livestock numbers, and changes in grazing season. Proposed projects in the area will be evaluated for impacts and permitted where relevant and important values will be maintained or enhanced. Noxious weeds will be aggressively controlled using limited methods, such as backpack hand sprayers, focusing on roads and other disturbed areas in and adjacent to the ACEC/RNA.

**Map 16. Toppin Creek Butte Key Research Natural Area**




Summary of Key RNA and Relevant and Important values evaluated for ACEC/RNA designation

2002 SEORMP ACEC/RNA Designation:

The relevant and important values of this ACEC/RNA are the low sagebrush/bluebunch wheatgrass community in excellent condition and low sagebrush/Idaho fescue plant community vegetation cells identified by the ONHP. These plant communities will be specially managed for current and future research.

2015 GRSG ARMPA:

The Toppin Creek Butte ACEC/RNA was designated a Key RNA as a reference area for sagebrush plant communities that are important for Sage-grouse. Special Designation (SD4) was to manage the Key RNA for minimum human disturbance, allowing natural succession to proceed.

Updated Vegetation Communities and Sage-Grouse Habitats

Vegetation communities present in this Key RNA include low sagebrush/Idaho fescue, low sagebrush/bluebunch wheatgrass, silver sagebrush/Sandberg's bluegrass plant communities. In addition, bare playa, Wyoming big sagebrush and basin big sagebrush communities are also present in the Key RNA though not identified in the 2015 ARMPA.

Vegetation communities represented in this Key RNA, that are important to GRSG habitat continue to be present. These communities are low sagebrush/Idaho fescue, low sagebrush/bluebunch wheatgrass, and silver sagebrush/Sandberg's bluegrass, and Wyoming sagebrush plant communities. These communities represent the Cool-moist/Warm-Dry Sagebrush, Shallow-Dry Sagebrush and playa communities. The Key RNA is within GRSG Priority Habitat Management Area (PHMA) in Sage-grouse focal area (SFA); two pending leks are within two miles of the Key RNA boundary, one of which is located inside the Key RNA. The western side of Toppin Creek Butte ACEC/RNA burned in the 2013 Sharon Creek Fire. In the burned area there are islands of sagebrush habitat were not burned. Monitoring has indicated invasion of cheatgrass post fire has occurred but is isolated and minimal.

Other Resources

Toppin Creek Butte Key RNA is 3,996 acres and is located wholly within the Owyhee River Canyon WSA. The WSA's outstanding opportunities for solitude are attributed to the isolated, intimate seclusion of canyonlands and the vastness of seemingly undisturbed desert plateau lands and distant mountain ranges. The Main Owyhee River and West Little Owyhee River are designated portions of the National Wild and Scenic River System (NWSRs) and flow through the Owyhee River Canyon WSA. River running opportunities are of exceptionally high quality and considered nationally significant. The scenic natural features and diversity of rugged landforms attract people interested in hunting, fishing, backpacking, sightseeing, outdoor photography, and wildlife viewing.

There is one population of mesamint (*Pogogyne floribunda*), a Bureau sensitive plant, located at the eastern edge of the Key RNA. This population straddles Stoney Corral Spur road.

The Key RNA is designated as bighorn sheep occupied habitat.

The visual resource management is Class I.

*Rationale Supporting Proposed Management Changes:*

Rationale for Retaining Key RNA:

The area continues to be in a desirable condition for the vegetative communities identified; management will continue to protect the relevant and important values.

Existing management would retain the following vegetation types important to GRSG: Cool-Moist/Warm-Dry Sagebrush, Shallow-Dry Sagebrush, and Playa.

Rationale for modifying the area excluded from grazing:

The Toppin Creek Butte Key RNA grazing use is historically light; the exclusion of livestock under Alternative 1 would not provide research benefits at a level that would warrant the impacts to other values. Under Alternative 5, the plant communities included in the 239-acre exclosure are Wyoming big sagebrush plant communities and bare playas.

The location of the 239-acre exclosure under this alternative is within intact sagebrush communities that are not impacted by wildfire.

Making this area unavailable to livestock grazing would reduce the impacts of fencing or increased management presence in the Owyhee River Canyon WSA to implement the closure. Disturbance in the WSA from fencing would be reduced overall from approximately 5.85 miles to 2.5 miles, with half of this distance along the existing Key RNA road boundary. Naturalness would be impacted, but to a lesser degree than Alternative 1The potential use of fence construction to exclude the area from livestock grazing would be designed to minimize impacts to naturalness. Outstanding opportunities for solitude and unconfined primitive recreation would be impacted in the short-term during fence construction; there would be no long-term impacts. a

*Environmental Consequences*

Compared to Alternative 1, Alternative 5 would reduce the area allocated as unavailable to grazing in the Key RNA from 2,865 acres to 239 acres and reduce potential new fence from 5.85 to 2.5 miles.

The fence proposed in Alternative 1 would be located approximately 60 feet from the mesamint (*Pogogyne floribunda*) site, with the plant site being on the side of the fence that would retain livestock grazing. The proximity of the fence to the plant site could potentially directly impact the plants in the short and long term due to livestock walking along the fence line, disturbing the ground. Given the distance from the proposed fence, there may be impacts to individual plants, but the population as a whole is expected to persist. The proposed fence location for Alternative 5 is approximately 1.5 miles from the plant site and would have no impacts on individual plants or the population in the short and long term.

Under Alternative 5, reducing the area allocated as available to livestock grazing would allow livestock grazing to continue under the current authorized use. The management changes of Alternative 1, such as the creation of a corridor between the area where livestock is not allocated and the adjacent pasture, would not occur, therefore limiting impacts to livestock management as well as other natural resource values where the potential for concentrated use is increased under Alternative 1. Livestock management would continue to allow for maintenance of current conditions, which were found to be meeting all standards for rangeland health as documented in the 2017 Standards for Rangeland Health Assessment and Evaluation (BLM 2017 pg. 72-75). A change in AUMs is not anticipated under this alternative due to the location of the exclosure within the pasture. Reducing the area that would be excluded from grazing would reduce the amount of fence or the need to require the permittee to manage livestock to avoid incursion into the unavailable area.

The wilderness characteristic of Naturalness would be impacted less than under Alternative 5 than under Alternative 1 due to the reduced fence mileage. Outstanding Opportunities for Solitude and primitive unconfined recreation would be reduced compared to Alternative 1 as short-term impacts to solitude caused by fence construction and long-term impacts to solitude caused by active management to exclude livestock from Key RNA would not be as extensive.

Compared to Alternative 1, Alternative 5 would have approximately 3.35 fewer miles of fence. The proposed exclosure could still result in wildlife, including sage-grouse, fence collisions, but at a much lower risk due to the location and reduced size compared to Alternative 1. Vegetative communities that are important to GRSG habitat would continue to be present under both Alternatives 1 and 5.

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# Appendix 18

## Social and Economic Impact Analysis Methodology and Economic Contribution Tables

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# Appendix 18. Social and Economic Impact Analysis Methodology

## 18.1 Introduction

This appendix describes the methods and data that underlie the social and economic impact analysis, the economic impact modeling analysis, and the environmental justice impact discussions. The social and economic impact analysis uses two general approaches. These are quantitative analysis and qualitative analysis. Input-output models such as the Impact Analysis for Planning (IMPLAN) model, an input-output (IO) model, provide a quantitative representation of the final demand and production relationships between individual economic sectors. This quantitative analysis approach is used when adequate information on physical production quantities and the prices and costs for goods and services is available. The first portion of the following discussion describes general aspects of the quantitative, qualitative, and environmental justice impact analysis methodologies. The quantitative methodology discussion describes the inputs required to run the IMPLAN model and how IMPLAN is used to estimate quantitative economic impacts. The resulting estimates from the IMPLAN model, by alternative, are in the Social and Economic Conditions (Including Environmental Justice) section of **Chapter 4**. The remaining sections provide additional detailed data used in the analysis for oil and gas, renewable energy (including geothermal, wind, and solar), and livestock grazing.

## 18.2 General Aspects of the Methodologies

### 18.2.1 Quantitative Economic Impact Analysis Using IMPLAN

A quantitative economic impact analysis was conducted for three resource uses: oil and gas development and production, geothermal development and production, and livestock grazing. Due to limitations on availability of data on production and quantity of market activities, analyses for nonenergy leasable minerals, locatable minerals, mineral materials, wind and solar energy, and greater sage grouse conservation were conducted qualitatively (see **Section 18.2.2**, Qualitative Economic and Social Impact Analysis, for discussion on the qualitative methodology used in the social and economic impacts analysis).

The basic approach used in quantitative economic impact analysis is to identify the economic sectors to be directly impacted and estimate the amount of direct economic activity likely to be affected by management decisions. For instance, management actions affecting oil and gas development on federal minerals could affect the Drilling Oil and Gas Wells sector if expenditures made by oil and gas companies to drill and complete new wells changes in response to these management actions. Potential direct impacts could also stem from changes in the amount of oil and gas produced. When direct impacts to economic activity can be quantified, they can be run through an economic input-output model to estimate the secondary economic activity that is generated as the direct impact ripples through the economy, "upstream" to providers of goods and services necessary for production, and "downstream" as income generated from production is spent by the households that receive the income.

The upstream, downstream, and total effects on economic activity are estimated through use of the IMPLAN model, an off-the-shelf input-output model that provides a mathematical accounting of the flow of money, goods, and services through a specified region's economy and yields estimates of gross economic output, jobs, and labor income. The model provides estimates of how economic activity (i.e., economic output, income, and employment) in one sector of the economy ripples through the broader economy, affecting seemingly unrelated sectors. These ripple effects include both indirect and induced impacts of proposed

management actions. Indirect impacts result from changes in economic activity in industries that sell inputs to the industries that may be directly impacted (for example, varying levels of economic output stemming from changes in supply purchases made by firms contracted to drill oil and gas wells). Induced impacts result from changes in household spending as households adjust their spending in response to increases or decreases in labor income supported by industries directly and indirectly affected by management actions (for example, changes in purchases at local stores for personal groceries).

This analysis used IMPLAN Cloud and data from IMPLAN's 2021data release. This means that parameters such as productivity and trade data reflect annual average economic conditions in the analysis areas during 2021. IMPLAN 2021 is the most recent vintage of data currently available in the IMPLAN Cloud platform. Prior to running the model, cost and price data were converted to a consistent dollar year (2023) using sector-specific adjustment factors from the IMPLAN model. Unless stated otherwise, the values in this appendix are expressed in year 2023 dollars.

Two models for each of the 10 states in the planning area were run, separately. The first model analyzed only the impacts on the counties in each state's analysis area, combined for each state. This provides information on the local economic contributions from direct economic changes in the analysis area, but it does not provide data on the economic contributions that result in other neighboring regions in the state from the direct changes in the analysis area. The second model took a multi-regional approach and analyzed the impacts on each state from direct impacts in the analysis area. The trade data available in the current version of IMPLAN (IMPLAN Cloud) make it possible to do multi-regional input-output (MRIO) analysis to track how an impact on any of the IMPLAN sectors in the identified socioeconomic analysis areas affects outputs in any of the sectors in other regions outside of the analysis area. For this analysis, this feature allowed the estimation of how an impact in the counties in the analysis area disperses into the counties in the rest of the state, and how these effects in the rest of the state create additional local effects in the analysis area. As a result, it was possible to estimate not only the jobs and income generation in the analysis area, but to also estimate how the economic activity in the analysis area affected jobs and income in each state as a whole.

The current IMPLAN model has 546 economic sectors, of which 507 are represented in the analysis area counties across all 10 states and 539 are represented across all counties in all states in the planning area (IMPLAN 2021 data).

Economic impacts were estimated and provided as an annual average over a 20-year time period (2023-2042). All dollar figures throughout the economic analysis area in constant 2023 dollars.

### 18.2.2 Qualitative Economic and Social Impact Analysis

The second methodological approach relies on qualitative discussions to describe potential economic and social impacts when impacts cannot be quantified. In such cases, the analysis describes the type of impact in a base scenario (in this planning effort, Alternative 1) and then assesses the relative changes in terms of increases or decreases in costs, the value of production, or differences in social conditions and changes in way of life for the communities across the analysis areas. This approach is used to describe potential impacts on market values, nonmarket values, and social conditions, which are all interconnected and discussed together by alternative.

Some of the management decisions under this planning action would result in increased costs to operators – the firms or individuals who undertake the activities – or to project proponents. The economic impacts of decisions that increase costs for operators and/or project proponents are many and can be complex.

Cost increases may cut into profitability and drive delays to, reductions in, or cessation of operations or projects. However, where operations or projects are not delayed, reduced, or terminated, increased costs also represent increased economic activity. For instance, if changes in ROW avoidance and exclusion areas under an alternative result in a change in solar plant siting and would require a new transmission line having to take a longer route, additional expenditures for materials, equipment, and labor would be made. These increased expenditures would support some amount of additional income and employment. However, increased costs may also represent opportunity costs; that is, the project proponent or society may have benefited more if the additional funds were used in another way. In the socioeconomic analysis in **Chapter 4**, where management actions would potentially increase costs to operators or project proponents, these increased costs are pointed out and discussed qualitatively. Readers should keep in mind that these increased costs reflect an opportunity cost which may negatively impact operators and be perceived as a benefit by others but may not be socially optimal overall.

Some effects associated with land management actions stem from changes in environmental goods and services that are not traded on traditional markets and whose value is not captured in standard measures of economic activity. Since these goods and services exist outside of observable markets, they lack prices that reveal people's willingness-to-pay for the benefits derived from them and are commonly referred to as nonmarket goods. The term "nonmarket values" refers to the benefits individuals derive from nonmarket goods, such as clean air and water, and healthy populations of wildlife. These values include the personal benefits derived from experiences in the natural environment or uses of natural and cultural resources. Nonmarket values also include passive use values (i.e., existence, option, and bequest) which are independent from the direct and indirect use of natural resources. Since these values are difficult to quantify because they cannot be estimated using observable market prices, qualitative discussions are essential to identifying and assessing impacts to nonmarket values in the planning process (see **Chapter 3** for more information on nonmarket values in the planning area).

Qualitative analysis is critical to understanding how management actions may affect social structures and values. While some social impacts stem from economic impacts, such as when changes in mineral payments and tax revenue impact the provisioning of public services and maintenance of infrastructure. Other potential impacts are social and cultural in nature and can affect quality of life, recreation and amenity values, and traditional land uses and associated cultural values. Social impacts stemming from BLM management decisions can vary considerably depending on the characteristics and diversity of the communities of interest that are involved. Additionally, the level of impacts is dependent on the degree to which new and revised management actions alter the course set in previous BLM decisions, and the degree to which local populations are dependent on BLM lands and resources. For a planning effort that covers 10 state analysis areas, analysis of social impacts must necessarily focus on broader discussion of impacts. As a result, in **Chapter 4**, a qualitative review is provided on potential social impacts resulting from changes in public service available for populations, based on anticipated changes to employment levels and tax revenues. These social impacts are discussed alongside the economic changes in employment, output, and tax revenues as well as the impacts on quality of life and non-market values associated with GRSG conservation as well as livestock grazing and wild horse and burros.

Additionally, the social impacts analysis addresses impacts based on the varying points of view of key types of communities of shared interest. **Chapter 3** and **Appendix 13**, Socioeconomics Baseline Report, identify several broad categories of communities of shared interest that could be impacted by sage-grouse management decisions in the planning area. These categories reflect different linkages people have to public land and reflect distinct sets of attitudes, beliefs, values, opinions, and perceptions about natural resources

and the effects of various management policies and actions. It should be noted that individuals and social groups may have multiple interests and often identify with more than one community of shared interest category. This categorization allows for differentiation of social impacts based on broad differences in points of view. The social impacts analysis in **Chapter 4** of the EIS assesses the alternatives against the different points of view in the broad communities of shared interest categories.

As mentioned above, impacts to market, nonmarket, and social conditions are interrelated, so in **Chapter 4**, they are discussed together for each resource use. The methodology and assumptions for each resource use are discussed below, in **Section 2.3**, Methodologies by Resource Use.

### 18.2.3 Environmental Justice Impact Analysis

Definitions and methods for analysis of potential environmental justice issues are described in **Appendix 13**, Socioeconomic Baseline Report. In short, the socioeconomic study area was screened to identify counties with minority, low-income, or American Indian and Alaska Native populations that qualify as potential environmental justice populations based on guidance for environmental justice analysis from the Council on Environmental Quality and the BLM (CEQ 1997, BLM 2022). These counties and their potential environmental justice populations are noted in **Chapter 3** of the EIS, as well as **Appendix 13**, Socioeconomic Baseline Report. The BLM reviewed public comments and issues of concern that were brought up in 2012 economic workshops and public scoping comments received in 2012, 2019, and for the current planning effort. These issues were considered for carrying forward for impact analysis based on the BLM-management decisions included under the alternatives for this planning effort. Assessment of the likelihood of disproportionate and adverse impacts to these populations was conducted as described in **Chapter 4** of the EIS.

## 18.3 Methodologies by Resource Use

### 18.3.1 Oil and Gas

The economic impact of oil and gas reflects drilling, completion, production and tax revenue activities, and changes in economic impacts of oil and gas stem from changes in these activities due to a change in the level of stipulations for the protection of Greater Sage-Grouse under each alternative. Under alternative 3, all areas managed for GRSG would be PHMA and fluid minerals in these areas would be closed to leasing (see **Section 4.9**, Mineral Resources, of this EIS for more details). Closing areas to fluid mineral leasing could result in impacts on level of oil and gas activities and associated jobs, income, and tax revenue supported by local operations. Under alternatives 1, 2, 4, 5, and 5a, all states include language to maintain and enhance sagebrush habitats with the intent of conserving sage-grouse populations; however, there would be fewer areas closed to leasing than under alternative 3 (the stipulations on oil and gas leasing and the areas closed to leasing for these alternatives vary by state and alternative and are described in detail in **Section 4.9**, Mineral Resources).

The estimated number of wells drilled and completed, and production from new wells were projected for a 20-year period (2023 to 2042) for each alternative and state as part of the Reasonably Foreseeable Development Scenario (see **Appendix 12**, Reasonably Foreseeable Development Scenario, which provides a complete description of the assumptions and methodology used in developing these estimates). These projections were used as inputs in IMPLAN to model the economic impacts of oil and gas development under each alternative.

Drilling and completion costs per well were developed from Spears & Associates, Inc.'s Drilling and Completion Services Cost Index.[1] These estimates were developed per state, and the weighted average costs were calculated based on the percentage of well type for each state.

Total regional expenditures from drilling costs are calculated by multiplying the drilling cost per well by the projected average annual number of new wells spud (see **Appendix 12**, Reasonably Foreseeable Development Scenario). The number of new wells spud per year is multiplied by the completion ratio (which is estimated by state based on historical completion rates) to calculate the average annual new wells completed. Total regional expenditures from completion costs are calculated by multiplying the average annual number of new wells completed each year by the completion cost per well. Total regional expenditures from drilling and completion costs were used as an input in IMPLAN to generate total regional output, employment, and earnings from oil and gas development.

Projected annual production for new wells developed from 2023 to 2043 is from the reasonably foreseeable development scenario (see **Appendix 12**, Reasonably Foreseeable Development Scenario). Projected oil and gas production under each alternative represents the forecast under varying levels of stipulations and restrictions on leasable mineral development. These stipulations and restrictions could deter operators from leasing, drilling, and producing oil and gas on BLM-administered lands. Instead, operators could choose to develop oil and gas on non-federal lands, or they could choose to reduce production altogether. For the purposes of this analysis, it is assumed that operators choose to reduce production rather than choose to develop on non-federal lands. This means the reported economic impacts associated with changes in federal mineral development may overstate the potential economic impacts within an analysis area due to the ability of some operators to shift operations to non-federal lands and minerals.

The market value of production per well from 2023 to 2043 was calculated using projected annual oil wellhead and natural gas supply prices, from the 2023 Annual Energy Outlook (AEO) reference case published by the US Energy Information Administration (EIA) (EIA 2023). The EIA forecasts oil and gas prices as an average across eight multi-state regions (EIA 2023). For the purposes of this analysis, the price used for each state was taken from the regional average where the state is located. **Table 1** shows the 20-year average price, from 2023 to 2042, for oil and gas for each state in the planning area.

**Table 1. 20-Year Average Oil and Gas Prices, by State**

| State | Multi-State Region | Oil Wellhead Price ($/barrel) | Natural Gas Supply Price ($/thousand cubic feet) |
|---|---|---|---|
| California | West Coast | 93.31 | 2.75 |
| Colorado | Rocky Mountain | 87.22 | 2.92 |
| Idaho | Rocky Mountain | 87.22 | 2.92 |
| Montana | Northern Great Plains | 87.22 | 3.79 |
| Nevada | Rocky Mountain | 87.22 | 2.92 |
| North Dakota | Northern Great Plains | 87.22 | 3.79 |
| Oregon | West Coast | 93.31 | 2.75 |
| South Dakota | Northern Great Plains | 87.22 | 3.79 |
| Utah | Rocky Mountain | 87.22 | 2.92 |
| Wyoming | Rocky Mountain | 87.22 | 2.92 |

Source: US EIA 2023

[1] These estimates for drilling and completion costs can be provided from the BLM upon request.

The pace and timing of mineral development activities is dependent on a variety of factors outside the management decisions of the BLM, some of which cannot be foreseen with reasonable certainty. These include national and international energy demand and prices, enactment of future laws and regulatory policies, global supply disruptions, technological advances, and business strategies of operators. The RFD projects future production based on expected rates of well drilling, estimated completion rates, and current production decline curves. Together these parameters allow for projection of future oil and gas production volumes for use in the economic impact analysis. Future real world economic impacts could vary if actual development or production varies from the projection schedule under the RFD, if prices change, or if there are significant structural changes within the oil and gas sector or the broader economies of these study areas.

The IMPLAN sector 35, drilling oil and gas wells, was used to model an exogenous change in demand for oil and gas well drilling. Sector 20, oil and gas extraction, was used to model a change in oil and gas production.

Changes in oil and gas development could also affect state and county public finances through disbursements of federal mineral leasing revenue or state severance taxes. The analysis of potential changes in federal mineral leasing payments is calculated from the projected production revenue and the federal royalty rate enacted in August 2022 (16.67 percent).[2] The impacts to the revenue from state severance taxes is calculated based on the severance tax rate for each state (see **Chapter 3**, Affected Environment, Social and Economic Conditions for the current severance tax assumptions by state).

Tax and royalty revenues derived from activities on BLM-administered lands and minerals would continue to have fiscal implications for communities within the socioeconomic analysis area, the state, and the Federal Government.

### 18.3.2 Locatable Minerals

The qualitative analysis of impacts on social and economic conditions due to potential changes in locatable minerals focuses on the impacts of proposed conservation measures to protect Greater Sage-Grouse under the alternatives. Under alternative 3, all PHMA would be recommended withdrawal from mineral entry (see **Section 4.9**, Mineral Resources, of this EIS for more details). Recommending areas for closure to the mining laws for locatable exploration or development does not restrict any activities and therefore, such recommendation does not have any impacts. However, the BLM could ask the Secretary of the Interior to propose and make a withdrawal of the land from location and entry under the Mining Law of 1872 pursuant to Section 204(a) of FLMPA. Proposing and making a withdrawal is not a land use planning process. Should the Secretary propose a withdrawal, the proposal would require environmental and other analysis under NEPA and other applicable authorities before the land could be withdrawn. For purposes of this planning initiative, the alternatives analysis includes a description of the likely environmental effects should the Secretary propose and make a withdrawal in the future (e.g., reduced potential for behavioral disturbance and habitat loss/alterations). If the Secretary ultimately decided to withdraw the land, under Alternative 3, such a withdrawal would likely result in impacts on the level of mineral extraction and associated jobs,

[2] The new rate (16.67 percent) only applies to federal leases issued after the IRA was signed. Many new wells development, and the production associated from these new wells, occur on these leases that were issued prior to August 2022 and the royalties from this production would be assessed based on the old rate of 12.5 percent. The approach to consistently use the new rate across all production from new wells means that actual disbursements of federal mineral leasing royalty revenue would likely be less that the results described in Chapter 4; however, the analysis can be used to compare the disbursements across alternatives. Additionally, the analysis on disbursements does not include other streams of federal mineral leasing revenue such as from rents and bonus bids as impacts from alternatives on rents and bonus bids are more uncertain.

income, and tax revenue supported by local mining operations. Under alternatives 1, 2, 4, 5, and 5a, actions would be taken to maintain and enhance sagebrush habitats with the intent of conserving sage-grouse populations; however, there would be fewer areas recommended for withdrawal than under alternative 3 (the areas recommended for withdrawal for these alternatives vary by state and alternative and are described in detail in **Section 4.9**, Mineral Resources).

### 18.3.3 Mineral Materials

The qualitative analysis of impacts on mineral materials are based on discussions of how changes in the acres available or unavailable for mineral material disposal, under each alternative, would impact mineral material extraction and costs associated with extraction, access to the resources, and transportation of minerals after they are extracted. Under alternative 3, all areas managed for GRSG would be PHMA and mineral materials would be closed to disposal in all PHMA (see **Section 4.9**, Mineral Resources, of this EIS for more details). Under alternatives 1, 2, 4, 5, and 5a, actions would be taken to maintain and enhance sagebrush habitats with the intent of conserving sage-grouse populations; however, there would be fewer areas closed to disposal than under alternative 3 (the areas closed to disposal for these alternatives vary by state and alternative and are described in detail in **Section 4.9**, Mineral Resources). Social impacts to communities due to availability of materials in free-use permits are also explored.

### 18.3.4 Renewable Energy (Geothermal, Wind, and Solar)

#### *Geothermal*

Economic impacts from changes geothermal exploration and development due to a change in the level of stipulations for the protection of Greater Sage-Grouse, under each alternative, are a function of construction and operation expenditures for geothermal electricity development, including drilling wells (exploratory, production, and injection), constructing power plants, and operating facilities. Under alternative 3, all areas managed for GRSG would be PHMA and these areas would be closed to all geothermal leasing (see **Section 4.9**, Mineral Resources, of this EIS for more details). Closing areas to geothermal leasing would result in impacts on level of geothermal activities and associated jobs, income, and tax revenue supported by local operations. Under alternatives 1, 2, 4, 5, and 5a, all states include language to maintain and enhance sagebrush habitats with the intent of conserving sage-grouse populations; however, there would be fewer areas closed to leasing than under alternative 3 (the stipulations on geothermal leasing and the areas closed to leasing for these alternatives vary by state and alternative and are described in detail in **Section 4.9**, Mineral Resources). In the Reasonably Foreseeable Development Scenarios for geothermal development, the BLM analyzed future leasing and development of federal geothermal resources within the decision area over the next 20 years for each alternative. The outputs from the scenarios in the Reasonably Foreseeable Development Scenarios on projected capacity and number of geothermal plants was used to model economic impacts from economic activity (see **Appendix 12**, Reasonably Foreseeable Development Scenarios for more details on how these projections were calculated).

To estimate economic activity associated with geothermal development, BLM used the National Renewable Energy Laboratory's Jobs and Economic Development Impact (JEDI) model (National Renewable Energy Laboratory 2016) to calculate the gross regional economic output, employment, and labor income associated with a representative power plant. The assumptions used 20 MW nameplate capacity for the analyses in Colorado, Idaho, Oregon, and Wyoming, 30 MW nameplate capacity for the analysis in Utah, and 28.8 MW nameplate capacity for the analysis in Nevada (based on the average plant capacity of existing geothermal plants in the planning area). BLM used standard assumptions from the National Renewable Energy Laboratory for the inputs, where data was not available. The economic impacts from the JEDI model were multiplied by

the number of geothermal power plants projected, as described in **Appendix 12**, Reasonably Foreseeable Development Scenarios.

The pace and timing of geothermal development activities is dependent on a variety of factors outside the management decisions of the BLM, some of which cannot be foreseen with reasonable certainty. These include demand for electricity, availability of transmission infrastructure capacity, geothermal energy prices relative to the prices for electricity from other sources, cost of energy generation technologies, technological advances, and business strategies of operators. The RFD projects future production based on expected rates of well drilling, estimated completion rates, and current production decline curves. Together these parameters allow for projection of future oil and gas production volumes for use in the economic impact analysis. Future real world economic impacts could vary if actual development or production varies from the projection schedule under the RFD, if prices change, or if there are significant structural changes within the oil and gas sector or the broader economies of these study areas.

***Wind and Solar Energy***

The qualitative analysis of impacts on wind and solar energy from BLM-management decisions are based on how the number of acres designated as ROW exclusion or ROW avoidance areas, under each alternative, would impact wind and solar energy development and costs associated with development and transmission of wind and solar energy. Under alternative 3, all PHMA would be managed as ROW exclusion (outside of designated corridors; see **Section 4.8**, Lands and Realty (Including Wind and Solar), of this EIS for more details). Under alternatives 1, 2, 4, 5, and 5a, actions would be taken to maintain and enhance sagebrush habitats with the intent of conserving sage-grouse populations; however, there would be fewer areas managed as ROW exclusion than under alternative 3 (the areas managed as ROW avoidance and exclusion under these alternatives vary by state and alternative and are described in detail in **Section 4.8**, Lands and Realty (Including Wind and Solar)).

The pace and timing of wind and solar energy development activities are dependent on a variety of factors outside the management decisions of the BLM. These include demand for electricity, availability of transmission infrastructure capacity, renewable energy prices relative to prices for electricity from other energy sources, costs of energy generation technologies, technological advances, and business strategies of operators. Due to uncertainties in these factors as well as data limitations, economic and social impacts on wind and solar energy from BLM-management decisions will be discussed qualitatively.

### 18.3.5 Livestock Grazing

Economic impacts from changes to livestock grazing are a function of the amount of forage utilization and the market value of livestock whose feed requirements are partially met through grazing on BLM managed allotments. Forage utilization is measured in animal unit months (AUMs), with one AUM defined as the amount of forage needed to feed a cow or five sheep for one month.

Two types of AUM measures are tracked: active AUMs, which measure the amount of forage from land available for grazing, and billed AUMs, which measure the amount of forage that the BLM bills for annually. For the purposes of the analysis in **Chapter 4**, impacts were estimated based on the 5-year average (2018-2022) of billed AUMs, which is the closest available proxy for actual forage use. Because billed use may exceed actual grazing use, the economic analyses may overstate the actual economic impacts of grazing to some degree; however, the comparison across alternatives is still representative of the impacts from BLM-management decisions.

The number of billed AUMS on allotments with greater than 15 percent PHMA land was determined by overlaying GIS data layers. The 5-year average total billed AUMs as well as the billed AUMs on allotments with greater than 15 percent PHMA land by livestock type and state were reported in **Appendix 13**, Socioeconomic Baseline Report. **Table 2** shows the estimated projected number of billed AUMs by alternative for each state, broken out by livestock type and total. The total billed AUMs and billed AUMs by livestock type for Alternatives 1, 2, 4, and 5 was assumed to be consistent with the 5-year average billed AUMs. Under Alternative 3, all of the allotments where PHMA accounts for 15 percent or more of the acreage would be completely closed to grazing, so the billed AUMs would be reduced to zero.

**Table 2. Number of Estimated AUMs by Livestock Type, State, and Alternative[1]**

| State | Alternative | Total Billed AUMs | Billed AUMs by Livestock Type | |
|---|---|---|---|---|
| | | | Cattle | Sheep |
| California | Alternatives 1, 2, 4, and 5 | 121,325 | 115,259 | 6,066 |
| | Alternative 3 | 0 | 0 | 0 |
| Colorado | Alternatives 1, 2, 4, and 5 | 126,183 | 104,227 | 21,956 |
| | Alternative 3 | 0 | 0 | 0 |
| Idaho | Alternatives 1, 2, 4, and 5 | 741,979 | 696,719 | 45,261 |
| | Alternative 3 | 0 | 0 | 0 |
| Montana | Alternatives 1, 2, 4, and 5 | 885,551 | 866,954 | 18,597 |
| | Alternative 3 | 0 | 0 | 0 |
| Nevada | Alternatives 1, 2, 4, and 5 | 1,092,825 | 1,019,606 | 73,219 |
| | Alternative 3 | 0 | 0 | 0 |
| North Dakota | Alternatives 1, 2, 4, and 5 | 3,871 | 3,863 | 8 |
| | Alternative 3 | 0 | 0 | 0 |
| Oregon | Alternatives 1, 2, 4, and 5 | 678,191 | 674,122 | 4,069 |
| | Alternative 3 | 0 | 0 | 0 |
| South Dakota | Alternatives 1, 2, 4, and 5 | 35,588 | 31,638 | 3,950 |
| | Alternative 3 | 0 | 0 | 0 |
| Utah | Alternatives 1, 2, 4, and 5 | 258,438 | 201,840 | 56,598 |
| | Alternative 3 | 0 | 0 | 0 |
| Wyoming | Alternatives 1, 2, 4, and 5 | 1,334,637 | 1,190,497 | 144,141 |
| | Alternative 3 | 0 | 0 | 0 |

Source: BLM 2023
— = Data not available
[1]Data reported is for allotments where PHMA accounted for 15 percent or more of the acreage.

The economic value of livestock produced that graze on BLM lands is estimated based on the market value of cattle and sheep. Values for cattle and sheep are estimated separately, and other grazing animals are considered of negligible commercial value. The direct value of production per AUM was estimated based on regional livestock production value data over 5 years and ratios in the livestock economics literature. **Table 3** shows the value of production per cow, AUMs per cow, and adjusted value of production per AUM. The value for cattle is $37.00 per AUM and the value for sheep is $59.56 per AUM.

The analysis focused on the economic impacts associated with cattle and sheep because those are the predominate types of livestock permitted to graze on BLM lands, however, BLM grazing permits may be issued for other classes of livestock. For the purposes of this analysis, one AUM for buffalo is assumed to be equivalent to one AUM for cattle and one AUM for goats is equivalent to one AUM for sheep. Forage utilization by horses was excluded from the analysis because it was assumed that most of this forage utilization for horses occurs as support for a ranching operation and would thus be an input cost for

**Table 3. Value of Livestock**

| Year | Value of Livestock Production (Nominal $)[1,2] | | AUMs per Animal[3] | | Adjusted Value of Livestock Production per AUM (2021$)[4] | |
|---|---|---|---|---|---|---|
| | Cow | Sheep/Ewe | Cow | Sheep/Ewe | Cow | Sheep/Ewe |
| 2015 | 1015.79 | 214 | 16 | 3.2 | 49.76 | 54.50 |
| 2016 | 704.62 | 202 | 16 | 3.2 | 41.41 | 60.96 |
| 2017 | 710.20 | 203 | 16 | 3.2 | 40.66 | 59.44 |
| 2018 | 589.29 | 204 | 16 | 3.2 | 35.00 | 61.47 |
| 2019 | 558.00 | 203 | 16 | 3.2 | 33.15 | 61.43 |
| 2020 | 565.77 | — | 16 | — | 35.66 | — |
| 2021 | 606.07 | — | 16 | — | 37.88 | — |
| 2022 | 698.80 | — | 16 | — | 43.30 | — |
| **5 Year Average** | **603.59** | **205.20** | **16** | **3.2** | **37.00** | **59.56** |

Source: [1]USDA Economic Research Service 2023; [2]USDA National Agricultural Statistics Service 2021; [3]The AUMs per animal is the number of months of forage one animal needs to grow to market weight, and was estimated from the estimated number of months to get an animal to market weight minus the estimated number of months the animal spends in a feedlot (Pennsylvania Beef Council 2024; US Agency for International Development; US Department of Agriculture 2013)
[4] Nominal values were converted to 2021 dollar values using IMPLAN deflators (IMPLAN 2021 Data).
— = Data not available

producing cattle and sheep. The IMPLAN sectors, 11, beef cattle ranching and farming, including feedlots and dual-purpose ranching and farming, and 14, animal production, except cattle and poultry and eggs were used to model an exogenous change in demand for livestock grazing on BLM lands for cattle and sheep, respectively.

The economic impacts were evaluated at both the analysis areas and state level for each state. The multi-regional input-output analysis feature of IMPLAN was used to evaluate the economic impacts at the state level from changes made in the analysis areas.

Forage utilization estimates in this analysis, and thus the economic impact estimates, only represent livestock grazing in sage-grouse habitat. They do not represent the total impact of livestock grazing in each state. Because of this, a percentage decrease between the action alternatives and Alternative 1 would be less on a total impact from livestock grazing basis than in the figures in **Chapter 4**, which are for livestock grazing in GRSG HMAs only.

## 18.4 SUPPLEMENTAL TABLES

### *Oil and Gas*

**Table 4. Average Annual Economic Contributions from Oil and Gas, Under Alternative I**

| State | Type of Impact | Employment | | Labor Income | | Economic Output | |
|---|---|---|---|---|---|---|---|
| | | Analysis Area | State | Analysis Area | State | Analysis Area | State |
| Colorado (Low Scenario) | Direct | 6,574 | 6,574 | 790,898,405 | 790,898,405 | 3,979,134,548 | 3,979,134,548 |
| | Indirect | 7,090 | 9,671 | 473,848,226 | 776,442,707 | 1,408,076,009 | 2,011,832,079 |
| | Induced | 4,411 | 6,020 | 222,619,299 | 321,309,153 | 726,211,232 | 1,032,129,727 |
| | Total | 18,075 | 22,265 | 1,487,365,930 | 1,888,650,265 | 6,113,421,790 | 7,023,096,354 |
| Colorado (High Scenario) | Direct | 12,791 | 12,791 | 1,539,179,946 | 1,539,179,946 | 7,738,174,737 | 7,738,174,737 |
| | Indirect | 13,786 | 18,801 | 921,044,007 | 1,508,906,703 | 2,737,727,285 | 3,911,507,852 |
| | Induced | 8,581 | 11,708 | 433,092,289 | 624,894,000 | 1,412,797,333 | 2,007,343,698 |
| | Total | 35,158 | 43,301 | 2,893,316,242 | 3,672,980,648 | 11,888,699,355 | 13,657,026,287 |
| Idaho | Direct | 6 | 6 | 360,003 | 360,003 | 1,873,754 | 1,873,754 |
| | Indirect | 4 | 5 | 245,779 | 285,872 | 843,411 | 989,487 |
| | Induced | 2 | 2 | 99,312 | 113,394 | 327,260 | 373,549 |
| | Total | 13 | 14 | 705,095 | 759,269 | 3,044,425 | 3,236,789 |
| Montana | Direct | 1,922 | 1,922 | 284,762,972 | 284,762,972 | 1,318,085,631 | 1,318,085,631 |
| | Indirect | 1,563 | 1,725 | 105,741,719 | 118,169,771 | 327,422,634 | 359,077,656 |
| | Induced | 1,561 | 1,651 | 77,407,961 | 81,913,449 | 248,078,502 | 262,290,130 |
| | Total | 5,046 | 5,299 | 467,912,653 | 484,846,192 | 1,893,586,767 | 1,939,453,416 |
| Nevada | Direct | 18 | 18 | 249,165 | 249,165 | 6,374,761 | 6,374,761 |
| | Indirect | 17 | 18 | 1,554,685 | 1,580,942 | 4,001,386 | 4,162,182 |
| | Induced | 6 | 6 | 329,181 | 352,408 | 1,069,843 | 1,144,350 |
| | Total | 41 | 42 | 2,133,031 | 2,182,516 | 11,445,990 | 11,681,292 |
| North Dakota | Direct | 275 | 275 | 31,990,856 | 31,990,856 | 406,307,567 | 406,307,567 |
| | Indirect | 172 | 180 | 10,249,846 | 10,897,896 | 44,494,011 | 46,938,673 |
| | Induced | 105 | 119 | 4,331,162 | 5,067,030 | 15,914,717 | 18,161,000 |
| | Total | 551 | 573 | 46,571,864 | 47,955,782 | 466,716,295 | 471,407,239 |
| South Dakota | Direct | 91 | 91 | 7,240,119 | 7,240,119 | 35,371,675 | 35,371,675 |
| | Indirect | 123 | 137 | 6,133,793 | 7,168,460 | 22,819,308 | 26,579,293 |
| | Induced | 30 | 42 | 1,023,047 | 1,694,364 | 4,512,917 | 6,594,671 |
| | Total | 244 | 271 | 14,396,959 | 16,102,943 | 62,703,900 | 68,545,638 |
| Utah | Direct | 2,368 | 2,368 | 162,438,183 | 162,438,183 | 1,619,804,067 | 1,619,804,067 |
| | Indirect | 2,022 | 3,284 | 115,705,860 | 226,994,302 | 382,678,849 | 600,222,762 |
| | Induced | 814 | 1,407 | 31,513,987 | 64,193,883 | 122,797,623 | 230,483,019 |
| | Total | 5,204 | 7,059 | 309,658,031 | 453,626,368 | 2,125,280,538 | 2,450,509,848 |

| State | Type of Impact | Employment | | Labor Income | | Economic Output | |
|---|---|---|---|---|---|---|---|
| | | Analysis Area | State | Analysis Area | State | Analysis Area | State |
| Wyoming | Direct | 16,564 | 16,564 | 1,764,447,162 | 1,764,447,162 | 11,626,402,461 | 11,626,402,461 |
| | Indirect | 12,284 | 12,337 | 776,372,794 | 780,303,077 | 2,672,749,560 | 2,684,939,890 |
| | Induced | 8,233 | 8,246 | 334,329,965 | 335,125,553 | 1,284,310,806 | 1,286,870,068 |
| | Total | 37,081 | 37,147 | 2,875,149,921 | 2,879,875,792 | 15,583,462,827 | 15,598,212,419 |
| Total Planning Area (Low Colorado Scenario) | Direct | 27,818 | 27,818 | 3,042,386,865 | 3,042,386,865 | 18,993,354,464 | 18,993,354,464 |
| | Indirect | 23,275 | 27,357 | 1,489,852,703 | 1,921,843,028 | 4,863,085,168 | 5,734,742,021 |
| | Induced | 15,161 | 17,494 | 671,653,916 | 809,769,234 | 2,403,222,900 | 2,838,046,512 |
| | Total | 66,255 | 72,669 | 5,203,893,485 | 5,773,999,127 | 26,259,662,533 | 27,566,142,997 |
| Total Planning Area (High Colorado Scenario) | Direct | 34,036 | 34,036 | 3,790,668,407 | 3,790,668,407 | 22,752,394,653 | 22,752,394,653 |
| | Indirect | 29,971 | 36,487 | 1,937,048,484 | 2,654,307,023 | 6,192,736,443 | 7,634,417,794 |
| | Induced | 19,331 | 23,183 | 882,126,906 | 1,113,354,081 | 3,089,809,001 | 3,813,260,483 |
| | Total | 83,338 | 93,706 | 6,609,843,797 | 7,558,329,511 | 32,034,940,098 | 34,200,072,929 |

Source: IMPLAN 2021 Data for model region including counties in the socioeconomic analysis area in California, Colorado, Idaho, Montana, Nevada, North Dakota, Oregon, South Dakota, Utah, and Wyoming as well as for all counties in the state using the multi-regional input-output analysis.
Note: There were no oil and gas developments projected for California and Oregon under all alternatives.

**Table 5. Average Annual Economic Contributions from Oil and Gas, Under Alternative 2**

| State | Type of Impact | Employment | | Labor Income | | Economic Output | |
|---|---|---|---|---|---|---|---|
| | | Analysis Area | State | Analysis Area | State | Analysis Area | State |
| Colorado (Low Scenario) | Direct | 6,669 | 6,669 | 802,283,755 | 802,283,755 | 4,036,412,178 | 4,036,412,178 |
| | Indirect | 7,192 | 9,810 | 480,668,731 | 787,619,135 | 1,428,344,184 | 2,040,792,766 |
| | Induced | 4,474 | 6,107 | 225,823,905 | 325,934,514 | 736,665,045 | 1,046,987,593 |
| | Total | 18,335 | 22,585 | 1,508,776,391 | 1,915,837,404 | 6,201,421,407 | 7,124,192,537 |
| Colorado (High Scenario) | Direct | 12,885 | 12,885 | 1,550,426,755 | 1,550,426,755 | 7,794,700,978 | 7,794,700,978 |
| | Indirect | 13,887 | 18,939 | 927,770,796 | 1,519,925,891 | 2,757,724,392 | 3,940,077,897 |
| | Induced | 8,644 | 11,794 | 436,256,457 | 629,458,854 | 1,423,119,210 | 2,022,007,419 |
| | Total | 35,415 | 43,617 | 2,914,454,009 | 3,699,811,501 | 11,975,544,580 | 13,756,786,294 |
| Idaho | Direct | 8 | 8 | 480,004 | 480,004 | 2,498,339 | 2,498,339 |
| | Indirect | 6 | 7 | 327,706 | 381,162 | 1,124,547 | 1,319,316 |
| | Induced | 3 | 3 | 132,416 | 151,192 | 436,347 | 498,065 |
| | Total | 17 | 18 | 940,127 | 1,012,359 | 4,059,233 | 4,315,719 |
| Montana | Direct | 1,922 | 1,922 | 284,762,972 | 284,762,972 | 1,318,085,631 | 1,318,085,631 |
| | Indirect | 1,563 | 1,725 | 105,741,719 | 118,169,771 | 327,422,634 | 359,077,656 |
| | Induced | 1,561 | 1,651 | 77,407,961 | 81,913,449 | 248,078,502 | 262,290,130 |
| | Total | 5,046 | 5,299 | 467,912,653 | 484,846,192 | 1,893,586,767 | 1,939,453,416 |
| Nevada | Direct | 18 | 18 | 249,165 | 249,165 | 6,374,761 | 6,374,761 |
| | Indirect | 17 | 18 | 1,554,685 | 1,580,942 | 4,001,386 | 4,162,182 |
| | Induced | 6 | 6 | 329,181 | 352,408 | 1,069,843 | 1,144,350 |
| | Total | 41 | 42 | 2,133,031 | 2,182,516 | 11,445,990 | 11,681,292 |
| North Dakota | Direct | 275 | 275 | 31,990,856 | 31,990,856 | 406,307,567 | 406,307,567 |
| | Indirect | 172 | 180 | 10,249,846 | 10,897,896 | 44,494,011 | 46,938,673 |
| | Induced | 105 | 119 | 4,331,162 | 5,067,030 | 15,914,717 | 18,161,000 |
| | Total | 551 | 573 | 46,571,864 | 47,955,782 | 466,716,295 | 471,407,239 |
| South Dakota | Direct | 91 | 91 | 7,240,119 | 7,240,119 | 35,371,675 | 35,371,675 |
| | Indirect | 123 | 137 | 6,133,793 | 7,168,460 | 22,819,308 | 26,579,293 |
| | Induced | 30 | 42 | 1,023,047 | 1,694,364 | 4,512,917 | 6,594,671 |
| | Total | 244 | 271 | 14,396,959 | 16,102,943 | 62,703,900 | 68,545,638 |
| Utah | Direct | 2,368 | 2,368 | 162,438,183 | 162,438,183 | 1,619,804,067 | 1,619,804,067 |
| | Indirect | 2,022 | 3,284 | 115,705,860 | 226,994,302 | 382,678,849 | 600,222,762 |
| | Induced | 814 | 1,407 | 31,513,987 | 64,193,883 | 122,797,623 | 230,483,019 |
| | Total | 5,204 | 7,059 | 309,658,031 | 453,626,368 | 2,125,280,538 | 2,450,509,848 |

| State | Type of Impact | Employment | | Labor Income | | Economic Output | |
|---|---|---|---|---|---|---|---|
| | | Analysis Area | State | Analysis Area | State | Analysis Area | State |
| Wyoming | Direct | 16,564 | 16,564 | 1,764,447,162 | 1,764,447,162 | 11,626,402,461 | 11,626,402,461 |
| | Indirect | 12,284 | 12,337 | 776,372,794 | 780,303,077 | 2,672,749,560 | 2,684,939,890 |
| | Induced | 8,233 | 8,246 | 334,329,965 | 335,125,553 | 1,284,310,806 | 1,286,870,068 |
| | Total | 37,081 | 37,147 | 2,875,149,921 | 2,879,875,792 | 15,583,462,827 | 15,598,212,419 |
| Total Planning Area (Low Colorado Scenario) | Direct | 27,915 | 27,915 | 3,053,892,217 | 3,053,892,217 | 19,051,256,679 | 19,051,256,679 |
| | Indirect | 23,378 | 27,497 | 1,496,755,134 | 1,933,114,746 | 4,883,634,479 | 5,764,032,536 |
| | Induced | 15,225 | 17,582 | 674,891,626 | 814,432,393 | 2,413,785,800 | 2,853,028,895 |
| | Total | 66,519 | 72,994 | 5,225,538,978 | 5,801,439,357 | 26,348,676,958 | 27,668,318,110 |
| Total Planning Area (High Colorado Scenario) | Direct | 34,131 | 34,131 | 3,802,035,217 | 3,802,035,217 | 22,809,545,479 | 22,809,545,479 |
| | Indirect | 30,073 | 36,626 | 1,943,857,199 | 2,665,421,502 | 6,213,014,687 | 7,663,317,668 |
| | Induced | 19,395 | 23,269 | 885,324,179 | 1,117,956,733 | 3,100,239,965 | 3,828,048,720 |
| | Total | 83,599 | 94,027 | 6,631,216,595 | 7,585,413,453 | 32,122,800,131 | 34,300,911,866 |

Source: IMPLAN 2021 Data for model region including counties in the socioeconomic analysis area in California, Colorado, Idaho, Montana, Nevada, North Dakota, Oregon, South Dakota, Utah, and Wyoming as well as for all counties in the state using the multi-regional input-output analysis.
Note: There were no oil and gas developments projected for California and Oregon under all alternatives.

**Table 6. Average Annual Economic Contributions from Oil and Gas, Under Alternative 3**

| State | Type of Impact | Employment | | Labor Income | | Economic Output | |
|---|---|---|---|---|---|---|---|
| | | Analysis Area | State | Analysis Area | State | Analysis Area | State |
| Colorado (Low Scenario) | Direct | 6,263 | 6,263 | 755,042,456 | 755,042,456 | 3,769,457,803 | 3,769,457,803 |
| | Indirect | 6,710 | 9,103 | 446,597,038 | 726,374,125 | 1,331,090,703 | 1,889,268,560 |
| | Induced | 4,195 | 5,685 | 211,750,319 | 303,124,126 | 690,742,964 | 973,984,029 |
| | Total | 17,169 | 21,052 | 1,413,389,813 | 1,784,540,707 | 5,791,291,470 | 6,632,710,393 |
| Colorado (High Scenario) | Direct | 9,122 | 9,122 | 1,099,726,614 | 1,099,726,614 | 5,488,012,722 | 5,488,012,722 |
| | Indirect | 9,768 | 13,251 | 650,031,765 | 1,057,138,792 | 1,937,740,979 | 2,750,295,798 |
| | Induced | 6,109 | 8,278 | 308,357,016 | 441,345,785 | 1,005,879,186 | 1,418,118,570 |
| | Total | 24,999 | 30,651 | 2,058,115,395 | 2,598,211,191 | 8,431,632,887 | 9,656,427,089 |
| Idaho | Direct | 5 | 5 | 312,003 | 312,003 | 1,623,920 | 1,623,920 |
| | Indirect | 4 | 4 | 213,009 | 247,755 | 730,956 | 857,555 |
| | Induced | 2 | 2 | 86,071 | 98,275 | 283,626 | 323,742 |
| | Total | 11 | 12 | 611,082 | 658,033 | 2,638,502 | 2,805,218 |
| Montana | Direct | 1,373 | 1,373 | 208,532,284 | 208,532,284 | 981,019,294 | 981,019,294 |
| | Indirect | 1,148 | 1,289 | 78,451,760 | 89,461,172 | 240,701,264 | 266,572,096 |
| | Induced | 1,140 | 1,215 | 56,520,836 | 60,271,768 | 181,144,175 | 192,975,835 |
| | Total | 3,661 | 3,877 | 343,504,881 | 358,265,225 | 1,402,864,733 | 1,440,567,225 |
| Nevada | Direct | 5 | 5 | 75,848 | 75,848 | 1,872,389 | 1,872,389 |
| | Indirect | 5 | 5 | 455,757 | 463,564 | 1,176,678 | 1,224,327 |
| | Induced | 2 | 2 | 96,998 | 103,864 | 315,246 | 337,269 |
| | Total | 12 | 12 | 628,603 | 643,276 | 3,364,313 | 3,433,985 |
| North Dakota | Direct | 233 | 233 | 27,075,375 | 27,075,375 | 343,845,594 | 343,845,594 |
| | Indirect | 145 | 152 | 8,675,140 | 9,223,747 | 37,657,396 | 39,726,925 |
| | Induced | 89 | 100 | 3,665,718 | 4,288,558 | 13,469,565 | 15,370,822 |
| | Total | 467 | 485 | 39,416,233 | 40,587,679 | 394,972,555 | 398,943,340 |
| South Dakota | Direct | 87 | 87 | 6,922,320 | 6,922,320 | 33,656,596 | 33,656,596 |
| | Indirect | 117 | 130 | 5,837,008 | 6,805,826 | 21,664,800 | 25,189,292 |
| | Induced | 29 | 40 | 974,992 | 1,611,011 | 4,300,891 | 6,273,181 |
| | Total | 232 | 257 | 13,734,319 | 15,339,158 | 59,622,287 | 65,119,069 |
| Utah | Direct | 2,122 | 2,122 | 145,452,892 | 145,452,892 | 1,453,148,321 | 1,453,148,321 |
| | Indirect | 1,813 | 2,948 | 103,766,870 | 203,833,762 | 343,164,682 | 538,804,986 |
| | Induced | 729 | 1,262 | 28,240,142 | 57,623,630 | 110,040,697 | 206,863,910 |
| | Total | 4,664 | 6,332 | 277,459,904 | 406,910,285 | 1,906,353,700 | 2,198,817,217 |

| State | Type of Impact | Employment | | Labor Income | | Economic Output | |
|---|---|---|---|---|---|---|---|
| | | Analysis Area | State | Analysis Area | State | Analysis Area | State |
| Wyoming | Direct | 6,963 | 6,963 | 708,184,660 | 708,184,660 | 5,901,184,407 | 5,901,184,407 |
| | Indirect | 5,228 | 5,244 | 356,127,143 | 357,292,356 | 1,177,946,394 | 1,181,560,469 |
| | Induced | 3,410 | 3,414 | 138,483,362 | 138,719,231 | 531,990,388 | 532,749,134 |
| | Total | 15,601 | 15,621 | 1,202,795,166 | 1,204,196,247 | 7,611,121,189 | 7,615,494,009 |
| Total Planning Area (Low Colorado Scenario) | Direct | 17,051 | 17,051 | 1,851,597,838 | 1,851,597,838 | 12,485,808,324 | 12,485,808,324 |
| | Indirect | 15,170 | 18,875 | 1,000,123,723 | 1,393,702,309 | 3,154,132,874 | 3,943,204,210 |
| | Induced | 9,596 | 11,722 | 439,818,440 | 565,840,463 | 1,532,287,551 | 1,928,877,922 |
| | Total | 41,817 | 47,648 | 3,291,540,001 | 3,811,140,610 | 17,172,228,749 | 18,357,890,456 |
| Total Planning Area (High Colorado Scenario) | Direct | 19,910 | 19,910 | 2,196,281,996 | 2,196,281,996 | 14,204,363,242 | 14,204,363,242 |
| | Indirect | 18,228 | 23,024 | 1,203,558,450 | 1,724,466,976 | 3,760,783,151 | 4,804,231,447 |
| | Induced | 11,510 | 14,314 | 536,425,136 | 704,062,122 | 1,847,423,773 | 2,373,012,463 |
| | Total | 49,648 | 57,247 | 3,936,265,583 | 4,624,811,095 | 19,812,570,166 | 21,381,607,153 |

Source: IMPLAN 2021 Data for model region including counties in the socioeconomic analysis area in California, Colorado, Idaho, Montana, Nevada, North Dakota, Oregon, South Dakota, Utah, and Wyoming as well as for all counties in the state using the multi-regional input-output analysis.
Note: There were no oil and gas developments projected for California and Oregon under all alternatives.

**Table 7. Average Annual Economic Contributions from Oil and Gas, Under Alternative 4**

| State | Type of Impact | Employment | | Labor Income | | Economic Output | |
|---|---|---|---|---|---|---|---|
| | | Analysis Area | State | Analysis Area | State | Analysis Area | State |
| Colorado (Low Scenario) | Direct | 6,948 | 6,948 | 835,579,681 | 835,579,681 | 4,210,876,842 | 4,210,876,842 |
| | Indirect | 7,504 | 10,248 | 501,986,077 | 823,906,926 | 1,490,742,665 | 2,133,156,312 |
| | Induced | 4,664 | 6,375 | 235,380,145 | 340,348,186 | 767,841,591 | 1,093,220,978 |
| | Total | 19,116 | 23,572 | 1,572,945,903 | 1,999,834,792 | 6,469,461,097 | 7,437,254,132 |
| Colorado (High Scenario) | Direct | 13,366 | 13,366 | 1,607,628,515 | 1,607,628,515 | 8,094,956,453 | 8,094,956,453 |
| | Indirect | 14,424 | 19,695 | 964,497,723 | 1,582,653,768 | 2,865,161,143 | 4,099,691,974 |
| | Induced | 8,969 | 12,257 | 452,687,909 | 654,332,656 | 1,476,725,857 | 2,101,783,237 |
| | Total | 36,759 | 45,318 | 3,024,814,147 | 3,844,614,938 | 12,436,843,453 | 14,296,431,664 |
| Idaho | Direct | 10 | 10 | 600,005 | 600,005 | 3,122,924 | 3,122,924 |
| | Indirect | 7 | 8 | 409,632 | 476,453 | 1,405,684 | 1,649,144 |
| | Induced | 3 | 4 | 165,521 | 188,990 | 545,434 | 622,581 |
| | Total | 21 | 23 | 1,175,158 | 1,265,448 | 5,074,042 | 5,394,649 |
| Montana | Direct | 1,922 | 1,922 | 284,762,972 | 284,762,972 | 1,318,085,631 | 1,318,085,631 |
| | Indirect | 1,563 | 1,725 | 105,741,719 | 118,169,771 | 327,422,634 | 359,077,656 |
| | Induced | 1,561 | 1,651 | 77,407,961 | 81,913,449 | 248,078,502 | 262,290,130 |
| | Total | 5,046 | 5,299 | 467,912,653 | 484,846,192 | 1,893,586,767 | 1,939,453,416 |
| Nevada | Direct | 18 | 18 | 249,165 | 249,165 | 6,374,761 | 6,374,761 |
| | Indirect | 17 | 18 | 1,554,685 | 1,580,942 | 4,001,386 | 4,162,182 |
| | Induced | 6 | 6 | 329,181 | 352,408 | 1,069,843 | 1,144,350 |
| | Total | 41 | 42 | 2,133,031 | 2,182,516 | 11,445,990 | 11,681,292 |
| North Dakota | Direct | 275 | 275 | 31,990,856 | 31,990,856 | 406,307,567 | 406,307,567 |
| | Indirect | 172 | 180 | 10,249,846 | 10,897,896 | 44,494,011 | 46,938,673 |
| | Induced | 105 | 119 | 4,331,162 | 5,067,030 | 15,914,717 | 18,161,000 |
| | Total | 551 | 573 | 46,571,864 | 47,955,782 | 466,716,295 | 471,407,239 |
| South Dakota | Direct | 91 | 91 | 7,240,119 | 7,240,119 | 35,371,675 | 35,371,675 |
| | Indirect | 123 | 137 | 6,133,793 | 7,168,460 | 22,819,308 | 26,579,293 |
| | Induced | 30 | 42 | 1,023,047 | 1,694,364 | 4,512,917 | 6,594,671 |
| | Total | 244 | 271 | 14,396,959 | 16,102,943 | 62,703,900 | 68,545,638 |
| Utah | Direct | 2,368 | 2,368 | 162,438,183 | 162,438,183 | 1,619,804,067 | 1,619,804,067 |
| | Indirect | 2,022 | 3,284 | 115,705,860 | 226,994,302 | 382,678,849 | 600,222,762 |
| | Induced | 814 | 1,407 | 31,513,987 | 64,193,883 | 122,797,623 | 230,483,019 |
| | Total | 5,204 | 7,059 | 309,658,031 | 453,626,368 | 2,125,280,538 | 2,450,509,848 |

| State | Type of Impact | Employment | | Labor Income | | Economic Output | |
|---|---|---|---|---|---|---|---|
| | | Analysis Area | State | Analysis Area | State | Analysis Area | State |
| Wyoming | Direct | 11,557 | 11,557 | 1,213,568,369 | 1,213,568,369 | 8,640,549,791 | 8,640,549,791 |
| | Indirect | 8,604 | 8,638 | 557,201,554 | 559,689,736 | 1,893,160,674 | 1,900,878,122 |
| | Induced | 5,718 | 5,726 | 232,189,123 | 232,692,793 | 891,949,436 | 893,569,653 |
| | Total | 25,878 | 25,921 | 2,002,959,045 | 2,005,950,898 | 11,425,659,900 | 11,434,997,565 |
| Total Planning Area (Low Colorado Scenario) | Direct | 23,190 | 23,190 | 2,536,429,350 | 2,536,429,350 | 16,240,493,257 | 16,240,493,257 |
| | Indirect | 20,012 | 24,238 | 1,298,983,167 | 1,748,884,487 | 4,166,725,211 | 5,072,664,144 |
| | Induced | 12,900 | 15,331 | 582,340,128 | 726,451,103 | 2,052,710,063 | 2,506,086,381 |
| | Total | 56,102 | 62,759 | 4,417,752,645 | 5,011,764,940 | 22,459,928,530 | 23,819,243,781 |
| Total Planning Area (High Colorado Scenario) | Direct | 29,607 | 29,607 | 3,308,478,184 | 3,308,478,184 | 20,124,572,868 | 20,124,572,868 |
| | Indirect | 26,933 | 33,685 | 1,761,494,813 | 2,507,631,329 | 5,541,143,688 | 7,039,199,805 |
| | Induced | 17,206 | 21,213 | 799,647,892 | 1,040,435,573 | 2,761,594,329 | 3,514,648,639 |
| | Total | 73,746 | 84,505 | 5,869,620,890 | 6,856,545,085 | 28,427,310,886 | 30,678,421,313 |

Source: IMPLAN 2021 Data for model region including counties in the socioeconomic analysis area in California, Colorado, Idaho, Montana, Nevada, North Dakota, Oregon, South Dakota, Utah, and Wyoming as well as for all counties in the state using the multi-regional input-output analysis.
Note: There were no oil and gas developments projected for California and Oregon under all alternatives.

**Table 8. Average Annual Economic Contributions from Oil and Gas, Under Alternative 5**

| State | Type of Impact | Employment | | Labor Income | | Economic Output | |
|---|---|---|---|---|---|---|---|
| | | Analysis Area | State | Analysis Area | State | Analysis Area | State |
| Colorado (Low Scenario) | Direct | 6,948 | 6,948 | 835,579,681 | 835,579,681 | 4,210,876,842 | 4,210,876,842 |
| | Indirect | 7,504 | 10,248 | 501,986,077 | 823,906,926 | 1,490,742,665 | 2,133,156,312 |
| | Induced | 4,664 | 6,375 | 235,380,145 | 340,348,186 | 767,841,591 | 1,093,220,978 |
| | Total | 19,116 | 23,572 | 1,572,945,903 | 1,999,834,792 | 6,469,461,097 | 7,437,254,132 |
| Colorado (High Scenario) | Direct | 13,366 | 13,366 | 1,607,628,515 | 1,607,628,515 | 8,094,956,453 | 8,094,956,453 |
| | Indirect | 14,424 | 19,695 | 964,497,723 | 1,582,653,768 | 2,865,161,143 | 4,099,691,974 |
| | Induced | 8,969 | 12,257 | 452,687,909 | 654,332,656 | 1,476,725,857 | 2,101,783,237 |
| | Total | 36,759 | 45,318 | 3,024,814,147 | 3,844,614,938 | 12,436,843,453 | 14,296,431,664 |
| Idaho | Direct | 10 | 10 | 576,005 | 576,005 | 2,998,007 | 2,998,007 |
| | Indirect | 7 | 8 | 393,247 | 457,395 | 1,349,457 | 1,583,179 |
| | Induced | 3 | 4 | 158,900 | 181,431 | 523,616 | 597,678 |
| | Total | 20 | 22 | 1,128,152 | 1,214,830 | 4,871,080 | 5,178,863 |
| Montana | Direct | 1,922 | 1,922 | 284,762,972 | 284,762,972 | 1,318,085,631 | 1,318,085,631 |
| | Indirect | 1,563 | 1,725 | 105,741,719 | 118,169,771 | 327,422,634 | 359,077,656 |
| | Induced | 1,561 | 1,651 | 77,407,961 | 81,913,449 | 248,078,502 | 262,290,130 |
| | Total | 5,046 | 5,299 | 467,912,653 | 484,846,192 | 1,893,586,767 | 1,939,453,416 |
| Nevada | Direct | 18 | 18 | 249,165 | 249,165 | 6,374,761 | 6,374,761 |
| | Indirect | 17 | 18 | 1,554,685 | 1,580,942 | 4,001,386 | 4,162,182 |
| | Induced | 6 | 6 | 329,181 | 352,408 | 1,069,843 | 1,144,350 |
| | Total | 41 | 42 | 2,133,031 | 2,182,516 | 11,445,990 | 11,681,292 |
| North Dakota | Direct | 275 | 275 | 31,990,856 | 31,990,856 | 406,307,567 | 406,307,567 |
| | Indirect | 172 | 180 | 10,249,846 | 10,897,896 | 44,494,011 | 46,938,673 |
| | Induced | 105 | 119 | 4,331,162 | 5,067,030 | 15,914,717 | 18,161,000 |
| | Total | 551 | 573 | 46,571,864 | 47,955,782 | 466,716,295 | 471,407,239 |
| South Dakota | Direct | 91 | 91 | 7,240,119 | 7,240,119 | 35,371,675 | 35,371,675 |
| | Indirect | 123 | 137 | 6,133,793 | 7,168,460 | 22,819,308 | 26,579,293 |
| | Induced | 30 | 42 | 1,023,047 | 1,694,364 | 4,512,917 | 6,594,671 |
| | Total | 244 | 271 | 14,396,959 | 16,102,943 | 62,703,900 | 68,545,638 |
| Utah | Direct | 2,368 | 2,368 | 162,438,183 | 162,438,183 | 1,619,804,067 | 1,619,804,067 |
| | Indirect | 2,022 | 3,284 | 115,705,860 | 226,994,302 | 382,678,849 | 600,222,762 |
| | Induced | 814 | 1,407 | 31,513,987 | 64,193,883 | 122,797,623 | 230,483,019 |
| | Total | 5,204 | 7,059 | 309,658,031 | 453,626,368 | 2,125,280,538 | 2,450,509,848 |

| State | Type of Impact | Employment | | Labor Income | | Economic Output | |
|---|---|---|---|---|---|---|---|
| | | Analysis Area | State | Analysis Area | State | Analysis Area | State |
| Wyoming | Direct | 15,728 | 15,728 | 1,672,490,384 | 1,672,490,384 | 11,127,941,682 | 11,127,941,682 |
| | Indirect | 11,670 | 11,719 | 739,785,658 | 743,475,229 | 2,542,611,380 | 2,554,055,105 |
| | Induced | 7,813 | 7,826 | 317,279,718 | 318,026,579 | 1,218,814,397 | 1,221,216,915 |
| | Total | 35,211 | 35,273 | 2,729,555,760 | 2,733,992,192 | 14,889,367,459 | 14,903,213,701 |
| Total Planning Area (Low Colorado Scenario) | Direct | 27,361 | 27,361 | 2,995,327,365 | 2,995,327,365 | 18,727,760,231 | 18,727,760,231 |
| | Indirect | 23,078 | 27,320 | 1,481,550,885 | 1,932,650,921 | 4,816,119,690 | 5,725,775,161 |
| | Induced | 14,995 | 17,430 | 667,424,103 | 811,777,330 | 2,379,553,206 | 2,833,708,740 |
| | Total | 65,434 | 72,110 | 5,144,302,354 | 5,739,755,616 | 25,923,433,127 | 27,287,244,131 |
| Total Planning Area (High Colorado Scenario) | Direct | 33,778 | 33,778 | 3,767,376,199 | 3,767,376,199 | 22,611,839,842 | 22,611,839,842 |
| | Indirect | 29,998 | 36,767 | 1,944,062,532 | 2,691,397,763 | 6,190,538,168 | 7,692,310,822 |
| | Induced | 19,301 | 23,312 | 884,731,867 | 1,125,761,799 | 3,088,437,472 | 3,842,270,998 |
| | Total | 83,077 | 93,857 | 6,596,170,598 | 7,584,535,762 | 31,890,815,482 | 34,146,421,663 |

Source: IMPLAN 2021 Data for model region including counties in the socioeconomic analysis area in California, Colorado, Idaho, Montana, Nevada, North Dakota, Oregon, South Dakota, Utah, and Wyoming as well as for all counties in the state using the multi-regional input-output analysis.
Note: There were no oil and gas developments projected for California and Oregon under all alternatives.

**Table 9. Average Annual Economic Contributions from Oil and Gas, Under Alternative 6**

| State | Type of Impact | Employment | | Labor Income | | Economic Output | |
|---|---|---|---|---|---|---|---|
| | | Analysis Area | State | Analysis Area | State | Analysis Area | State |
| Colorado (Low Scenario) | Direct | 6,948 | 6,948 | 835,579,681 | 835,579,681 | 4,210,876,842 | 4,210,876,842 |
| | Indirect | 7,504 | 10,248 | 501,986,077 | 823,906,926 | 1,490,742,665 | 2,133,156,312 |
| | Induced | 4,664 | 6,375 | 235,380,145 | 340,348,186 | 767,841,591 | 1,093,220,978 |
| | Total | 19,116 | 23,572 | 1,572,945,903 | 1,999,834,792 | 6,469,461,097 | 7,437,254,132 |
| Colorado (High Scenario) | Direct | 13,366 | 13,366 | 1,607,628,515 | 1,607,628,515 | 8,094,956,453 | 8,094,956,453 |
| | Indirect | 14,424 | 19,695 | 964,497,723 | 1,582,653,768 | 2,865,161,143 | 4,099,691,974 |
| | Induced | 8,969 | 12,257 | 452,687,909 | 654,332,656 | 1,476,725,857 | 2,101,783,237 |
| | Total | 36,759 | 45,318 | 3,024,814,147 | 3,844,614,938 | 12,436,843,453 | 14,296,431,664 |
| Idaho | Direct | 10 | 10 | 576,005 | 576,005 | 2,998,007 | 2,998,007 |
| | Indirect | 7 | 8 | 393,247 | 457,395 | 1,349,457 | 1,583,179 |
| | Induced | 3 | 4 | 158,900 | 181,431 | 523,616 | 597,678 |
| | Total | 20 | 22 | 1,128,152 | 1,214,830 | 4,871,080 | 5,178,863 |
| Montana | Direct | 1,922 | 1,922 | 284,762,972 | 284,762,972 | 1,318,085,631 | 1,318,085,631 |
| | Indirect | 1,563 | 1,725 | 105,741,719 | 118,169,771 | 327,422,634 | 359,077,656 |
| | Induced | 1,561 | 1,651 | 77,407,961 | 81,913,449 | 248,078,502 | 262,290,130 |
| | Total | 5,046 | 5,299 | 467,912,653 | 484,846,192 | 1,893,586,767 | 1,939,453,416 |
| Nevada | Direct | 18 | 18 | 249,165 | 249,165 | 6,374,761 | 6,374,761 |
| | Indirect | 17 | 18 | 1,554,685 | 1,580,942 | 4,001,386 | 4,162,182 |
| | Induced | 6 | 6 | 329,181 | 352,408 | 1,069,843 | 1,144,350 |
| | Total | 41 | 42 | 2,133,031 | 2,182,516 | 11,445,990 | 11,681,292 |
| North Dakota | Direct | 275 | 275 | 31,990,856 | 31,990,856 | 406,307,567 | 406,307,567 |
| | Indirect | 172 | 180 | 10,249,846 | 10,897,896 | 44,494,011 | 46,938,673 |
| | Induced | 105 | 119 | 4,331,162 | 5,067,030 | 15,914,717 | 18,161,000 |
| | Total | 551 | 573 | 46,571,864 | 47,955,782 | 466,716,295 | 471,407,239 |
| South Dakota | Direct | 91 | 91 | 7,240,119 | 7,240,119 | 35,371,675 | 35,371,675 |
| | Indirect | 123 | 137 | 6,133,793 | 7,168,460 | 22,819,308 | 26,579,293 |
| | Induced | 30 | 42 | 1,023,047 | 1,694,364 | 4,512,917 | 6,594,671 |
| | Total | 244 | 271 | 14,396,959 | 16,102,943 | 62,703,900 | 68,545,638 |
| Utah | Direct | 2,368 | 2,368 | 162,438,183 | 162,438,183 | 1,619,804,067 | 1,619,804,067 |
| | Indirect | 2,022 | 3,284 | 115,705,860 | 226,994,302 | 382,678,849 | 600,222,762 |
| | Induced | 814 | 1,407 | 31,513,987 | 64,193,883 | 122,797,623 | 230,483,019 |
| | Total | 5,204 | 7,059 | 309,658,031 | 453,626,368 | 2,125,280,538 | 2,450,509,848 |

| State | Type of Impact | Employment | | Labor Income | | Economic Output | |
|---|---|---|---|---|---|---|---|
| | | Analysis Area | State | Analysis Area | State | Analysis Area | State |
| Wyoming | Direct | 15,560 | 15,560 | 1,654,005,799 | 1,654,005,799 | 11,027,827,872 | 11,027,827,872 |
| | Indirect | 11,546 | 11,595 | 732,434,155 | 736,075,311 | 2,516,458,936 | 2,527,752,496 |
| | Induced | 7,729 | 7,741 | 313,852,673 | 314,589,734 | 1,205,649,832 | 1,208,020,824 |
| | Total | 34,835 | 34,896 | 2,700,292,628 | 2,704,670,845 | 14,749,936,640 | 14,763,601,192 |
| Total Planning Area (Low Colorado Scenario) | Direct | 27,193 | 27,193 | 2,976,842,780 | 2,976,842,780 | 18,627,646,421 | 18,627,646,421 |
| | Indirect | 22,954 | 27,196 | 1,474,199,383 | 1,925,251,004 | 4,789,967,246 | 5,699,472,552 |
| | Induced | 14,911 | 17,346 | 663,997,059 | 808,340,485 | 2,366,388,641 | 2,820,512,649 |
| | Total | 65,058 | 71,734 | 5,115,039,221 | 5,710,434,268 | 25,784,002,308 | 27,147,631,622 |
| Total Planning Area (High Colorado Scenario) | Direct | 33,610 | 33,610 | 3,748,891,614 | 3,748,891,614 | 22,511,726,032 | 22,511,726,032 |
| | Indirect | 29,874 | 36,643 | 1,936,711,029 | 2,683,997,846 | 6,164,385,724 | 7,666,008,214 |
| | Induced | 19,217 | 23,228 | 881,304,823 | 1,122,324,955 | 3,075,272,907 | 3,829,074,907 |
| | Total | 82,701 | 93,480 | 6,566,907,466 | 7,555,214,414 | 31,751,384,663 | 34,006,809,153 |

Source: IMPLAN 2021 Data for model region including counties in the socioeconomic analysis area in California, Colorado, Idaho, Montana, Nevada, North Dakota, Oregon, South Dakota, Utah, and Wyoming as well as for all counties in the state using the multi-regional input-output analysis.
Note: There were no oil and gas developments projected for California and Oregon under all alternatives.

### *Geothermal*

**Table 10. Average Annual Economic Contributions from Geothermal, Under Alternative I**

| State | Type of Impact | Employment | Labor Income | Economic Output |
|---|---|---|---|---|
| California and Nevada Combined | Direct | 276 | 17,088,024 | 24,364,445 |
| | Indirect | 191 | 14,858,872 | 70,756,086 |
| | Induced | 73 | 4,035,862 | 11,151,537 |
| | Total | 540 | 35,982,758 | 106,272,068 |
| Colorado | Direct | 8 | 536,971 | 761,363 |
| | Indirect | 4 | 333,762 | 1,356,788 |
| | Induced | 3 | 186,572 | 540,294 |
| | Total | 16 | 1,057,306 | 2,658,444 |
| Idaho | Direct | 22 | 1,020,547 | 1,413,689 |
| | Indirect | 10 | 561,620 | 2,833,188 |
| | Induced | 5 | 212,864 | 683,476 |
| | Total | 36 | 1,795,032 | 4,930,353 |
| Oregon | Direct | 6 | 297,479 | 402,124 |
| | Indirect | 3 | 188,906 | 846,182 |
| | Induced | 2 | 90,611 | 260,967 |
| | Total | 11 | 576,996 | 1,509,272 |
| Utah | Direct | 12 | 742,958 | 1,059,324 |
| | Indirect | 6 | 397,232 | 1,868,982 |
| | Induced | 4 | 209,788 | 671,228 |
| | Total | 22 | 1,349,977 | 3,599,534 |
| Wyoming | Direct | 6 | 288,314 | 388,376 |
| | Indirect | 2 | 113,518 | 796,725 |
| | Induced | 1 | 30,436 | 101,568 |
| | Total | 9 | 432,268 | 1,286,669 |
| Total Planning Area | Direct | 330 | 19,974,293 | 28,389,321 |
| | Indirect | 216 | 16,453,910 | 78,457,951 |
| | Induced | 88 | 4,766,133 | 13,409,070 |
| | Total | 634 | 41,194,337 | 120,256,340 |

Source: National Renewable Energy Laboratory 2016

Note: There were no geothermal power plant developments projected for Montana, North Dakota, and South Dakota due to limited geothermal potential in the analysis areas under all alternatives.

**Table 11. Average Annual Economic Contributions from Geothermal, Under Alternative 2**

| State | Type of Impact | Employment | Labor Income | Economic Output |
|---|---|---|---|---|
| California and Nevada Combined | Direct | 276 | 17,088,024 | 24,364,445 |
| | Indirect | 191 | 14,858,872 | 70,756,086 |
| | Induced | 73 | 4,035,862 | 11,151,537 |
| | Total | 540 | 35,982,758 | 106,272,068 |
| Colorado | Direct | 8 | 536,971 | 761,363 |
| | Indirect | 4 | 333,762 | 1,356,788 |
| | Induced | 3 | 186,572 | 540,294 |
| | Total | 16 | 1,057,306 | 2,658,444 |
| Idaho | Direct | 22 | 1,020,547 | 1,413,689 |
| | Indirect | 10 | 561,620 | 2,833,188 |
| | Induced | 5 | 212,864 | 683,476 |
| | Total | 36 | 1,795,032 | 4,930,353 |
| Oregon | Direct | 6 | 297,479 | 402,124 |
| | Indirect | 3 | 188,906 | 846,182 |
| | Induced | 2 | 90,611 | 260,967 |
| | Total | 11 | 576,996 | 1,509,272 |
| Utah | Direct | 12 | 742,958 | 1,059,324 |
| | Indirect | 6 | 397,232 | 1,868,982 |
| | Induced | 4 | 209,788 | 671,228 |
| | Total | 22 | 1,349,977 | 3,599,534 |
| Wyoming | Direct | 6 | 288,314 | 388,376 |
| | Indirect | 2 | 113,518 | 796,725 |
| | Induced | 1 | 30,436 | 101,568 |
| | Total | 9 | 432,268 | 1,286,669 |
| Total Planning Area | Direct | 330 | 19,974,293 | 28,389,321 |
| | Indirect | 216 | 16,453,910 | 78,457,951 |
| | Induced | 88 | 4,766,133 | 13,409,070 |
| | Total | 634 | 41,194,337 | 120,256,340 |

Source: National Renewable Energy Laboratory 2016

Note: There were no geothermal power plant developments projected for Montana, North Dakota, and South Dakota due to limited geothermal potential in the analysis areas under all alternatives.

**Table 12. Average Annual Economic Contributions from Geothermal, Under Alternative 3**

| State | Type of Impact | Employment | Labor Income | Economic Output |
|---|---|---|---|---|
| California and Nevada Combined | Direct | 276 | 17,088,024 | 24,364,445 |
| | Indirect | 191 | 14,858,872 | 70,756,086 |
| | Induced | 73 | 4,035,862 | 11,151,537 |
| | Total | 540 | 35,982,758 | 106,272,068 |
| Colorado | Direct | 0 | 0 | 0 |
| | Indirect | 0 | 0 | 0 |
| | Induced | 0 | 0 | 0 |
| | Total | 0 | 0 | 0 |
| Idaho | Direct | 11 | 514,407 | 711,614 |
| | Indirect | 5 | 281,427 | 1,421,504 |
| | Induced | 2 | 106,915 | 343,289 |
| | Total | 18 | 902,749 | 2,476,407 |
| Oregon | Direct | 0 | 0 | 0 |
| | Indirect | 0 | 0 | 0 |
| | Induced | 0 | 0 | 0 |
| | Total | 0 | 0 | 0 |
| Utah | Direct | 0 | 0 | 0 |
| | Indirect | 0 | 0 | 0 |
| | Induced | 0 | 0 | 0 |
| | Total | 0 | 0 | 0 |
| Wyoming | Direct | 0 | 0 | 0 |
| | Indirect | 0 | 0 | 0 |
| | Induced | 0 | 0 | 0 |
| | Total | 0 | 0 | 0 |
| Total Planning Area | Direct | 287 | 17,602,431 | 25,076,059 |
| | Indirect | 196 | 15,140,299 | 72,177,590 |
| | Induced | 75 | 4,142,777 | 11,494,826 |
| | Total | 558 | 36,885,507 | 108,748,475 |

Source: National Renewable Energy Laboratory 2016

Note: There were no geothermal power plant developments projected for Montana, North Dakota, and South Dakota due to limited geothermal potential in the analysis areas under all alternatives.

**Table 13. Average Annual Economic Contributions from Geothermal, Under Alternative 4**

| State | Type of Impact | Employment | Labor Income | Economic Output |
|---|---|---|---|---|
| California and Nevada Combined | Direct | 276 | 17,088,024 | 24,364,445 |
| | Indirect | 191 | 14,858,872 | 70,756,086 |
| | Induced | 73 | 4,035,862 | 11,151,537 |
| | Total | 540 | 35,982,758 | 106,272,068 |
| Colorado | Direct | 8 | 536,971 | 761,363 |
| | Indirect | 4 | 333,762 | 1,356,788 |
| | Induced | 3 | 186,572 | 540,294 |
| | Total | 16 | 1,057,306 | 2,658,444 |
| Idaho | Direct | 22 | 1,020,547 | 1,413,689 |
| | Indirect | 10 | 561,620 | 2,833,188 |
| | Induced | 5 | 212,864 | 683,476 |
| | Total | 36 | 1,795,032 | 4,930,353 |
| Oregon | Direct | 6 | 297,479 | 402,124 |
| | Indirect | 3 | 188,906 | 846,182 |
| | Induced | 2 | 90,611 | 260,967 |
| | Total | 11 | 576,996 | 1,509,272 |
| Utah | Direct | 12 | 742,958 | 1,059,324 |
| | Indirect | 6 | 397,232 | 1,868,982 |
| | Induced | 4 | 209,788 | 671,228 |
| | Total | 22 | 1,349,977 | 3,599,534 |
| Wyoming | Direct | 6 | 288,314 | 388,376 |
| | Indirect | 2 | 113,518 | 796,725 |
| | Induced | 1 | 30,436 | 101,568 |
| | Total | 9 | 432,268 | 1,286,669 |
| Total Planning Area | Direct | 330 | 19,974,293 | 28,389,321 |
| | Indirect | 216 | 16,453,910 | 78,457,951 |
| | Induced | 88 | 4,766,133 | 13,409,070 |
| | Total | 634 | 41,194,337 | 120,256,340 |

Source: National Renewable Energy Laboratory 2016

Note: There were no geothermal power plant developments projected for Montana, North Dakota, and South Dakota due to limited geothermal potential in the analysis areas under all alternatives.

**Table 14. Average Annual Economic Contributions from Geothermal, Under Alternative 5**

| State | Type of Impact | Employment | Labor Income | Economic Output |
|---|---|---|---|---|
| California and Nevada Combined | Direct | 276 | 17,088,024 | 24,364,445 |
| | Indirect | 191 | 14,858,872 | 70,756,086 |
| | Induced | 73 | 4,035,862 | 11,151,537 |
| | Total | 540 | 35,982,758 | 106,272,068 |
| Colorado | Direct | 8 | 536,971 | 761,363 |
| | Indirect | 4 | 333,762 | 1,356,788 |
| | Induced | 3 | 186,572 | 540,294 |
| | Total | 16 | 1,057,306 | 2,658,444 |
| Idaho | Direct | 22 | 1,020,547 | 1,413,689 |
| | Indirect | 10 | 561,620 | 2,833,188 |
| | Induced | 5 | 212,864 | 683,476 |
| | Total | 36 | 1,795,032 | 4,930,353 |
| Oregon | Direct | 6 | 297,479 | 402,124 |
| | Indirect | 3 | 188,906 | 846,182 |
| | Induced | 2 | 90,611 | 260,967 |
| | Total | 11 | 576,996 | 1,509,272 |
| Utah | Direct | 12 | 742,958 | 1,059,324 |
| | Indirect | 6 | 397,232 | 1,868,982 |
| | Induced | 4 | 209,788 | 671,228 |
| | Total | 22 | 1,349,977 | 3,599,534 |
| Wyoming | Direct | 6 | 288,314 | 388,376 |
| | Indirect | 2 | 113,518 | 796,725 |
| | Induced | 1 | 30,436 | 101,568 |
| | Total | 9 | 432,268 | 1,286,669 |
| Total Planning Area | Direct | 330 | 19,974,293 | 28,389,321 |
| | Indirect | 216 | 16,453,910 | 78,457,951 |
| | Induced | 88 | 4,766,133 | 13,409,070 |
| | Total | 634 | 41,194,337 | 120,256,340 |

Source: National Renewable Energy Laboratory 2016

Note: There were no geothermal power plant developments projected for Montana, North Dakota, and South Dakota due to limited geothermal potential in the analysis areas under all alternatives.

**Table 15. Average Annual Economic Contributions from Geothermal, Under Alternative 6**

| State | Type of Impact | Employment | Labor Income | Economic Output |
|---|---|---|---|---|
| California and Nevada Combined | Direct | 276 | 17,088,024 | 24,364,445 |
| | Indirect | 191 | 14,858,872 | 70,756,086 |
| | Induced | 73 | 4,035,862 | 11,151,537 |
| | Total | 540 | 35,982,758 | 106,272,068 |
| Colorado | Direct | 8 | 536,971 | 761,363 |
| | Indirect | 4 | 333,762 | 1,356,788 |
| | Induced | 3 | 186,572 | 540,294 |
| | Total | 16 | 1,057,306 | 2,658,444 |
| Idaho | Direct | 22 | 1,020,547 | 1,413,689 |
| | Indirect | 10 | 561,620 | 2,833,188 |
| | Induced | 5 | 212,864 | 683,476 |
| | Total | 36 | 1,795,032 | 4,930,353 |
| Oregon | Direct | 6 | 297,479 | 402,124 |
| | Indirect | 3 | 188,906 | 846,182 |
| | Induced | 2 | 90,611 | 260,967 |
| | Total | 11 | 576,996 | 1,509,272 |
| Utah | Direct | 12 | 742,958 | 1,059,324 |
| | Indirect | 6 | 397,232 | 1,868,982 |
| | Induced | 4 | 209,788 | 671,228 |
| | Total | 22 | 1,349,977 | 3,599,534 |
| Wyoming | Direct | 6 | 288,314 | 388,376 |
| | Indirect | 2 | 113,518 | 796,725 |
| | Induced | 1 | 30,436 | 101,568 |
| | Total | 9 | 432,268 | 1,286,669 |
| Total Planning Area | Direct | 330 | 19,974,293 | 28,389,321 |
| | Indirect | 216 | 16,453,910 | 78,457,951 |
| | Induced | 88 | 4,766,133 | 13,409,070 |
| | Total | 634 | 41,194,337 | 120,256,340 |

Source: National Renewable Energy Laboratory 2016

Note: There were no geothermal power plant developments projected for Montana, North Dakota, and South Dakota due to limited geothermal potential in the analysis areas under all alternatives.

***Livestock Grazing***

**Table 16. Average Annual Economic Contributions from Livestock Grazing in Allotments where PHMA Accounted for 15 Percent or More of the Acreage, Under Alternative I**

| State | Type of Impact | Employment | | Labor Income | | Economic Output | |
|---|---|---|---|---|---|---|---|
| | | Analysis Area | State | Analysis Area | State | Analysis Area | State |
| California | Direct | 7 | 7 | 2,146,636 | 2,146,636 | 4,625,897 | 4,625,897 |
| | Indirect | 6 | 8 | 696,936 | 898,981 | 1,815,961 | 2,545,591 |
| | Induced | 6 | 7 | 261,689 | 340,831 | 995,028 | 1,219,542 |
| | Total | 19 | 22 | 3,105,261 | 3,386,449 | 7,436,887 | 8,391,031 |
| Colorado | Direct | 50 | 50 | 1,844,864 | 1,844,864 | 5,164,123 | 5,164,123 |
| | Indirect | 19 | 22 | 694,800 | 841,506 | 2,390,963 | 3,006,278 |
| | Induced | 9 | 10 | 455,946 | 514,078 | 1,491,065 | 1,671,211 |
| | Total | 78 | 82 | 2,995,610 | 3,200,447 | 9,046,152 | 9,841,613 |
| Idaho | Direct | 77 | 77 | 13,312,954 | 13,312,954 | 28,474,475 | 28,474,475 |
| | Indirect | 71 | 75 | 5,978,587 | 6,198,240 | 16,904,455 | 17,943,103 |
| | Induced | 66 | 68 | 3,158,689 | 3,294,103 | 10,417,492 | 10,862,683 |
| | Total | 214 | 221 | 22,450,229 | 22,805,297 | 55,796,422 | 57,280,261 |
| Montana | Direct | 186 | 186 | 10,506,213 | 10,506,213 | 33,185,106 | 33,185,106 |
| | Indirect | 109 | 122 | 6,251,713 | 6,858,824 | 20,744,631 | 22,504,995 |
| | Induced | 69 | 73 | 3,419,901 | 3,613,023 | 10,966,233 | 11,575,632 |
| | Total | 364 | 381 | 20,177,827 | 20,978,060 | 64,895,970 | 67,265,732 |
| Nevada | Direct | 82 | 82 | 13,703,178 | 13,703,178 | 42,086,589 | 42,086,589 |
| | Indirect | 85 | 88 | 5,973,781 | 6,146,434 | 20,950,722 | 22,479,206 |
| | Induced | 63 | 65 | 3,616,403 | 3,717,918 | 11,765,675 | 12,091,385 |
| | Total | 230 | 236 | 23,293,363 | 23,567,530 | 74,802,986 | 76,657,180 |
| North Dakota | Direct | 1 | 1 | 39,141 | 39,141 | 143,402 | 143,402 |
| | Indirect | 0 | 0 | 16,853 | 18,114 | 61,594 | 66,765 |
| | Induced | 0 | 0 | 6,328 | 6,822 | 23,344 | 24,852 |
| | Total | 1 | 1 | 62,321 | 64,077 | 228,340 | 235,019 |
| Oregon | Direct | 78 | 78 | 6,451,505 | 6,451,505 | 25,184,996 | 25,184,996 |
| | Indirect | 73 | 79 | 4,601,991 | 5,095,613 | 15,223,657 | 16,982,271 |
| | Induced | 46 | 49 | 2,412,991 | 2,592,299 | 7,323,332 | 7,844,739 |
| | Total | 197 | 206 | 13,466,487 | 14,139,416 | 47,731,985 | 50,012,006 |

| State | Type of Impact | Employment | | Labor Income | | Economic Output | |
|---|---|---|---|---|---|---|---|
| | | Analysis Area | State | Analysis Area | State | Analysis Area | State |
| South Dakota | Direct | 5 | 5 | 185,898 | 185,898 | 1,405,882 | 1,405,882 |
| | Indirect | 4 | 4 | 157,013 | 176,985 | 794,297 | 888,717 |
| | Induced | 1 | 1 | 30,346 | 39,578 | 134,827 | 163,478 |
| | Total | 10 | 10 | 373,256 | 402,461 | 2,335,006 | 2,458,076 |
| Utah | Direct | 54 | 54 | 4,634,026 | 4,634,026 | 10,839,099 | 10,839,099 |
| | Indirect | 16 | 18 | 803,047 | 892,704 | 2,901,262 | 3,399,715 |
| | Induced | 17 | 18 | 646,897 | 692,011 | 2,527,803 | 2,676,460 |
| | Total | 87 | 90 | 6,083,969 | 6,218,740 | 16,268,163 | 16,915,273 |
| Wyoming | Direct | 301 | 301 | 14,742,131 | 14,742,131 | 52,633,690 | 52,633,690 |
| | Indirect | 172 | 176 | 7,079,345 | 7,304,934 | 26,109,990 | 27,047,064 |
| | Induced | 74 | 74 | 2,998,096 | 3,012,816 | 11,552,266 | 11,599,690 |
| | Total | 547 | 552 | 24,819,572 | 25,059,882 | 90,295,946 | 91,280,444 |
| Total Planning Area | Direct | 841 | 841 | 67,566,546 | 67,566,546 | 203,743,259 | 203,743,259 |
| | Indirect | 555 | 592 | 32,254,066 | 34,432,335 | 107,897,532 | 116,863,705 |
| | Induced | 351 | 365 | 17,007,286 | 17,823,479 | 57,197,065 | 59,729,672 |
| | Total | 1,747 | 1,801 | 116,827,895 | 119,822,359 | 368,837,857 | 380,336,635 |

Source: IMPLAN 2021 Data for model region including counties in the socioeconomic analysis area in California, Colorado, Idaho, Montana, Nevada, North Dakota, Oregon, South Dakota, Utah, and Wyoming as well as for all counties in the state using the multi-regional input-output analysis.

**Table 17. Average Annual Economic Contributions from Livestock Grazing in Allotments where PHMA Accounted for 15 Percent or More of the Acreage, Under Alternative 2**

| State | Type of Impact | Employment | | Labor Income | | Economic Output | |
|---|---|---|---|---|---|---|---|
| | | Analysis Area | State | Analysis Area | State | Analysis Area | State |
| California | Direct | 7 | 7 | 2,146,636 | 2,146,636 | 4,625,897 | 4,625,897 |
| | Indirect | 6 | 8 | 696,936 | 898,981 | 1,815,961 | 2,545,591 |
| | Induced | 6 | 7 | 261,689 | 340,831 | 995,028 | 1,219,542 |
| | Total | 19 | 22 | 3,105,261 | 3,386,449 | 7,436,887 | 8,391,031 |
| Colorado | Direct | 50 | 50 | 1,844,864 | 1,844,864 | 5,164,123 | 5,164,123 |
| | Indirect | 19 | 22 | 694,800 | 841,506 | 2,390,963 | 3,006,278 |
| | Induced | 9 | 10 | 455,946 | 514,078 | 1,491,065 | 1,671,211 |
| | Total | 78 | 82 | 2,995,610 | 3,200,447 | 9,046,152 | 9,841,613 |
| Idaho | Direct | 77 | 77 | 13,312,954 | 13,312,954 | 28,474,475 | 28,474,475 |
| | Indirect | 71 | 75 | 5,978,587 | 6,198,240 | 16,904,455 | 17,943,103 |
| | Induced | 66 | 68 | 3,158,689 | 3,294,103 | 10,417,492 | 10,862,683 |
| | Total | 214 | 221 | 22,450,229 | 22,805,297 | 55,796,422 | 57,280,261 |
| Montana | Direct | 186 | 186 | 10,506,213 | 10,506,213 | 33,185,106 | 33,185,106 |
| | Indirect | 109 | 122 | 6,251,713 | 6,858,824 | 20,744,631 | 22,504,995 |
| | Induced | 69 | 73 | 3,419,901 | 3,613,023 | 10,966,233 | 11,575,632 |
| | Total | 364 | 381 | 20,177,827 | 20,978,060 | 64,895,970 | 67,265,732 |
| Nevada | Direct | 82 | 82 | 13,703,178 | 13,703,178 | 42,086,589 | 42,086,589 |
| | Indirect | 85 | 88 | 5,973,781 | 6,146,434 | 20,950,722 | 22,479,206 |
| | Induced | 63 | 65 | 3,616,403 | 3,717,918 | 11,765,675 | 12,091,385 |
| | Total | 230 | 236 | 23,293,363 | 23,567,530 | 74,802,986 | 76,657,180 |
| North Dakota | Direct | 1 | 1 | 39,141 | 39,141 | 143,402 | 143,402 |
| | Indirect | 0 | 0 | 16,853 | 18,114 | 61,594 | 66,765 |
| | Induced | 0 | 0 | 6,328 | 6,822 | 23,344 | 24,852 |
| | Total | 1 | 1 | 62,321 | 64,077 | 228,340 | 235,019 |
| Oregon | Direct | 78 | 78 | 6,451,505 | 6,451,505 | 25,184,996 | 25,184,996 |
| | Indirect | 73 | 79 | 4,601,991 | 5,095,613 | 15,223,657 | 16,982,271 |
| | Induced | 46 | 49 | 2,412,991 | 2,592,299 | 7,323,332 | 7,844,739 |
| | Total | 197 | 206 | 13,466,487 | 14,139,416 | 47,731,985 | 50,012,006 |
| South Dakota | Direct | 5 | 5 | 185,898 | 185,898 | 1,405,882 | 1,405,882 |
| | Indirect | 4 | 4 | 157,013 | 176,985 | 794,297 | 888,717 |
| | Induced | 1 | 1 | 30,346 | 39,578 | 134,827 | 163,478 |
| | Total | 10 | 10 | 373,256 | 402,461 | 2,335,006 | 2,458,076 |

| State | Type of Impact | Employment | | Labor Income | | Economic Output | |
|---|---|---|---|---|---|---|---|
| | | Analysis Area | State | Analysis Area | State | Analysis Area | State |
| Utah | Direct | 54 | 54 | 4,634,026 | 4,634,026 | 10,839,099 | 10,839,099 |
| | Indirect | 16 | 18 | 803,047 | 892,704 | 2,901,262 | 3,399,715 |
| | Induced | 17 | 18 | 646,897 | 692,011 | 2,527,803 | 2,676,460 |
| | Total | 87 | 90 | 6,083,969 | 6,218,740 | 16,268,163 | 16,915,273 |
| Wyoming | Direct | 301 | 301 | 14,742,131 | 14,742,131 | 52,633,690 | 52,633,690 |
| | Indirect | 172 | 176 | 7,079,345 | 7,304,934 | 26,109,990 | 27,047,064 |
| | Induced | 74 | 74 | 2,998,096 | 3,012,816 | 11,552,266 | 11,599,690 |
| | Total | 547 | 552 | 24,819,572 | 25,059,882 | 90,295,946 | 91,280,444 |
| Total Planning Area | Direct | 841 | 841 | 67,566,546 | 67,566,546 | 203,743,259 | 203,743,259 |
| | Indirect | 555 | 592 | 32,254,066 | 34,432,335 | 107,897,532 | 116,863,705 |
| | Induced | 351 | 365 | 17,007,286 | 17,823,479 | 57,197,065 | 59,729,672 |
| | Total | 1,747 | 1,801 | 116,827,895 | 119,822,359 | 368,837,857 | 380,336,635 |

Source: IMPLAN 2021 Data for model region including counties in the socioeconomic analysis area in California, Colorado, Idaho, Montana, Nevada, North Dakota, Oregon, South Dakota, Utah, and Wyoming as well as for all counties in the state using the multi-regional input-output analysis.

**Table 18. Average Annual Economic Contributions from Livestock Grazing in Allotments where PHMA Accounted for 15 Percent or More of the Acreage, Under Alternative 3**

| State | Type of Impact | Employment | | Labor Income | | Economic Output | |
|---|---|---|---|---|---|---|---|
| | | Analysis Area | State | Analysis Area | State | Analysis Area | State |
| California | Direct | 0 | 0 | 0 | 0 | 0 | 0 |
| | Indirect | 0 | 0 | 0 | 0 | 0 | 0 |
| | Induced | 0 | 0 | 0 | 0 | 0 | 0 |
| | Total | 0 | 0 | 0 | 0 | 0 | 0 |
| Colorado | Direct | 0 | 0 | 0 | 0 | 0 | 0 |
| | Indirect | 0 | 0 | 0 | 0 | 0 | 0 |
| | Induced | 0 | 0 | 0 | 0 | 0 | 0 |
| | Total | 0 | 0 | 0 | 0 | 0 | 0 |
| Idaho | Direct | 0 | 0 | 0 | 0 | 0 | 0 |
| | Indirect | 0 | 0 | 0 | 0 | 0 | 0 |
| | Induced | 0 | 0 | 0 | 0 | 0 | 0 |
| | Total | 0 | 0 | 0 | 0 | 0 | 0 |
| Montana | Direct | 0 | 0 | 0 | 0 | 0 | 0 |
| | Indirect | 0 | 0 | 0 | 0 | 0 | 0 |
| | Induced | 0 | 0 | 0 | 0 | 0 | 0 |
| | Total | 0 | 0 | 0 | 0 | 0 | 0 |
| Nevada | Direct | 0 | 0 | 0 | 0 | 0 | 0 |
| | Indirect | 0 | 0 | 0 | 0 | 0 | 0 |
| | Induced | 0 | 0 | 0 | 0 | 0 | 0 |
| | Total | 0 | 0 | 0 | 0 | 0 | 0 |
| North Dakota | Direct | 0 | 0 | 0 | 0 | 0 | 0 |
| | Indirect | 0 | 0 | 0 | 0 | 0 | 0 |
| | Induced | 0 | 0 | 0 | 0 | 0 | 0 |
| | Total | 0 | 0 | 0 | 0 | 0 | 0 |
| Oregon | Direct | 0 | 0 | 0 | 0 | 0 | 0 |
| | Indirect | 0 | 0 | 0 | 0 | 0 | 0 |
| | Induced | 0 | 0 | 0 | 0 | 0 | 0 |
| | Total | 0 | 0 | 0 | 0 | 0 | 0 |
| South Dakota | Direct | 0 | 0 | 0 | 0 | 0 | 0 |
| | Indirect | 0 | 0 | 0 | 0 | 0 | 0 |
| | Induced | 0 | 0 | 0 | 0 | 0 | 0 |
| | Total | 0 | 0 | 0 | 0 | 0 | 0 |

| State | Type of Impact | Employment | | Labor Income | | Economic Output | |
|---|---|---|---|---|---|---|---|
| | | Analysis Area | State | Analysis Area | State | Analysis Area | State |
| Utah | Direct | 0 | 0 | 0 | 0 | 0 | 0 |
| | Indirect | 0 | 0 | 0 | 0 | 0 | 0 |
| | Induced | 0 | 0 | 0 | 0 | 0 | 0 |
| | Total | 0 | 0 | 0 | 0 | 0 | 0 |
| Wyoming | Direct | 0 | 0 | 0 | 0 | 0 | 0 |
| | Indirect | 0 | 0 | 0 | 0 | 0 | 0 |
| | Induced | 0 | 0 | 0 | 0 | 0 | 0 |
| | Total | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Planning Area | Direct | 0 | 0 | 0 | 0 | 0 | 0 |
| | Indirect | 0 | 0 | 0 | 0 | 0 | 0 |
| | Induced | 0 | 0 | 0 | 0 | 0 | 0 |
| | Total | 0 | 0 | 0 | 0 | 0 | 0 |

Source: IMPLAN 2021 Data for model region including counties in the socioeconomic analysis area in California, Colorado, Idaho, Montana, Nevada, North Dakota, Oregon, South Dakota, Utah, and Wyoming as well as for all counties in the state using the multi-regional input-output analysis.

**Table 19. Average Annual Economic Contributions from Livestock Grazing in Allotments where PHMA Accounted for 15 Percent or More of the Acreage, Under Alternative 4**

| State | Type of Impact | Employment | | Labor Income | | Economic Output | |
|---|---|---|---|---|---|---|---|
| | | Analysis Area | State | Analysis Area | State | Analysis Area | State |
| California | Direct | 7 | 7 | 2,146,636 | 2,146,636 | 4,625,897 | 4,625,897 |
| | Indirect | 6 | 8 | 696,936 | 898,981 | 1,815,961 | 2,545,591 |
| | Induced | 6 | 7 | 261,689 | 340,831 | 995,028 | 1,219,542 |
| | Total | 19 | 22 | 3,105,261 | 3,386,449 | 7,436,887 | 8,391,031 |
| Colorado | Direct | 50 | 50 | 1,844,864 | 1,844,864 | 5,164,123 | 5,164,123 |
| | Indirect | 19 | 22 | 694,800 | 841,506 | 2,390,963 | 3,006,278 |
| | Induced | 9 | 10 | 455,946 | 514,078 | 1,491,065 | 1,671,211 |
| | Total | 78 | 82 | 2,995,610 | 3,200,447 | 9,046,152 | 9,841,613 |
| Idaho | Direct | 77 | 77 | 13,312,954 | 13,312,954 | 28,474,475 | 28,474,475 |
| | Indirect | 71 | 75 | 5,978,587 | 6,198,240 | 16,904,455 | 17,943,103 |
| | Induced | 66 | 68 | 3,158,689 | 3,294,103 | 10,417,492 | 10,862,683 |
| | Total | 214 | 221 | 22,450,229 | 22,805,297 | 55,796,422 | 57,280,261 |
| Montana | Direct | 186 | 186 | 10,506,213 | 10,506,213 | 33,185,106 | 33,185,106 |
| | Indirect | 109 | 122 | 6,251,713 | 6,858,824 | 20,744,631 | 22,504,995 |
| | Induced | 69 | 73 | 3,419,901 | 3,613,023 | 10,966,233 | 11,575,632 |
| | Total | 364 | 381 | 20,177,827 | 20,978,060 | 64,895,970 | 67,265,732 |
| Nevada | Direct | 82 | 82 | 13,703,178 | 13,703,178 | 42,086,589 | 42,086,589 |
| | Indirect | 85 | 88 | 5,973,781 | 6,146,434 | 20,950,722 | 22,479,206 |
| | Induced | 63 | 65 | 3,616,403 | 3,717,918 | 11,765,675 | 12,091,385 |
| | Total | 230 | 236 | 23,293,363 | 23,567,530 | 74,802,986 | 76,657,180 |
| North Dakota | Direct | 1 | 1 | 39,141 | 39,141 | 143,402 | 143,402 |
| | Indirect | 0 | 0 | 16,853 | 18,114 | 61,594 | 66,765 |
| | Induced | 0 | 0 | 6,328 | 6,822 | 23,344 | 24,852 |
| | Total | 1 | 1 | 62,321 | 64,077 | 228,340 | 235,019 |
| Oregon | Direct | 78 | 78 | 6,451,505 | 6,451,505 | 25,184,996 | 25,184,996 |
| | Indirect | 73 | 79 | 4,601,991 | 5,095,613 | 15,223,657 | 16,982,271 |
| | Induced | 46 | 49 | 2,412,991 | 2,592,299 | 7,323,332 | 7,844,739 |
| | Total | 197 | 206 | 13,466,487 | 14,139,416 | 47,731,985 | 50,012,006 |
| South Dakota | Direct | 5 | 5 | 185,898 | 185,898 | 1,405,882 | 1,405,882 |
| | Indirect | 4 | 4 | 157,013 | 176,985 | 794,297 | 888,717 |
| | Induced | 1 | 1 | 30,346 | 39,578 | 134,827 | 163,478 |
| | Total | 10 | 10 | 373,256 | 402,461 | 2,335,006 | 2,458,076 |

| State | Type of Impact | Employment | | Labor Income | | Economic Output | |
|---|---|---|---|---|---|---|---|
| | | Analysis Area | State | Analysis Area | State | Analysis Area | State |
| Utah | Direct | 54 | 54 | 4,634,026 | 4,634,026 | 10,839,099 | 10,839,099 |
| | Indirect | 16 | 18 | 803,047 | 892,704 | 2,901,262 | 3,399,715 |
| | Induced | 17 | 18 | 646,897 | 692,011 | 2,527,803 | 2,676,460 |
| | Total | 87 | 90 | 6,083,969 | 6,218,740 | 16,268,163 | 16,915,273 |
| Wyoming | Direct | 301 | 301 | 14,742,131 | 14,742,131 | 52,633,690 | 52,633,690 |
| | Indirect | 172 | 176 | 7,079,345 | 7,304,934 | 26,109,990 | 27,047,064 |
| | Induced | 74 | 74 | 2,998,096 | 3,012,816 | 11,552,266 | 11,599,690 |
| | Total | 547 | 552 | 24,819,572 | 25,059,882 | 90,295,946 | 91,280,444 |
| Total Planning Area | Direct | 841 | 841 | 67,566,546 | 67,566,546 | 203,743,259 | 203,743,259 |
| | Indirect | 555 | 592 | 32,254,066 | 34,432,335 | 107,897,532 | 116,863,705 |
| | Induced | 351 | 365 | 17,007,286 | 17,823,479 | 57,197,065 | 59,729,672 |
| | Total | 1,747 | 1,801 | 116,827,895 | 119,822,359 | 368,837,857 | 380,336,635 |

Source: IMPLAN 2021 Data for model region including counties in the socioeconomic analysis area in California, Colorado, Idaho, Montana, Nevada, North Dakota, Oregon, South Dakota, Utah, and Wyoming as well as for all counties in the state using the multi-regional input-output analysis.

**Table 20. Average Annual Economic Contributions from Livestock Grazing in Allotments where PHMA Accounted for 15 Percent or More of the Acreage, Under Alternative 5**

| State | Type of Impact | Employment | | Labor Income | | Economic Output | |
|---|---|---|---|---|---|---|---|
| | | Analysis Area | State | Analysis Area | State | Analysis Area | State |
| California | Direct | 7 | 7 | 2,146,636 | 2,146,636 | 4,625,897 | 4,625,897 |
| | Indirect | 6 | 8 | 696,936 | 898,981 | 1,815,961 | 2,545,591 |
| | Induced | 6 | 7 | 261,689 | 340,831 | 995,028 | 1,219,542 |
| | Total | 19 | 22 | 3,105,261 | 3,386,449 | 7,436,887 | 8,391,031 |
| Colorado | Direct | 50 | 50 | 1,844,864 | 1,844,864 | 5,164,123 | 5,164,123 |
| | Indirect | 19 | 22 | 694,800 | 841,506 | 2,390,963 | 3,006,278 |
| | Induced | 9 | 10 | 455,946 | 514,078 | 1,491,065 | 1,671,211 |
| | Total | 78 | 82 | 2,995,610 | 3,200,447 | 9,046,152 | 9,841,613 |
| Idaho | Direct | 77 | 77 | 13,312,954 | 13,312,954 | 28,474,475 | 28,474,475 |
| | Indirect | 71 | 75 | 5,978,587 | 6,198,240 | 16,904,455 | 17,943,103 |
| | Induced | 66 | 68 | 3,158,689 | 3,294,103 | 10,417,492 | 10,862,683 |
| | Total | 214 | 221 | 22,450,229 | 22,805,297 | 55,796,422 | 57,280,261 |
| Montana | Direct | 186 | 186 | 10,506,213 | 10,506,213 | 33,185,106 | 33,185,106 |
| | Indirect | 109 | 122 | 6,251,713 | 6,858,824 | 20,744,631 | 22,504,995 |
| | Induced | 69 | 73 | 3,419,901 | 3,613,023 | 10,966,233 | 11,575,632 |
| | Total | 364 | 381 | 20,177,827 | 20,978,060 | 64,895,970 | 67,265,732 |
| Nevada | Direct | 82 | 82 | 13,703,178 | 13,703,178 | 42,086,589 | 42,086,589 |
| | Indirect | 85 | 88 | 5,973,781 | 6,146,434 | 20,950,722 | 22,479,206 |
| | Induced | 63 | 65 | 3,616,403 | 3,717,918 | 11,765,675 | 12,091,385 |
| | Total | 230 | 236 | 23,293,363 | 23,567,530 | 74,802,986 | 76,657,180 |
| North Dakota | Direct | 1 | 1 | 39,141 | 39,141 | 143,402 | 143,402 |
| | Indirect | 0 | 0 | 16,853 | 18,114 | 61,594 | 66,765 |
| | Induced | 0 | 0 | 6,328 | 6,822 | 23,344 | 24,852 |
| | Total | 1 | 1 | 62,321 | 64,077 | 228,340 | 235,019 |
| Oregon | Direct | 78 | 78 | 6,451,505 | 6,451,505 | 25,184,996 | 25,184,996 |
| | Indirect | 73 | 79 | 4,601,991 | 5,095,613 | 15,223,657 | 16,982,271 |
| | Induced | 46 | 49 | 2,412,991 | 2,592,299 | 7,323,332 | 7,844,739 |
| | Total | 197 | 206 | 13,466,487 | 14,139,416 | 47,731,985 | 50,012,006 |
| South Dakota | Direct | 5 | 5 | 185,898 | 185,898 | 1,405,882 | 1,405,882 |
| | Indirect | 4 | 4 | 157,013 | 176,985 | 794,297 | 888,717 |
| | Induced | 1 | 1 | 30,346 | 39,578 | 134,827 | 163,478 |
| | Total | 10 | 10 | 373,256 | 402,461 | 2,335,006 | 2,458,076 |

| State | Type of Impact | Employment | | Labor Income | | Economic Output | |
|---|---|---|---|---|---|---|---|
| | | Analysis Area | State | Analysis Area | State | Analysis Area | State |
| Utah | Direct | 54 | 54 | 4,634,026 | 4,634,026 | 10,839,099 | 10,839,099 |
| | Indirect | 16 | 18 | 803,047 | 892,704 | 2,901,262 | 3,399,715 |
| | Induced | 17 | 18 | 646,897 | 692,011 | 2,527,803 | 2,676,460 |
| | Total | 87 | 90 | 6,083,969 | 6,218,740 | 16,268,163 | 16,915,273 |
| Wyoming | Direct | 301 | 301 | 14,742,131 | 14,742,131 | 52,633,690 | 52,633,690 |
| | Indirect | 172 | 176 | 7,079,345 | 7,304,934 | 26,109,990 | 27,047,064 |
| | Induced | 74 | 74 | 2,998,096 | 3,012,816 | 11,552,266 | 11,599,690 |
| | Total | 547 | 552 | 24,819,572 | 25,059,882 | 90,295,946 | 91,280,444 |
| Total Planning Area | Direct | 841 | 841 | 67,566,546 | 67,566,546 | 203,743,259 | 203,743,259 |
| | Indirect | 555 | 592 | 32,254,066 | 34,432,335 | 107,897,532 | 116,863,705 |
| | Induced | 351 | 365 | 17,007,286 | 17,823,479 | 57,197,065 | 59,729,672 |
| | Total | 1,747 | 1,801 | 116,827,895 | 119,822,359 | 368,837,857 | 380,336,635 |

Source: IMPLAN 2021 Data for model region including counties in the socioeconomic analysis area in California, Colorado, Idaho, Montana, Nevada, North Dakota, Oregon, South Dakota, Utah, and Wyoming as well as for all counties in the state using the multi-regional input-output analysis.

**Table 21. Average Annual Economic Contributions from Livestock Grazing in Allotments where PHMA Accounted for 15 Percent or More of the Acreage, Under Alternative 6**

| State | Type of Impact | Employment | | Labor Income | | Economic Output | |
|---|---|---|---|---|---|---|---|
| | | Analysis Area | State | Analysis Area | State | Analysis Area | State |
| California | Direct | 7 | 7 | 2,146,636 | 2,146,636 | 4,625,897 | 4,625,897 |
| | Indirect | 6 | 8 | 696,936 | 898,981 | 1,815,961 | 2,545,591 |
| | Induced | 6 | 7 | 261,689 | 340,831 | 995,028 | 1,219,542 |
| | Total | 19 | 22 | 3,105,261 | 3,386,449 | 7,436,887 | 8,391,031 |
| Colorado | Direct | 50 | 50 | 1,844,864 | 1,844,864 | 5,164,123 | 5,164,123 |
| | Indirect | 19 | 22 | 694,800 | 841,506 | 2,390,963 | 3,006,278 |
| | Induced | 9 | 10 | 455,946 | 514,078 | 1,491,065 | 1,671,211 |
| | Total | 78 | 82 | 2,995,610 | 3,200,447 | 9,046,152 | 9,841,613 |
| Idaho | Direct | 77 | 77 | 13,312,954 | 13,312,954 | 28,474,475 | 28,474,475 |
| | Indirect | 71 | 75 | 5,978,587 | 6,198,240 | 16,904,455 | 17,943,103 |
| | Induced | 66 | 68 | 3,158,689 | 3,294,103 | 10,417,492 | 10,862,683 |
| | Total | 214 | 221 | 22,450,229 | 22,805,297 | 55,796,422 | 57,280,261 |
| Montana | Direct | 186 | 186 | 10,506,213 | 10,506,213 | 33,185,106 | 33,185,106 |
| | Indirect | 109 | 122 | 6,251,713 | 6,858,824 | 20,744,631 | 22,504,995 |
| | Induced | 69 | 73 | 3,419,901 | 3,613,023 | 10,966,233 | 11,575,632 |
| | Total | 364 | 381 | 20,177,827 | 20,978,060 | 64,895,970 | 67,265,732 |
| Nevada | Direct | 82 | 82 | 13,703,178 | 13,703,178 | 42,086,589 | 42,086,589 |
| | Indirect | 85 | 88 | 5,973,781 | 6,146,434 | 20,950,722 | 22,479,206 |
| | Induced | 63 | 65 | 3,616,403 | 3,717,918 | 11,765,675 | 12,091,385 |
| | Total | 230 | 236 | 23,293,363 | 23,567,530 | 74,802,986 | 76,657,180 |
| North Dakota | Direct | 1 | 1 | 39,141 | 39,141 | 143,402 | 143,402 |
| | Indirect | 0 | 0 | 16,853 | 18,114 | 61,594 | 66,765 |
| | Induced | 0 | 0 | 6,328 | 6,822 | 23,344 | 24,852 |
| | Total | 1 | 1 | 62,321 | 64,077 | 228,340 | 235,019 |
| Oregon | Direct | 78 | 78 | 6,451,505 | 6,451,505 | 25,184,996 | 25,184,996 |
| | Indirect | 73 | 79 | 4,601,991 | 5,095,613 | 15,223,657 | 16,982,271 |
| | Induced | 46 | 49 | 2,412,991 | 2,592,299 | 7,323,332 | 7,844,739 |
| | Total | 197 | 206 | 13,466,487 | 14,139,416 | 47,731,985 | 50,012,006 |
| South Dakota | Direct | 5 | 5 | 185,898 | 185,898 | 1,405,882 | 1,405,882 |
| | Indirect | 4 | 4 | 157,013 | 176,985 | 794,297 | 888,717 |
| | Induced | 1 | 1 | 30,346 | 39,578 | 134,827 | 163,478 |
| | Total | 10 | 10 | 373,256 | 402,461 | 2,335,006 | 2,458,076 |

| State | Type of Impact | Employment | | Labor Income | | Economic Output | |
|---|---|---|---|---|---|---|---|
| | | Analysis Area | State | Analysis Area | State | Analysis Area | State |
| Utah | Direct | 54 | 54 | 4,634,026 | 4,634,026 | 10,839,099 | 10,839,099 |
| | Indirect | 16 | 18 | 803,047 | 892,704 | 2,901,262 | 3,399,715 |
| | Induced | 17 | 18 | 646,897 | 692,011 | 2,527,803 | 2,676,460 |
| | Total | 87 | 90 | 6,083,969 | 6,218,740 | 16,268,163 | 16,915,273 |
| Wyoming | Direct | 301 | 301 | 14,742,131 | 14,742,131 | 52,633,690 | 52,633,690 |
| | Indirect | 172 | 176 | 7,079,345 | 7,304,934 | 26,109,990 | 27,047,064 |
| | Induced | 74 | 74 | 2,998,096 | 3,012,816 | 11,552,266 | 11,599,690 |
| | Total | 547 | 552 | 24,819,572 | 25,059,882 | 90,295,946 | 91,280,444 |
| Total Planning Area | Direct | 841 | 841 | 67,566,546 | 67,566,546 | 203,743,259 | 203,743,259 |
| | Indirect | 555 | 592 | 32,254,066 | 34,432,335 | 107,897,532 | 116,863,705 |
| | Induced | 351 | 365 | 17,007,286 | 17,823,479 | 57,197,065 | 59,729,672 |
| | Total | 1,747 | 1,801 | 116,827,895 | 119,822,359 | 368,837,857 | 380,336,635 |

Source: IMPLAN 2021 Data for model region including counties in the socioeconomic analysis area in California, Colorado, Idaho, Montana, Nevada, North Dakota, Oregon, South Dakota, Utah, and Wyoming as well as for all counties in the state using the multi-regional input-output analysis.

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# Appendix 19

## Idaho Buffers Appendix Alternative Language

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# Appendix 19. Idaho Buffers Appendix Alternative Language

## 19.1 Introduction

Under Idaho's state-specific circumstances, there are proposed changes to Appendix B: Buffers. Proposed changes include changes to which leks buffers would be applied to for BLM management and project NEPA analysis, and several modifications to lek buffer distances based on the updated plan for GRSG by the State of Idaho, i.e. the 2021 Idaho Sage-grouse Plan (State of Idaho 2021).

### 19.1.1 Lek Definitions

In the "2015 Idaho ARMPA" (Southwestern Idaho and Montana Approved Resource Management Plan Amendment [BLM and Forest Service 2015a]; Alternative 1), lek definitions were based on Idaho Department of Fish and Game's (IDFG) lek management status and described in the 2015 Idaho ARMPA (also see **Appendix 4**). No changes were made in the 2019 Idaho ARMPA (BLM Idaho 2019; Alternative 2). A lek with a five-year management status of *occupied* was a lek that had been active at least one breeding season within the prior five years. An *active* lek was an annual status and meant that the lek had been attended by more than one male GRSG during the most recent breeding season. A lek with a five-year management status of *unoccupied* was a lek that had not been active for five consecutive years.

### 19.1.2 Lek Buffer Distances

In the 2015 ARMPA ROD (Alternative 1), BLM based lek buffer distances on the USGS Report, *Conservation Buffer Distance Estimates for Greater Sage-Grouse – A Review* (Manier et al. 2014) which provided a summary of scientific literature on the influence of anthropogenic disturbance and infrastructure on GRSG. The BLM decision was to apply lek buffer distances specified as the 'lower end of the interpreted range' in the report which was based on multiple research studies.

The 2019 proposal for the Idaho management alignment alternative included reduced lek buffers. BLM Idaho's 2019 ROD (BLM Idaho 2019; Alternative 2) did not reduce lek buffers in PHMA but did reduce lek buffers in IHMA and GHMA to better align buffer distances with the Governor's three-tiered habitat approach. Lek buffer distances were most restrictive in PHMA (same as 2015 Idaho ARMPA), and slightly reduced in IHMA and further reduced in GHMA. Instead of the 'lower end of the interpreted range' (basis for the 2015 ARMPA buffer distances), buffer distances were based on the 'literature minimum' in the USGS report, i.e., the lowest effect distance reported from multiple research studies. Buffer exception criteria were possible in IHMA and GHMA. This approach encouraged development outside of the best habitat and into lesser quality or non-habitat. The proposal was also consistent with acknowledgement in the USGS report that no single buffer distance would be appropriate for all populations and habitats across the range of sage-grouse (Manier et al. 2014).

## 19.2 Proposed Action for Alternatives 3, 4, 5, and 6

### 19.2.1 Lek Definitions

For range wide consistency and analysis of lek data, BLM will adopt the updated WAFWA lek definitions (Cook et al. 2022; Appendix 4). These differ from the lek definitions in the 2015 Idaho ARMPA (Alternative 1). In Idaho, BLM would apply buffers to *active* and *pending active* leks under Alternatives 3, 4, 5, and 6. An *active* lek is a lek that has more than two or more males counted during two or more lek counts within the

last 10 years. A *pending active* lek is a lek with one observation of at least two males in the last 10 years and at least one observation of at least two males more than 10 years ago. BLM will rely on the lek status determinations of the Idaho Department of Fish and Game based on their most recent lek data. The change in lek definitions and change from a five-year to a ten-year lek management status better captures fluctuations in GRSG population dynamics, which generally follow 9- to 10-year population cycles (Fedy and Aldridge 2011, Fedy and Doherty 2011). Under Alternatives 3, 4, and 6, any *active* and *pending active* leks would be evaluated whereas under Alternative 5, lek buffers would only apply to *active* and *pending active* leks within HMA.

### 19.2.2 Lek Buffer Distances

Under Alternatives 3 and 4, lek buffer distances in IHMA and GHMA would be the same as in PHMA, as in the 2015 Idaho ARMPA or Alternative 1 (**Table ID-1**). Lek buffer distances in the 2015 Idaho ARMPA were based on the 'lower end of the interpreted range' of potential effect area and potential distribution of habitat as outlined in Manier et al. (2014).

Under Alternatives 5 and 6, lek buffer distances in IHMA and GHMA are largely based on the 'literature minimum' (Manier et al. 2014), or the minimum distance where effects were documented in the scientific literature, similar to the lek buffer distances in the 2019 Idaho ARMPA (Alternative 2). Alternatives 5 and 6 also includes changes to lek buffer distances in the 2021 Idaho Sage-grouse Plan (Executive Order 2022-03; State of Idaho 2022).

The following modifications were made to the lek buffer distances under Alternatives 5 and 6:

- A decrease for minor linear features (e.g. minor roads) in PHMA from 3.1 to 1.2 miles
- An increase for major linear features in IHMA from 0.8 to 2.0 miles
- An increase for transmission line towers in IHMA from 1.2 to 1.7 miles
- A decrease for communication and meteorological towers in IHMA from 2.0 to 1.7 miles
- A decrease for other types of surface disturbance in GHMA from 2.0 to 0.6 miles

Buffer distances would remain the same in PHMA under all Alternatives, with the one exception for minor linear features noted above. Approximately 75% of all active and pending active leks are in PHMA; thus, buffer distances in PHMA would provide protection for GRSG habitat in PHMA. In areas with tripped triggers, i.e. neighborhood lek clusters for population triggers and fine-scale HAF for habitat triggers, IHMA would be treated as PHMA and PHMA buffers would be applied in NEPA analyses and any associated management decisions.

## Table ID-1. Lek Buffer Distances by Disturbance Type, Habitat Management Area (HMA), and Alternative

| Disturbance Type | HMA | Lek Buffer Distance (miles) | | | |
|---|---|---|---|---|---|
| | | Alts 1[1] | Alt 2 [2] | Alts 3 and 4[1] | Alts 5 and 6 [3] |
| Linear features (e.g. roads) [4]<br>- Major / Minor | PHMA | 3.1 | 3.1 | 3.1 | Major – 3.1<br>Minor – 1.2 |
| | IHMA | 3.1 | 0.8 | 3.1 | Major – 2.0<br>Minor – 0.8 |
| | GHMA | 3.1 | 0.25 | 3.1 | Major – 0.25<br>Minor – 0.25 |
| Infrastructure related to energy development | PHMA | 3.1 | 3.1 | 3.1 | 3.1 |
| | IHMA | 3.1 | 2.0 | 3.1 | 2.0 |
| | GHMA | 3.1 | 0.6 | 3.1 | 0.6 |
| Tall structures [5]<br>- Com. or met. towers<br>- Transmission line towers<br>- Distribution poles | PHMA | 2.0 | 2.0 | 2.0 | 2.0 |
| | IHMA | 2.0<br>--<br>--<br>-- | --<br>2.0<br>1.2<br>0.6 | 2.0<br>--<br>--<br>-- | --<br>1.7<br>1.7<br>0.6 |
| | GHMA | 2.0 | 0.6 | 2.0 | 0.6 |
| Low structures (e.g. fences, rangeland structures) | PHMA | 1.2 | 1.2 | 1.2 | 1.2 |
| | IHMA | 1.2 | 0.6 | 1.2 | 0.6 |
| | GHMA | 1.2 | 0.12 | 1.2 | 0.12 |
| Surface disturbance (continuing human activities that alter or remove the natural vegetation) | PHMA | 3.1 | 3.1 | 3.1 | 3.1 |
| | IHMA | 3.1 | 2.0 | 3.1 | 2.0 |
| | GHMA | 3.1 | 2.0 | 3.1 | 0.6 |
| Noise and related disruptive activities including those do not result in habitat loss | PHMA | ≥ 0.25 | n/a | ≥ 0.25 | n/a |
| | IHMA | ≥ 0.25 | n/a | ≥ 0.25 | n/a |
| | GHMA | ≥ 0.25 | n/a | ≥ 0.25 | n/a |

[1] Based on the 'lower end of the interpreted range' from the USGS report (Manier et al. 2014) for disturbances in all HMA

[2] For disturbances in PHMA, and IHMA/GHMA, based on the 'lower end of the interpreted range', and the 'literature minimum', respectively (Manier et al. 2014)

[3] Distances from the 2021 Idaho Sage-grouse Plan. In accordance with the 2021 Idaho Sage-grouse Plan, linear features are split into major and minor linear features, and tall structures are split out for disturbances in IHMA.

[4] Roads are linear routes declared as a road by the owner, managed for use by low-clearance vehicles having four or more wheels, and maintained for regular and continuous use. Roads do not include trails, primitive roads, temporary routes, or administrative routes with maintenance intensity of 0 or 1 (2015 ARMPA ROD).

[5] Communication or meteorological towers

## 19.3 *ALTERNATIVES 3 AND 4* APPENDIX B: BUFFERS

### 19.3.1 Applying Lek Buffer-Distances When Approving Actions

***Buffer Distances and Evaluation of Impact on Leks***

Evaluate impacts to active and pending active leks (Cook, et al. 2022; Appendix 4) from actions requiring NEPA analysis. In addition to any other relevant information determined to be appropriate (e.g. State wildlife agency plans), the BLM will assess and address impacts from the following activities using the lek buffer-distances as identified in the USGS Report, *Conservation Buffer Distance Estimates for Greater Sage-Grouse - A Review* (Manier et al. 2014). The BLM will apply the lek buffer-distances specified as the lower end of the interpreted range in the report unless justifiable departures are determined to be appropriate (see below). The lower end of the interpreted range of the lek buffer-distances is as follows:

- Linear features (roads)[6] within 3.1 miles of leks
- Infrastructure related to energy development within 3.1 miles of leks.
- Tall structures (e.g., communication or transmission towers, transmission lines) within 2 miles of leks.
- Low structures (e.g., fences, rangeland structures) within1.2 miles of leks.
- Surface disturbance (continuing human activities that alter or remove the natural vegetation) within 3.1 miles of leks.
- Noise and related disruptive activities including those that do not result in habitat loss (e.g., motorized recreational events) at least 0.25 miles from leks.

Justifiable departures to decrease or increase from these distances, based on local data, best available science, landscape features, and other existing protections (e.g., land use allocations, state regulations) may be appropriate for determining activity impacts. The USGS report recognized "that because of variation in populations, habitats, development patterns, social context, and other factors, for a particular disturbance type, there is no single distance that is an appropriate buffer for all populations and habitats across the sage-grouse range". The USGS report also states that "various protection measures have been developed and implemented… [which have] the ability (alone or in concert with others) to protect important habitats, sustain populations, and support multiple-use demands for public lands". All variations in lek buffer-distances will require appropriate analysis and disclosure as part of activity authorization.

In determining lek locations, the BLM will use the most recent lek determination available from the state wildlife agency.

***For Actions in GHMA***

- The BLM will apply the lek buffer-distances identified above as required conservation measures to fully address the impacts to leks as identified in the NEPA analysis. Impacts should first be avoided by locating the action outside of the applicable lek buffer – distance(s) identified above.
- The BLM may approve actions in GHMA that are within the applicable lek buffer distance identified above only if:
  - Impacts should first be avoided by locating the action outside of the applicable lek buffer-distance(s) identified above.

[6] Roads are linear routes declared as a road by the owner, managed for use by low-clearance vehicles having four or more wheels, and maintained for regular and continuous use. Roads do not include trails, primitive roads, temporary routes, or administrative routes with maintenance intensity of 0 or 1 (2015 ARMPA ROD).

- If it is not possible to relocate the project outside of the applicable lek buffer-distance(s) identified above, the BLM may approve the project only if:
  - Based on best available science, landscape features, and other existing protections, (e.g., land use allocations, state regulations), the BLM determines that a lek buffer-distance other than the applicable distance identified above offers the same or a greater level of protection to GRSG and its habitat, including conservation of seasonal habitat outside of the analyzed buffer area; **or**
  - The BLM determines that impacts to GRSG and its habitat are minimized such that the project will cause minor or no new disturbance (ex. co-location with existing authorizations); **and**
  - Any residual impacts within the lek buffer-distances are addressed through compensatory mitigation measures sufficient to ensure a net conservation gain, as outlined in the Mitigation Strategy (Appendix J).

***For Actions in PHMA and IHMA***

- The BLM will apply the lek buffer-distances identified above as required conservation measures to fully address the impacts to leks as identified in the NEPA analysis. Impacts should be avoided by locating the action outside of the applicable lek buffer-distance(s) identified above.
- The BLM may approve actions in PHMA and IMHA that are within the applicable lek buffer distance identified above only if with input from state fish and wildlife agency, it determines, based on best available science, landscape features, and other existing protections, that a buffer distance other than identified above offers the same or greater level of protection for GRSG and its habitat, including conservation of seasonal habitat outside of the analyzed buffer area.
- Range improvements which do not impact GRSG, or, range improvements which provide a conservation benefit to GRSG such as fences for protecting important seasonal habitats, meet the lek buffer requirement.

The BLM will explain its justification for determining the approved buffer distances meet these conditions in its project decision.

## 19.4 *ALTERNATIVES 5 AND 6* APPENDIX B: BUFFERS

### 19.4.1 Applying Lek Buffer-Distances When Approving Actions

***Buffer Distances and Evaluation of Impact on Leks***

Evaluate impacts on active and pending active leks (Cook et al. 2022; Appendix 4) within HMA from actions requiring NEPA analysis. In addition to any other relevant information determined to be appropriate (e.g., state wildlife agency plans), the BLM will apply the lek buffer-distances described below, unless justifiable departures are determined to be appropriate or buffer exception criteria for GHMA. Buffers do not apply to vegetation treatments specifically designed to improve or protect Greater Sage-Grouse habitat.

The BLM will apply lek buffer-distances as specified in the USGS Report, *Conservation Buffer Distance Estimates for Greater Sage-Grouse - A Review* (Manier et al. 2014). In general, buffer distances would be the 'lower end of the interpreted range' in the USGS report for disturbances in PHMA, the 'literature minimum' for disturbances in IHMA or GHMA, or as specified in the 2021 Idaho Sage-grouse Plan.

***PHMA***

- Major linear features (roads)[7] within 3.1 miles of leks
- Minor linear features (e.g. minor roads) or low structures (e.g., fences and rangeland structures) within 1.2 miles of leks
- Tall structures (e.g., communication or transmission towers and transmission lines) within 2 miles of leks
- Infrastructure related to energy development within 3.1 miles of leks
- Surface disturbance (continuing human activities that alter or remove the natural vegetation) within 3.1 miles of leks

***IHMA***

- Major linear features (e.g., roads) within 2 miles of leks
- Minor linear features within 0.8 miles or low structures within 0.6 miles of leks
- Tall structures (e.g., electrical, communication, and meteorological) within 1.7 miles of leks
- Transmission lines/towers within 1.2 miles of leks[2]
- Distribution lines/poles within 0.6 miles of leks[1]
- Infrastructure related to energy development (e.g., oil, gas, wind, and solar) within 2 miles of leks
- Surface disturbance (continuing human activities that alter or remove the natural vegetation) within 2 miles of leks

***GHMA***

- Major linear features (e.g., roads) within 0.25 miles of leks
- Minor linear features within 0.25 miles of leks; low structures within 0.12 miles of leks
- Tall structures (e.g., electrical, communication, and meteorological) within 0.6 miles of leks
- Infrastructure related to energy development (e.g., oil, gas, wind, and solar) within 0.6 miles of leks; 2-mile feasibility/practicality conditions
- Surface disturbance (continuing human activities that alter or remove the natural vegetation) within 0.6 miles of leks

**Justifiable Departures**—Justifiable departures to decrease or increase from these distances, based on local data, best available science, landscape features, and other existing protections (e.g., land use allocations and state regulations) may be appropriate for determining activity impacts. The USGS report recognized "that because of variation in populations, habitats, development patterns, social context, and other factors, for a particular disturbance type, there is no single distance that is an appropriate buffer for all populations and habitats across the sage- grouse range." The USGS report also states that "various protection measures have been developed and implemented…[which have] the ability (alone or in concert with others) to protect important habitats, sustain populations, and support multiple-use demands for public lands." All variations in lek buffer-distances will require appropriate analysis and disclosure as part of activity authorization.

In determining lek locations, the BLM will use the most recent lek determination available from the state wildlife agency.

[7] Roads are linear routes declared as a road by the owner, managed for use by low-clearance vehicles having four or more wheels, and maintained for regular and continuous use. Roads do not include trails, primitive roads, temporary routes, or administrative routes with maintenance intensity of 0 or 1 (2015 ARMPA ROD).

***For Actions in PHMA and IHMA***

- The BLM will apply the lek buffer-distances identified above as required conservation measures to fully address the impacts on leks, as identified in the NEPA analysis. Impacts should be avoided by locating the action outside the applicable lek buffer-distances identified above.
- The BLM may approve actions in PHMA and IHMA that are within the applicable lek buffer- distance identified above, only if, with input from the state fish and wildlife agency, it determines, based on best available science, landscape features, and other existing protections, that a buffer-distance other than that identified above offers the same or greater level of protection to Greater Sage-Grouse and its habitat, including conservation of seasonal habitat outside of the analyzed buffer area.
- Range improvements that do not affect Greater Sage-Grouse, or range improvements that provide a conservation benefit to Greater Sage-Grouse, such as fences for protecting important seasonal habitats, meet the lek buffer requirement.

The BLM will explain its justification for determining if the approved buffer-distances meet these conditions in its project decision.

**Buffer Exception Criteria for IHMA and GHMA**—If it is impracticable, technically or economically, to locate the project outside of the buffer area and impacts are avoided through project siting and design, to the extent reasonable, BLM may approve actions within buffers in IHMA and GHMA.

## 19.5 CHAPTER 3. AFFECTED ENVIRONMENT

In September 2023, IDFG adopted the new WAFWA lek definitions (Cook et al. 2022; Appendix 4). Since current management is the 2015 Idaho ARMPA, BLM uses 2015 Idaho ARMPA definitions for implementation decisions. BLM Idaho applied these definitions to 2023 lek data to determine management status of leks as *occupied* or *unoccupied* (BLM Idaho IM 2024-003). There were 1104 leks in 2023 that would be considered *occupied* under Alternatives 1 and 2; **Table ID-2**). Under the proposed action, there would be 1093 *active* and 161 *pending active* leks (Alternatives 3, 4, 5, and 6).

**Table ID-2. Number of Leks by Management Status, Habitat Management Area (HMA), and Alternatives**

| Lek Management Status | HMA | Alt 1 | Alt 2 | Alts 3 and 4 | Alts 5 and 6 |
|---|---|---|---|---|---|
| **Number of leks where buffers would apply** | | | | | |
| Occupied | n/a | 1104 | 1104 | n/a | n/a |
| Active | n/a | n/a | n/a | 1093 | 1093 |
| Pending Active | n/a | n/a | n/a | 161 | 159 |
| Total Leks | n/a | 1104 | 1104 | 1254 | 1252 |
| **Percent of leks where buffers would apply by HMA type** | | | | | |
| Occupied | PHMA<br>IHMA<br>GHMA<br>Non | 68<br>25<br>5<br>2 | 67<br>26<br>5<br>2 | n/a | n/a |
| Active | PHMA<br>IHMA<br>GHMA<br>Non | n/a | n/a | 78<br>19<br>3<br>0 | 73<br>22<br>4<br>0 |

| Lek Management Status | HMA | Alt 1 | Alt 2 | Alts 3 and 4 | Alts 5 and 6 |
|---|---|---|---|---|---|
| Pending Active | PHMA | n/a | n/a | 67 | 67 |
| | IHMA | | | 22 | 21 |
| | GHMA | | | 10 | 11 |
| | Non | | | 0 | 0 |

## 19.6 CHAPTER 4. ENVIRONMENTAL CONSEQUENCES

### 19.6.1 Analytical Assumptions

Methods for analyzing impacts are described in **Section 4.1.1**, General Methodology for Analyzing Impacts, and include definitions for 'type of impact', 'context', 'duration', 'intensity', and 'direct, indirect, and cumulative impacts'.

BLM analyzed:

- Changes in lek definitions and number of leks where buffers would be applied, and
- Changes in lek buffer distances

For analytical purposes and comparisons of lek buffer distances among alternatives, buffer distances were considered potential 'protection' or non-development areas, and, thus, percent of HMA closed for development (i.e. areas within HMA and lek buffers) were compared among alternatives. Effects under Alternatives 3 and 4 were assumed to be the similar since buffer distances are the same among these alternatives. Buffer distances for Alternatives 3 and 4 are also the same as buffer distances under Alternative 1 but would apply to *pending active* as well as *active* leks instead of *occupied* leks. Buffer distances under Alternatives 5 and 6 are most similar to Alternative 2 but with some additional modifications.

The analysis focused on differences between:

- Alternatives 1 and 4 (changes in lek definitions),
- Alternatives 2 and 5 (changes in lek buffer distances), and
- Alternatives 4 and 5 (changes in lek buffer distances)

Comparisons between lek buffer distances under Alternatives 1 and 2 were made in the 2018 FEIS (BLM Idaho 2018) and 2020 FSEIS (BLM Idaho 2020). Comparisons of HMA acres and percent of HMA were made on BLM lands only, i.e. 8.7 to 8.8 million acres depending on Alternative (**Table 2-3**).

***Changes in Lek Definitions***

Adopting range wide lek definitions (Cook et al. 2022; Appendix 4) changes both the number of leks evaluated for BLM management leks where buffers would apply from the 2015 Idaho ARMPA lek definitions. This change would result in a 1% change from *occupied* leks under Alternatives 1 and 2 to *active* leks under Alternatives 3 through 6. It would also be a 5 to 10% increase from the number of *occupied* leks in PHMA to the number of *active* leks in PHMA (**Table ID-2**). With the proposed action, there would be a slight increase in the number of active leks in PHMA and IHMA combined and a decrease in the number of leks outside of HMA.

Based on recommendations from the State of Idaho, in addition to *active leks,* the proposed action also considers management for *pending active* leks.. This change in 161 *pending active* leks would result in a 15% increase in the number of leks considered for BLM management (**Table ID-2**).

Changing which leks buffers apply to, i.e. *active* and *pending active* leks, could provide protection to additional BLM lands from new disturbances with Alternative 4's lek buffers when compared with Alternative 1. Since two thirds of the pending active leks are in PHMA and PHMA is closed or excluded for multiple disturbance types, such as renewable energy or non-energy leasable minerals, or salable minerals, effects of the proposed action to consider *pending active* leks would be realized more in IHMA and GHMA. However, these changes would be minimal in IHMA and GHMA, with only 6% additional BLM lands in IHMA and 1% in GHMA that would be protected under Alternative 4 compared with Alternative 1.

***Resources Potentially Affected by Modifying Lek Buffer Distances***

- GRSG
- Mineral Resource Management
- Lands and Realty
- Renewable Energy
- Livestock Grazing
- Travel and Transportation
- Cumulative Effects – Social and Economic Conditions

***General Effects of Lek Buffers***

Known effects of anthropogenic disturbance on GRSG are described in **Section 4.2.1**. Effects of various anthropogenic disturbances and lek buffer distances were analyzed in the USGS report (Manier et al. 2014) and in 2015 FEIS (BLM and Forest Service 2015), 2018 FEIS (BLM Idaho 2018), and 2020 FSEIS (BLM Idaho 2020). The lek buffer distances from the 2015 Idaho ARMPA (Alternative 1) were based on the lower end of the interpreted range from the USGS Report (Manier et al. 2014) for various types of anthropogenic disturbances, with the major types of anthropogenic disturbance such as energy development with a 3.1-mile buffer. The recommended 3.1-mile buffer was based on disturbance effects reported in the literature and that the majority of nesting birds from a given lek would be protected by that buffer distance. For example, in Nevada and California, 95% of all nests are within 3.1 miles of leks (Coates et al. 2013), and in Wyoming, 64% of nests within 3.1 miles of leks (Holloran and Anderson 2005). In some populations, hens may nest further from leks and a 3.1-mile buffer would protect fewer nesting birds from a given lek. In Idaho, less than 50% of GRSG hens nest within 1.9 miles and 80% within 6 miles from leks where they were captured (Connelly et al. 2013). However, effects of anthropogenic disturbance do not depend solely on where hens are nesting. In some areas, depending on existing disturbance, habitat conditions, and topography, smaller buffers may suffice to protect leks from development. The interpreted range in the USGS report is based on a "typical response" but "there is no single distance that is an appropriate buffer for all populations and habitats across the sage-grouse range" (Manier et al. 2014).

Reducing lek buffers could impact GRSG, including avoidance behavior, reduced productivity, declines in lek attendance, and extirpation of leks. However, the type of impacts and intensity would vary depending on several factors, including habitat conditions, breeding bird density in the area and proximity to other leks, home range size for that particular population, existing anthropogenic disturbance, and whether the potentially impacted area provides unique seasonal habitats or connectivity among other habitat patches. Project-level impacts would be analyzed during NEPA.

***Effects of Modified Lek Buffers under Alternatives 3 and 4***

Under Alternatives 3, and 4, lek buffer distances would remain the same as in the 2015 Idaho ARMPA (Alternative 1). Therefore, there would be no effects to GRSG under these Alternatives.

***Effects of Modified Lek Buffers under Alternatives 5 and 6***

The proposed changes to lek buffer distances under Alternatives 5 and 6 would result in the following changes compared with the 2019 Idaho ARMPA (Alternative 2):

- Increase in lek buffers in IHMA—For major linear features, e.g. major roads, in IHMA, the buffer distance would increase from 0.8 to 2.0 miles (**Table ID-1**). This would increase the portions of IHMA protected from major linear features from 6% (0.8-mile buffer) to 24% (2.0-mile buffer), or an increase of 18% in the portion of IHMA protected from major linear features. For transmission line towers in IHMA, the buffer distance would increase from 1.2 to 1.7 miles. This would increase the portions of IHMA protected from transmission line towers from 12% (1.2-mile buffer) to 19% (1.7-mile buffer), or an increase of 7% in the portion of IHMA protected from transmission line towers.
- Decrease in lek buffers in PHMA—For minor linear features, e.g. minor roads, in PHMA, the buffer distance would decrease from 3.1 to 1.2 miles. This would decrease the portions of PHMA protected from minor linear features from 72% (3.1-mile buffer) to 28% (1.2-mile buffer) or a 44% decrease in the portion of PHMA protected from minor linear features.
- Decrease in lek buffers in IHMA—For communication and meteorological towers in IHMA, the buffer distance would decrease from 2.0 miles to 1.7 miles. This change is due to more recent literature on the effects of tall structures (Kohl et al. 2019a, b). This would decrease the portions of IHMA protected from communication and meteorological towers from 25% (2.0-mile buffer) to 19% (1.7-mile buffer), or a 6% decrease in the portion of IHMA protected from communication and meteorological towers.
- Decrease in lek buffers in GHMA—For surface disturbances due to continuing human activities that alter or remove the natural vegetation, other than infrastructure related to energy development, major and minor linear features, tall structures, and low structures, the buffer distance would decrease from 2.0 miles to 0.6 miles. This change would make the buffer distance consistent with buffer distances for other anthropogenic disturbance in GHMA, such as infrastructure related to energy development also 0.6 miles. This would decrease the portions of GHMA protected from other surface disturbance from 5% (2.0-mile buffer) to 1% (0.6-mile buffer), or a 4% decrease in the portion of GHMA protected from surface disturbance.

The proposed changes to lek buffer distances under Alternative 5 would result in the following changes compared with Alternative 4:

- PHMA—Lek buffers would remain the same in PHMA for all disturbance types across all Alternatives, except for the modification for minor linear features noted above. Under Alternative 5, the buffer distance for minor linear features, e.g. minor roads, would decrease from 3.1 to 1.2 miles (**Table ID-3**). This would decrease the portions of PHMA protected from minor linear features from 93% (3.1-mile buffer) to 28% (1.2-mile buffer) or a 65% decrease in the portion of PHMA protected from minor linear features. Buffer distances for all other types of disturbance would remain the same and provide protection for approximately 76% of all *active* and *pending active* leks that are in PHMA (Alternatives 3 through 6; **Table ID-2**).

**Table ID-3. Habitat Protected by Lek Buffers under Alternatives 4 and 5**

| Action | PHMA (4,472,499 acres) | | IHMA (2,410,920 acres) | | GHMA (1,908,361 acres) | |
|---|---|---|---|---|---|---|
| | Buffer | Percent Protected | Buffer | Percent Protected | Buffer | Percent Protected |
| **Alternative 4** | | | | | | |
| Linear Features (roads) | 3.1 Miles | 93 | 3.1 Miles | 47 | 3.1 Miles | 13 |
| Infrastructure Related to Energy Development | 3.1 Miles | 93 | 3.1 Miles | 47 | 3.1 Miles | 13 |
| Tall Structures | 2 Miles | 58 | 2 Miles | 26 | 2 Miles | 6 |
| Low Structures | 1.2 Miles | 29 | 1.2 Miles | 11 | 1.2 Miles | 2 |
| Surface Disturbance | 3.1 Miles | 93 | 3.1 Miles | 47 | 3.1 Miles | 13 |
| Noise and Related Disruptive Activities | 0.25 Miles | 1 | 0.25 Miles | 1 | 0.25 Miles | 0 |
| **Action** | **PHMA (4,452,947 acres)** | | **IHMA (2,440,288 acres)** | | **GHMA (1,717,050 acres)** | |
| | **Buffer** | **Percent Protected** | **Buffer** | **Percent Protected** | **Buffer** | **Percent Protected** |
| **Alternative 5** | | | | | | |
| Linear Features: major<br>minor | 3.1 Miles<br>1.2 Miles | 92<br>28 | 2 Miles<br>0.8 Miles | 24<br>6 | 0.25 Miles<br>0.25 Miles | 0<br>0 |
| Infrastructure Related to Energy Development | 3.1 Miles | 92 | 2 Miles | 24 | 0.6 Miles | 1 |
| Tall Structures<br>Distribution poles *only* | 2 Miles | 49 | 1.7 Miles<br>0.6 Miles | 19<br>6 | 0.6 Miles | 1 |
| Low Structures | 1.2 Miles | 28 | 0.6 Miles | 6 | 0.12 Miles | 0 |
| Surface Disturbance | 3.1 Miles | 92 | 2 Miles | 24 | 0.6 Miles | 1 |
| Noise and Related Disruptive Activities | -- | -- | -- | -- | -- | -- |

- IHMA—Under Alternative 5, reduced buffer distances for disturbances, such as infrastructure related to energy development, other surface disturbance, and linear features, would result in 23% less IHMA protected compared with Alternative 4 (i.e., 47% for a 3.1-mile buffer to 24% for a 2-mile buffer; **Table ID-3**). Buffer distances would be reduced for other types of disturbances compared with Alternative 4 and also result in less IHMA protected, i.e. tall structures 7% less; low structures 5% less; and noise and disruptive activities 1% less.
- GHMA—Under Alternative 5, buffer distances for disturbances would result in 1 to 13% less GHMA protected, where the largest difference would be for infrastructure related to energy development, other types of surface disturbance, and linear features (i.e. 3.1-mile buffer reduced to 0.6- or 0.25-mile buffer; **Table ID-3**). Impacts on GRSG would vary widely since only 5% of all *active* and *pending active* leks are in GHMA and scattered across nearly 2 million acres of BLM lands. On a project-specific basis, BLM would continue to avoid and minimize impacts to the extent practicable within GHMA.

Besides differences to Alternatives 2 and 4 described above, Alternative 5 would not include any buffers for noise and related disruptive activities that do no result in habitat loss. Also, Alternative 5 would include 'Buffer Exception Criteria', where BLM may approve actions within IHMA and GHMA, if it is impracticable, technically or economically, to locate the project outside of the buffer and impacts are avoided through

project siting and design, to the extent reasonable. The Buffer Exception Criteria and reduced buffers in GHMA and IHMA should encourage development outside of PHMA.

The reduced buffer distances, primarily in IHMA and GHMA, along with the Buffer Exception Criteria in IHMA and GHMA would improve alignment with the Governor's Plan by having the most restrictive management in PHMA and reducing those restrictions in IHMA and further reducing restrictions in GHMA. Other restrictions in IHMA such as RDFs, Mitigation, Disturbance cap, and NSO with limited exception would serve to ensure responsible development. However, infrastructure and development could be allowed closer to leks, subject to the before mentioned restrictions. As described above, the amount of GRSG habitat and HMA that could be protected with lek buffers under Alternative 5 would be lower compared to protections under Alternative 4. As a result, under Alternative 5 development could occur closer to some leks (smaller buffer) than under Alternative 4 and result in increased impacts to GRSG. Project-level impacts would be analyzed during NEPA and consider other measures to ensure responsible development.

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