U.S. Department of the Interior
Bureau of Land Management

Volume 1: Chapters 1 through 5, Glossary, Literature Cited, and Index
November 2024

Greater Sage-Grouse Rangewide Planning

Proposed Resource Management Plan Amendment and Final Environmental Impact Statement

The Bureau of Land Management's mission is to sustain the health, diversity, and productivity of public lands for the use and enjoyment of present and future generations.

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Greater Sage-Grouse Rangewide Planning
Proposed Resource Management Plan Amendment and
Final Environmental Impact Statement

DOI-BLM-WO-2300-2022-0001-RMP-EIS

Responsible Agency: United States Department of the Interior,
Bureau of Land Management

Type of Action: Administrative (X) Legislative ( )

Document Status: Draft ( ) Final (X)

Abstract: This Greater Sage-Grouse Rangewide Planning (GRSG) Proposed Resource Management Pan Amendment and Final Environmental Impact Statement (Proposed RMP Amendment /Final EIS) has been prepared by the United States Department of the Interior, Bureau of Land Management (BLM) with input from cooperating agencies and in response to public comment. This document considers amendments to 77 BLM RMPs across the range of greater sage-grouse (GRSG) to respond to updated scientific information and changing land uses and provide for consistent and effective rangewide conservation based on biological information that is responsive to locally relevant habitat variability. The Final EIS describes and analyzes seven alternatives, including the Proposed RMP Amendment, for management of GRSG habitat on BLM-administered lands, including areas where BLM administers subsurface minerals.

Alternative 1 includes the applicable elements (goals, objectives, and management direction) from BLM's 2015 GRSG Amendment. Alternative 2, the No Action Alternative, includes the applicable RMP elements from BLM's 2019 GRSG Amendment. Alternative 3 emphasizes GRSG conservation and protection and has the highest amount of preservation measures of the alternatives and includes the identification of Areas of Critical Environmental Concern (ACECs). Alternative 4 emphasizes conservation while providing more allowances for public land uses than Alternative 3 and adjusts GRSG habitat management areas based on new information and science available since the previous planning efforts. Alternative 5, identified as the Preferred Alternative in the Draft RMPA/EIS, balances conservation with increased levels of site-specific allowances for public land uses and aligns habitat management areas with new information and science. Alternative 6 applies all the habitat management areas and associated management as Alternative 5 and includes the identification of ACECs.

In response to public and cooperating agency comments and internal review of the alternatives and effects described in the Draft RMPA/EIS, BLM developed the Proposed RMP Amendment alternative, which increases protections for GRSG from the Preferred Alternative in the Draft RMPA/EIS, while maintaining an appropriate balance of public land uses. The Proposed RMP Amendment incorporates management direction approaches from all of the alternatives analyzed in the Draft RMPA/EIS. Specifically, priority habitat management areas (PHMA) are identified as exclusion for solar and wind energy and no surface occupancy for fluid minerals. PHMA remains an avoidance area for major rights of way but the exceptions for allowing development are strengthened. Areas within PHMA requiring additional protections have been identified as PHMA with limited exceptions, to be managed as exclusion areas for major rights-of-way, and with no exceptions to the solar and wind exclusion allocation or to the no surface occupancy allocation for fluid minerals. Since the changes in management were consistent across the range, the areas were less suited to being identified as proposed ACECs, which are generally tailored to different values and locations. These additional protections will provide the necessary protections for GRSG habitat given

anticipated development threats and negative impacts from climate change, while ensuring an appropriate balance of public land uses.

Protest Period: Protests on the GRSG Proposed RMP Amendment/Final EIS must be in writing and filed with the BLM Director, either as a hard copy or electronically via BLM's National NEPA Register, by the close of the protest period (for instructions refer to: Filing a Plan Protest). The protest period closes 30 days from the date the United States Environmental Protection Agency publishes the Notice of Availability in the *Federal Register*.

For further information, contact:

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BLM Wyoming State Office
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Project Website: https://eplanning.blm.gov/eplanning-ui/project/2016719/510

United States Department of the Interior

BUREAU OF LAND MANAGEMENT
National Office
1849 C Street NW
Washington, DC 20240

Dear Reader:

Enclosed is the Greater Sage-Grouse Rangewide Planning Proposed Resource Management Plan Amendment and Final Environmental Impact Statement (Proposed RMPA/Final EIS) for greater sage-grouse (GRSG) habitat management. Building on previous BLM plans, this planning effort is proposing to amend to 77 BLM RMPs to update management of approximately 65 million acres of greater sage-grouse habitat management areas in response to updated scientific information and changing land uses and to provide for consistent and effective rangewide conservation based on biological information that is responsive to locally relevant habitat variability. All actions analyzed in the Proposed RMPA/Final EIS would apply to BLM-administered lands, including areas where BLM administers subsurface minerals, in portions of California, Colorado, Idaho, Montana, Nevada, North Dakota, Oregon, South Dakota, Utah, and Wyoming.

The Proposed RMP Amendment/Final EIS was prepared by the BLM in consultation with cooperating agencies and in response to public comments received. The Proposed RMPA increases protections for GRSG from the Preferred Alternative identified in the Draft RMPA/Draft EIS, while maintaining an appropriate balance of public land uses. The Proposed RMPA incorporates management direction approaches from all of the alternatives analyzed in the Draft RMPA/Draft EIS. Specifically, priority habitat management areas (PHMA) are identified as exclusion for solar and wind energy and as no surface occupancy for fluid minerals. PHMA remains an avoidance area for major rights-of-way, but the exceptions for allowing development are more restrictive. Areas within PHMA requiring additional protections have been identified as PHMA with limited exceptions, to be managed as exclusion areas for major rights-of-way, and with no exceptions to the solar and wind energy exclusion allocation or to the no surface occupancy allocation for fluid minerals. These additional protections will provide the necessary conservation measures for GRSG habitat, given anticipated development threats and negative impacts from climate change, while ensuring an appropriate balance of public land uses.

There are numerous values and concerns associated with the management of greater sage-grouse habitat across the West. We remain committed to implementing the policies and conservation measures that will meet the BLM's multiple-use and sustained yield mandate, provide for the habitat needs to conserve GRSG, avoid the need to list under the Endangered Species Act, and minimize long-term regulatory burdens. Thank you for your interest in the Greater Sage-Grouse Rangewide Planning RMPA.

Protests
Release of the Proposed RMP Amendment/Final EIS initiates a 30-day protest period for any person who previously participated in the planning process and has an interest that is (or may be)

adversely affected by the Proposed RMP Amendment. The protest regulations specify the required elements for filing a valid protest. To help guide you through this process, there is a critical item checklist available at https://www.blm.gov/programs/planning-and-nepa/public-participation/filing-a-plan-protest. As much as possible, cite specific planning documents or available planning records (such as summaries, correspondence, etc.) in your protest. All protests must be in writing and filed with the BLM Director, either as a hard copy or electronically via the BLM's ePlanning website, by the close of the protest period. The protest period closes 30 days from the date the United States Environmental Protection Agency publishes the Notice of Availability in the *Federal Register*.

The only electronic protests the BLM will accept are those filed through the National NEPA Register at https://eplanning.blm.gov/eplanning-ui/project/2016719/510. All protest letters sent to the BLM via fax or email will be considered invalid unless a properly filed protest is also submitted. If you do not have the ability to file your protest electronically, hard-copy protests must be mailed to the following address (regular or overnight mail), postmarked by the close of the protest period:

USPS Mail:
BLM Director
Attention: Protest Coordinator (HQ210)
P.O. Box 151029
Lakewood, CO 80215

Overnight Mail:
BLM Director
Attention: Protest Coordinator (HQ210)
Denver Federal Center, Building 40
Lakewood, CO 80215

Before including your address, phone number, email address, or other personal, identifying information in your protest, be advised that your entire protest—including your personal, identifying information—may be made publicly available at any time. While you can ask the BLM in your protest to withhold from public review your personal, identifying information, the BLM cannot guarantee that it will be able to do so.

The BLM Director will make every attempt to promptly render a decision on each protest. The decision will be in writing and will be sent to the protesting party by certified mail, return receipt requested. The decision of the BLM Director shall be the final decision of the Department of the Interior on each protest. Responses to protest issues will be compiled and formalized in a Director's Protest Resolution Report made available following issuance of the decisions. Upon resolution of all land use plan protests, the BLM will issue state specific Approved RMP Amendments and Records of Decision (ROD). The Approved RMP Amendments and RODs will be available to all parties online at the BLM's National NEPA Register, linked above.

Sincerely,

SHARIF BRANHAM Digitally signed by SHARIF BRANHAM
Date: 2024.10.30 16:15:49 -04'00'

Sharif Branham,
Assistant Director for Resources and Planning

Executive Summary

Executive Summary

The greater sage-grouse (GRSG) is a state-managed species that depends on intact functioning sagebrush ecosystems. This expansive sagebrush landscape is managed by a mix of federal, tribal, state, and local agencies (e.g., counties and conservation districts), as well as private landowners. The Bureau of Land Management (BLM) manages approximately half of GRSG habitat as part of the agency's multiple use and sustained yield mission.

State and Tribal-led efforts to conserve the species and its habitat date back to the 1950s. For the past three decades, state wildlife agencies, the BLM and other federal agencies, and many others in the range of the species have collaborated to conserve GRSG and its habitats. The BLM's land management plans (collectively referred to as resource management plans [RMP]) include goals, objectives, and management actions for managing GRSG habitat on BLM-administered public lands in ten Western states (California, Colorado, Idaho, Montana, Nevada, North Dakota, Oregon, South Dakota, Utah and Wyoming). These plans include management for GRSG Habitat Management Areas to provide for conservation, enhancement, and restoration of GRSG habitat. GRSG also occur in Washington but have limited distribution on BLM-administered lands and are primarily influenced by actions on private lands. Therefore, GRSG in Washington are not included as part of this plan amendment.

The U.S. Fish and Wildlife Service identified the threats to GRSG as part of evaluating whether GRSG warranted being listed as threatened or endangered in 2005, 2010, and 2015. Many of these threats have been addressed in the BLM's prior GRSG planning efforts in the 2014/2015 plan revisions and amendments, and again in all states except Montana and the Dakotas with a 2019 series of state-specific amendments. Despite years of management attention from multiple state and federal agencies GRSG habitat continues to be impacted and lost.

The BLM has prepared this Proposed Resource Management Plan Amendment (RMPA)/Final Environmental Impact Statement (EIS) to analyze potential amendments to specific GRSG goals, objectives, and management actions contained in 77 existing RMPs to enhance GRSG conservation through management of GRSG habitats on BLM-administered lands. These amendments seek to continue providing the BLM with locally relevant decisions that achieve rangewide GRSG conservation goals consistent with the agency's multiple use and sustained yield mission, and GRSG management efforts with federal, state, local, and Tribal partners. The ten-state planning area includes nearly 121 million acres of BLM-administered public land. GRSG habitat management areas occur on approximately 65 million acres and are the focus of this effort.

Purpose and Need

The BLM's purpose is to amend certain goals, objectives, allocations, and management direction for GRSG management in its RMPs to respond to updated scientific information and changing land uses and provide for consistent and effective rangewide conservation based on biological information that is responsive to locally relevant habitat variability. Following an internal review of the effectiveness of 2015 and 2019 RMP Amendment decisions, including the degree to which those decisions sufficiently addressed threats to greater sage-grouse habitats and continued population declines, while balancing the BLM's ability to manage public lands for other uses, and as informed by updated scientific findings and feedback received from Tribal, federal, state, and local agencies and the public during the scoping period, the BLM proposes to amend the following RMP elements:

- Clarifying the existing GRSG RMP goal
- GRSG habitat management area alignments to incorporate new science and improve alignment along state boundaries along with the associated major land use allocations, including management for non-habitat within habitat management areas
- Adoption of the Western Association of Fish and Wildlife Agencies (WAFWA) definition of "lek" and "lek status"
- Mitigation
- GRSG habitat objectives
- Disturbance caps
- Fluid mineral development and leasing objectives
- Fluid mineral leasing waivers, exceptions, and modifications
- Renewable energy development
- Rights-of-Way
- Minimizing threats from predation
- Livestock grazing
- Wild horse and burro management
- Areas of Critical Environmental Concern
- Adaptive Management

Some management concerns are localized to circumstances in individual States and the ecological diversity across the sagebrush ecosystem. As such, the purpose of this planning effort also includes amending specific RMP management actions associated with state-specific circumstances to facilitate GRSG habitat conservation efforts. Beyond the rangewide considerations detailed above, states considered additional targeted amendments to existing management direction. Each state determined the need to amend management actions independently and based on a review of updated scientific information, changing land uses, and locally relevant habitat variability. Management actions targeted for amendment in some states include saleable minerals, fire and fuels, vegetation and invasives, lands and realty actions, project screening, lek buffers, and interagency coordination. Inclusion of a management category for amendment in one state does not necessitate consideration of this category in other states or the consideration of the category rangewide. See **Section 2.5**, State Specific Circumstances, for more information.

Section 102 of the FLPMA, as amended, requires the BLM to manage public lands "in a manner that will protect the quality of scientific, scenic, historical, ecological, environmental, air and atmospheric, water resource, and archeological values; that, where appropriate, will preserve and protect certain public lands in their natural condition; that will provide food and habitat for fish and wildlife and domestic animals; and that will provide for outdoor recreation and human occupancy and use;". BLM policy further directs the BLM to proactively initiate conservation measures and to minimize or avoid potential adverse effects to prevent decline of sensitive species. Specifically, the BLM's Wildlife and Fisheries Management Manual, M-6500, directs the BLM to "conserve rare, vulnerable, and representative habitats, plant communities, and ecosystems", with specific objectives to "develop and implement plans to ensure that the characteristics of rare, threatened, or representative habitat types are maintained." and to "collaborate with other agencies, the States, and private groups to ensure protection of the best representative habitats/ecosystem/plant communities for each area.". The BLM's Special Status Species Management Manual, M-6840, directs the

BLM to "to initiate proactive conservation measures that reduce or eliminate threats to Bureau sensitive species to minimize the likelihood of and need for listing of these species under the ESA."

The BLM is therefore considering amending RMPs to:

- Address continued GRSG habitat losses contributing to GRSG population declines. While GRSG populations experience natural fluctuations, monitoring indicates the most recent nadirs (low point of population cycles) are lower than the prior nadirs in most states. The U.S. Geological Survey[1] analyzed state-collected lek data and reported estimated rangewide population declines of nearly 80 percent from 1966-2021 and of 41 percent from 2002-2021. While some GRSG populations are stable to increasing, over 87 percent of areas throughout the range had declining populations since 2002. The quantity and quality of available habitat, as well as non-habitat factors such as disruptive activities and prolonged drought can affect the size and trend of GRSG populations. Analyses of satellite maps shows sagebrush availability across all land ownerships declined by approximately 3 percent (1.9 million acres) between 2012 and 2018. Nearly 60 percent of the sagebrush losses (approximately 1.1 million acres rangewide) occurred on BLM-administered lands. The BLM's 2021 *Greater Sage-Grouse Plan Implementation Rangewide Monitoring Report for 2015-2020*[2] identified 42 population triggers that had been tripped through 2020. Habitat triggers were tripped sixteen times, mostly the result of sagebrush loss to wildfires. The Monitoring Report also estimated habitat loss of less than one percent in GRSG priority habitat management areas (PHMA) rangewide and Important Habitat Management Areas (IHMA) in Idaho due to anthropogenic disturbance., although losses due to wildfire were more extensive. Thie anthropogenic loss on BLM lands is less than what scientific literature has identified as the threshold where GRSG abandon leks (Kirol et al., 2020). Disturbance from infrastructure in General Habitat Management Areas (GHMA) and other state-specific habitat management area designations averaged approximately 1.58 percent.
- Ensure habitat management areas and associated decisions incorporate recent relevant science to prioritize management where it will provide conservation benefit and durability when considering the effects of climate change. Since the 2015 and 2019 planning efforts, hundreds of peer-reviewed scientific publications on GRSG and management of their habitats have been published. Some of these new publications are consistent with science the BLM previously considered while others identify new information. Several provide new spatial information on important population and habitat parameters for GRSG. USGS also compiled and summarized peer-reviewed journal articles, data products, and formal technical reports related to GRSG since January 2015 (Teige, et. al. 2023). The BLM considered this new information and relevant science in developing and analyzing proposed management on BLM-administered lands.

Issues Analyzed

In the November 2021 Notice of Intent initiating this planning effort, the BLM invited the public to identify issues, management questions, or concerns related to the preliminary purpose and need (refer to **Section 5.4.1** for more information on scoping) to guide development of the effects analysis. Public comments were

[1] Coates, P.S., Prochazka, B.G., Aldridge, C.L., O'Donnell, M.S., Edmunds, D.R., Monroe, A.P., Hanser, S.E., Wiechman, L.A., and Chenaille, M.P., 2023, Rangewide population trend analysis for greater sage-grouse (*Centrocercus urophasianus*)—Updated 1960–2022: U.S. Geological Survey Data Report 1175, 17 p., https://doi.org/10.3133/dr1175.

[2] Herren, V., E. Kachergis, A. Titolo, K. Mayne, S. Glazer, K. Lambert, B. Newman, and B. Franey. 2021. Greater sage-grouse plan implementation: Rangewide monitoring report for 2015–2020. U.S. Department of the Interior, Bureau of Land Management, Denver, CO.

evaluated to identify resources that could potentially be affected by the GRSG sagebrush habitat management. The BLM compiled comments received from members of the public and various governmental and non-governmental groups to describe the issues and analysis concerns that are discussed in this document. (Refer to Scoping Report at: https://eplanning.blm.gov/eplanning-ui/project/2016719/570).

On March 15, 2024, the BLM released the Draft RMPA/Draft EIS for a 90-day public comment period, which closed on June 13, 2024. The BLM held thirteen public meetings, including two virtual meetings and eleven in-person public meetings, across the planning area. The BLM revised the RMP Amendment and EIS based on issues, management questions, and concerns raised during the public comment period.

Issues Analyzed in this RMPA/EIS

Decision-makers and the public need to understand the impacts each alternative would have on specific resources and resource uses. The following resource issues/topics are analyzed in detail in this RMP Amendment/EIS are:

- Special status species (including GRSG)
- Fish and wildlife
- Air resources and climate
- Soil resources
- Water resources
- Vegetation
- Riparian areas and wetlands
- Wild horses and burros
- Cultural resources
- Lands with wilderness characteristics
- Wildland fire ecology
- Livestock grazing
- Recreation
- Travel and transportation
- Mineral resources
- Lands and realty
- Areas of Critical Environmental Concern (ACECs)
- Tribal interests
- Social and economic conditions, including environmental justice

ALTERNATIVES CONSIDERED

The development of alternatives was guided by the BLM's identified purpose and need, while remaining responsive to issues identified by the public and cooperating agencies,, in alignment with planning criteria, and compliant with Federal laws, regulations, policies, and standards, including the multiple-use mandates specified by FLPMA. This planning process considers seven alternatives (six alternatives analyzed in the Draft RMPA/Draft EIS and the Proposed RMP Amendment identified in the Proposed RMPA/Final EIS). These alternatives have been derived from scoping, interagency coordination, and internal discussions. The alternatives developed provide alternative strategies to meet the purpose and need and to identify the trade-offs and differing effects of alternative management approaches.

Alternative 1

Alternative 1 includes the applicable decisions from the 2015 Approved RMPAs (ARMPA) that are being analyzed for potential amendment as part of this planning effort. It does not include all the goals, objectives, and actions from the 2015 ARMPAs. Under Alternative 1, the BLM would re-adopt the applicable GRSG habitat management area (HMA) boundaries, goals, objectives, and actions from the 2015 Records of Decision (ROD)/ARMPAs (as updated through plan maintenance). Due to the U.S. District Court of Idaho's preliminary injunction preventing implementation of the 2019 amendments (see explanation in Alternative 2 summary below) this alternative reflects how the BLM is currently managing GRSG habitat on public lands. This includes designation of some areas of PHMA as Sagebrush Focal Areas (SFA) with a recommendation to withdraw them from mineral location and entry under the Mining Law of 1872.

Alternative 2

Alternative 2 is the No-Action Alternative and includes the applicable decisions from the 2019 Greater Sage-Grouse ROD/ARMPAs efforts except in Montana/Dakotas, which did not amend their RMPs in 2019. This is the No Action because it reflects the management language currently in the BLM's approved land use plans. The U.S. District Court for the District of Idaho has issued a preliminarily injunction, preventing the BLM from implementing the 2019 amendments, but not vacating them or their Records of Decision. Because the 2019 RODs/ARMPAs were not vacated, they are the existing management plans. Under this alternative the BLM would apply the management from the 2019 ARMPA. SFAs would be removed from the BLM RMPs in all states except Oregon and Montana; these areas would still be managed with all the protections of PHMA, but would no longer include a recommendation for withdrawal (including in the Oregon SFAs).

Alternative 3

Alternative 3 provides the most protective measures to preserve GRSG and its habitat of the alternatives analyzed. Alternative 3 would update the Habitat Management Area (HMA) boundaries based on new information and science that has become available since the 2015 and 2019 planning efforts. All HMAs would be managed as priority HMA (PHMA). The BLM would close PHMA to new fluid mineral leasing, saleable minerals/mineral materials permits, and nonenergy leasable minerals leasing (development associated with existing permits and leases would not be precluded). PHMA would be recommended for withdrawal from location and entry under the Mining Law of 1872 and unavailable for livestock grazing. PHMA would also be ROW exclusion areas. Where there are currently designated wild horse and burro herd management areas overlapping PHMA, the wild horse and burro herd management area would become a Herd Area that is not managed for wild horses and burros. Under Alternative 3, the BLM would designate 32 GRSG habitat ACECs.

Alternative 4

Alternative 4 would update the habitat management area boundaries and associated management based on new information and science that became available since the 2015 and 2019 efforts. While many of the allocations would be similar to Alternatives 1 and 2, the habitat management areas are updated to reflect new science. Under Alternative 4, in Wyoming, all PHMA would be managed with no surface occupancy stipulations for new oil and gas leases (all other states have this stipulation in PHMA in this and the other alternatives in the PRMPA). In addition, management associated with some of the major minimization measures (e.g., disturbance cap and adaptive management) is adjusted to address cross-boundary coordination of shared populations, rangewide biological and managerial concerns based on monitoring, and experience gained from implementing management for GRSG since 2015. Alternative 4 allows compensatory mitigation to be used under specific conditions. Additional compensatory mitigation may be required where habitat and/or population adaptive management thresholds have been met. Areas previously identified as SFAs are generally managed as PHMA. The primary difference between management of SFAs in the 2015 Plans and PHMAs in this planning effort is that PHMA would not include a recommendation for withdrawal or prioritization strategies for oil and gas leasing and grazing permit renewals.

Alternative 5

Alternative 5 was identified as the preferred alternative in the Draft EIS. Alternative 5 considers other potential alignments of habitat management areas and associated management to try to balance GRSG conservation with public land uses. If state governments updated the GRSG management area boundaries in their specific state plans, the BLM is considering those boundaries on public lands in Alternative 5. HMAs are similar to but refined from Alternative 4 and restrictions would generally be similar to Alternative 4; with the exception of Wyoming which would follow the oil and gas management direction in Alternative 2;

and the fact that Alternative 5 considered options with fewer restrictions on resource uses and provided more opportunities for considering compensatory mitigation to offset impacts on GRSG and its habitat than Alternative 4. Areas previously identified as SFAs are generally managed as PHMA. The primary difference between management of SFAs in the 2015 Plans and PHMAs in this planning effort is that PHMA would not include a recommendation for withdrawal or prioritization strategies for oil and gas leasing and grazing permit renewals.

Alternative 6

Under Alternative 6, management for all habitat management areas and the resource topics being considered in the range of alternatives would be the same as described for Alternative 5, but with the addition of the designation of 32 ACECs. The same ACECs proposed for designation under Alternative 3 would be considered but the management direction for these areas would be less restrictive compared to Alternative 3.

Proposed RMP Amendment

The Proposed RMP Amendment increases protections for greater sage-grouse and its habitat from the Preferred Alternative (Alternative 5) in the Draft EIS. The Proposed RMP Amendment, described in detail below in **Section 2.4** and **Section 2.5**, identifies PHMA as exclusion for solar and wind and NSO for fluid minerals with exceptions. PHMA remains an avoidance area for major rights of way but the exceptions for allowing development are more restrictive. Areas within PHMA requiring additional protections have also been identified. Within these areas referred to as PHMA with limited exceptions, there are no exceptions to the solar and wind exclusion allocation or for the NSO allocation for fluid minerals. PHMA with limited exceptions are also exclusion areas for major rights of way. These additional protections in the Proposed RMP Amendment are designed to provide the necessary protections for GRSG and its habitat in light of anticipated development threats and negative impacts from climate change such as drought.

Summary of Environmental Consequences

GRSG: All alternatives would apply some restrictions on resource uses within habitat management areas to reduce potential impacts on GRSG. The acreage and location of habitat management areas varies by alternative, and impacts on GRSG would similarly vary, with the BLM managing the most PHMA under Alternative 3, followed by Alternatives 4, the Proposed RMP Amendment, Alternative 1, and Alternatives 5/6 in descending order. The fewest acres of PHMA and General Habitat Management Areas (GHMA) would be managed under Alternative 2. However, the simple comparison of acreages does not reflect the incorporation of new science published since 2015 that more accurately identify important GRSG habitats. Under the Proposed RMP Amendment, areas within PHMA that require additional protection have also been identified as PHMA with limited exceptions, with appropriate management direction to provide the necessary conservation of these key areas of GRSG habitat, given anticipated development threats and negative impacts from climate change, while ensuring an appropriate balance of public land uses. Under Alternative 1, restrictions on development and avoidance/exclusion areas, would be focused in PHMA, while energy development, mining, ROWs, and other surface disturbing activities would be focused outside of PHMA. The BLM would incorporate adaptive management, mitigation, disturbance caps, habitat objectives, and monitoring, to reduce the total net impact on GRSG. Impacts from Alternative 2 would be similar to those under Alternative 1, with more flexibility incorporated in the management of activities that can impact GRSG, and the BLM would remove SFA in all states except OR and MT. Increased flexibility could increase potential impacts on GRSG habitat, including the potential for disturbance, degradation, and loss. The habitat management areas in Alternatives 1 and 2 do not reflect the most current data on important habitats that are contributing to the long-term persistence of GRSG, including potential habitat impacts resulting from climate change. Therefore, management actions may be incongruent with long-term conservation where Habitat Management Areas overlap areas of little conservation value, or do not capture areas key to GRSG persistence.

The greatest protection for GRSG habitat is under Alternative 3, which has the largest PHMA acreage with the greatest restrictions. However, actions to implement the Alternative 3 allocation making public lands unavailable to grazing would require increased fencing to separate federal and nonfederal grazing lands, resulting in possible habitat fragmentation, increased GRSG collision risks, and increased opportunities for GRSG predators. Further, removal of grazing could allow for the buildup of fine fuels, which may increase the risk of a large-scale wildfire that would damage or destroy large areas of GRSG habitat.

Under Alternatives 4, 5, and 6, incorporation of new information and science that has become available since the 2015 and 2019 efforts would refine management for GRSG and associated habitats and improve cross-boundary coordination of shared populations compared with Alternatives 1 and 2, thus potentially improving management of GRSG across its range. These alternatives also retain components of the 2015 and 2019 amendments that continue to provide conservation to GRSG. Alternatives 5 and 6 may have more impacts than Alternative 4, given the fewer restrictions on resource uses and providing more opportunities for considering compensatory mitigation to offset impacts on GRSG and its habitat.

Natural, biological, and cultural resources: Protections for GRSG under the Proposed RMP Amendment and all alternatives would result in incidental protections for other natural, biological, and cultural resources, including vegetation, fish and wildlife, other special status species, soil resources, water resources, cultural resources, tribal interests, air quality, climate change, and wilderness characteristics. The location and magnitude of impacts would be similar to those summarized for GRSG, based on habitat management area acreages and particular restrictions under each alternative. As described for GRSG, the removal of livestock grazing under Alternative 3 could result in an increased risk of wildland fire that could destroy or damage natural, biological, or cultural resources. Removal of all horses and burros from herd management areas that overlap with PHMA under Alternative 3 would result in short-term disturbances from human presence and round up activities. In the long-term the combination of removing livestock grazing and wild horses and burros could have positive benefits for grazing wildlife due to removal of uses that compete for similar resources.

Resource uses: Impacts on resource uses, including mineral development, livestock grazing, lands and realty, and renewable energy, are typically inversely related to impacts on GRSG. Alternative 3 would have the greatest effects on resource uses by making PHMA unavailable for livestock grazing and closing PHMA to mineral, ROW, and renewable energy development. There would be less variability in the differences between Alternatives 1, 2, 4, 5, and 6, and the Proposed RMP Amendment would be based on HMAs acreages and resource management differences. For instance, management of PHMA as no surface occupancy (NSO) in Wyoming under Alternative 4 would increase restrictions on fluid mineral development compared to the other alternatives for that state. However, the NSO stipulations in areas of high development could limit flexibility of managers to locate disturbances in areas with the least potential for conflict with GRSG conservation. While SFAs under Alternative 1 and all PHMA under Alternative 3 would be recommended for withdrawal from location and entry under the Mining Law of 1872, the recommendation for withdrawal does not itself restrict any resource uses. As such, there would be no effects on locatable mineral claims or mine development. If, in the future, the Secretary of the Interior were to propose a withdrawal of the land from location and entry under the Mining Law of 1872, that proposal would be subject to appropriate NEPA and other analysis and if the Secretary were to withdraw the land following such analysis, location and entry under the Mining Law of 1872 would no longer be allowable, subject to valid existing rights.

Social and economic conditions: Impacts on social and economic conditions vary across regions and alternatives. Under Alternative 3, the BLM would no longer manage PHMA for livestock grazing, mineral, and renewable and non-renewable energy development, supporting lower levels of these activities across the analysis area. Additionally, this reduced economic activity in public land-dependent sectors, such as mining, livestock production, and renewable energy development, will have a ripple effect which causes economic activity in other sectors of the economy to slow. The large changes in economic conditions, under Alternative 3, could affect rural quality of life and lead to higher levels of unemployment and underemployment in some mineral dependent economies. Displaced workers in more diversified economies are likely to have an easier time finding new employment while rural residents may have to commute further for work or may have to consider re-locating out of the area. Those lacking financial resources to either commute further or relocate will be especially impacted. The scale of closures under Alternative 3 would have adverse impacts on social and economic conditions in a large number of communities and could affect fiscal budgets at both the local and state level of government, especially in states like Wyoming where taxes on mineral production serve as the largest source of tax revenue for multiple levels of government. However, Alternative 3 would provide the greatest protection of nonmarket values for GRSG and sagebrush ecosystems. The adverse economic impacts of PHMA closures under Alt 3 would be compounded in communities where a significant portion of residents either work in the oil and gas and mining sector or operate small family-owned ranches with affected grazing permits and ranching is their sole source of income, or where rural residents work in mineral extraction as a way to support a family while operating a small family-owned ranch.

Alternatives 1, 2, 4, 5, 6, and the Proposed RMP Amendment would support higher levels of economic activity in natural resource-dependent economies across the planning area relative to Alternative 3. Management actions that lead to a change oil and gas activity, under alternatives 4, 5, 6, and the Proposed RMP Amendment, could result in the same economic conditions as Alternative 1 in some areas (Montana, Nevada, North Dakota, South Dakota, and Utah), could support an increase in jobs, labor income, economic output, and tax revenue in some areas (Colorado and Idaho), or could lead to a reduction in jobs, labor income, economic output, and tax revenue in other areas (Wyoming). The management actions, under alternatives 4, 5, 6 and the Proposed RMP Amendment could affect social conditions and quality of life in some communities.

Summary of Changes to the Proposed RMP Amendment/Final EIS

The Proposed RMP Amendment/Final EIS incorporates changes based on public comments, cooperating agency input, and internal BLM reviews of the Draft RMPA/EIS. Additional detail has been added and editorial changes have been made throughout the document to improve clarity.

The Proposed RMPA increases protections for GRSG from the Preferred Alternative while balancing public land uses by incorporating management direction approaches from all of the alternatives analyzed in the Draft RMPA and EIS. Specifically, priority habitat management areas (PHMAs) are identified as exclusion for solar and wind energy. PHMA remains an avoidance area for major rights-of-way but the exceptions for allowing development are strengthened. Areas within PHMA that require additional protection have been identified as PHMA with limited exceptions, to be managed as exclusion areas for major rights-of-way, and with no exceptions to the solar and wind energy exclusion allocation or to the no surface occupancy allocation for fluid minerals. These additional protections will provide the necessary conservation of these key areas of GRSG habitat given anticipated development threats and negative impacts from climate change, while ensuring an appropriate balance of public land uses.

In addition, between Draft RMPA/EIS and the Proposed RMPA/Final EIS, the BLM has clarified how the management direction from the 2015 and 2019 planning efforts is being amended by this Proposed RMPA (refer to **Appendix 2**). The management direction for renewable energy, rights-of-way, fluid minerals, livestock grazing, predation, wild horses and burros, adaptive management, mitigation, disturbance cap, saleable minerals, and leasable minerals has been refined and clarified in response to public and cooperating agency comments and internal review. The BLM also made updates throughout the document to clarify the ACECs being considered by the Proposed RMPA and the effects of the alternatives and Proposed RMPA on the ACECs identified for designation in Alternatives 3 and 6. Between the Draft and Final EIS, the BLM also updated the Habitat Management Areas for the states of Oregon, California, and Nevada based on updated science and input from State wildlife agencies and federal partners. Four new appendices were added, detailing (1) changes between Draft RMP Amendment/EIS and Proposed RMP Amendment/Final EIS (**Appendix 20**), (2) description of the six alternatives analyzed in the Draft EIS in the same manner they were presented in the Draft EIS (**Appendix 21**), (3) public outreach conducted on the Draft RMPA/EIS, comments received, and responses to substantive comments (**Appendix 22**), and (4) known inconsistencies between the Proposed RMP Amendment and federal, state, local, and Tribal plans (**Appendix 23**).

NEXT STEPS

The publication of the Notice of Availability in the Federal Register by the US Environmental Protection Agency for the Proposed RMP/Final EIS initiates a 30-day protest period and a 60-day Governor's consistency review. Protests must be postmarked or received no later than 30 calendar days following publication of the Notice of Availability. Please refer to the instructions in the "Dear Reader Letter" at the beginning of this document for additional information on how to submit a protest. The close of the protest period will be 30 days after the publication of the Federal Register Notice of Availability and announced on the BLM's National NEPA Register at: https://eplanning.blm.gov/eplanning-ui/project/2016719/510). Following resolution of any protests and the completion of the consistency review, the Approved RMP Amendments and Records of Decision will be announced via news release and made available electronically on the National NEPA Register.

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APPENDIXES

ACRONYMS AND ABBREVIATIONS

	Full Phrase
°F	degrees Fahrenheit
ACEC	area of critical environmental concern
ADH	all designated habitat
AIM	assessment, inventory, and monitoring
AML	appropriate management level
AMP	allotment management plans
AO	authorized officer
APD	application for permit to drill
ARMPA	approved resource management plan amendment
AUM	animal unit month
BCC 2021	Birds of Conservation Concern 2021
BFO	Butte Field Office
BLM	United States Department of the Interior, Bureau of Land Management
BMP	best management practices
BSU	biologically significant unit
CA	California
CBNG	coalbed natural gas
CEQ	Council on Environmental Quality
CFA	causal factor analysis
CFR	code of federal regulations
CHMA	Connectivity Habitat Management Area
CO	Colorado
COA	conditions of approval
CO_2	carbon dioxide
CO_2e	carbon dioxide equivalent
COT	Conservation Objectives Team
CRVFO	Colorado River Valley Field Office
CSU	controlled surface use
CWA	Clean Water Act
DDT	dichlorodiphenyltrichloroethane
DDCT	density and disturbance calculation tool
DK	North and South Dakota
DOI	United States Department of the Interior
EGS	Enhanced Geothermal Systems
EIS	environmental impact statement
EOI	Expression of Interest
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
ESD	Ecological Site Description
ESR	emergency stabilization and rehabilitation
EVT	existing vegetation type
ES&R	Emergency Stabilization and Rehabilitation

FLPMA	Federal Land Policy and Management Act of 1976
FR	federal regulation
GBBO	Great Basin Bird Observatory
GHG	greenhouse gas
GHMAs	general habitat management areas
GIS	geographic information system
GJFO	Grand Junction Field Office
GPS	global positioning system
GRSG	greater sage-grouse
HAs	herd areas
HAF	habitat assessment framework
HAP	hazardous air pollutant
HBP	held by production
HMAs	habitat management areas
ID	Idaho
IHMAs	important habitat management areas
IM	instruction memorandum
IPaC	Information for Planning and Consultation
IPCC	Intergovernmental Panel on Climate Change
KPLA	known phosphate lease areas
kV	kilovolt
LCHMA	linkage and connectivity habitat management area
LCT	Lahontan cutthroat trout
LMA	linkage management area
LUP	land use plan
LUPA	land use plan amendment
LWC	lands with wilderness characteristics
MA	management area
MD	management direction
MLB	management of land boundary
MR	mineral resources
MSHA	Mine Safety and Health Administration
MT	Montana
MW	megawatt
MZ	management zone
NAAQS	national ambient air quality standards
NEPA	National Environmental Policy Act
ND	North Dakota
NDOW	Nevada Department of Wildlife
NHPA	National Historic Preservation Act of 1966, as amended
NIFC	National Interagency Fire Center
NOx	nitrogen oxides
NRHP	National Register of Historic Places
NSO	no surface occupancy

NTT	National Technical Team
NV	Nevada
OHMA	other habitat management areas
OHV	off-highway vehicle
OR	Oregon
PAC	priority area of conservation
PEIS	programmatic environmental impact statement
PHMAs	priority habitat management areas
PM_{10}	particulate matter with a diameter less than or equal to 10 microns
$PM_{2.5}$	particulate matter with a diameter less than or equal to 2.5 microns
RA	Restoration Area
RDF	required design feature
RFD	reasonably foreseeable development
RHMA	restoration habitat management area
RIPS	Rangeland Improvement Project System
RMP	resource management plan
RMPA	resource management plan amendment
RNA	research natural area
ROD	record of decision
ROW	right-of-way
SD	South Dakota
SDWA	Safe Drinking Water Act
SFAs	sagebrush focal areas
SHPO	State Historic Preservation Office
SMA	Surface Management Agency
SO	Secretarial Order
SO2	sulfur dioxide
SRP	special recreation permit
SSS	special status species
STM	State and Transition Model
TAWS	targeted annual warning system
T&C	terms and conditions
TL	timing limitation
TUP	temporary use permit
UMRBNM	Upper Missouri River Breaks National Monument
US	United States
USC	United States Code
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
UT	Utah
VOC	volatile organic compound

WEM	waivers, exceptions, and modifications
WO	Washington Office
WSA	wilderness study area
WY	Wyoming

Chapter 1. Introduction

1.1 INTRODUCTION

The BLM prepared this Proposed Resource Management Plan Amendment (RMPA)/Final Environmental Impact Statement (FEIS) to analyze potential amendments to a subset of greater sage-grouse (GRSG) goals, objectives, and management allocations and actions to 77 existing land use plans across ten Western states (California, Colorado, Idaho, Montana, Nevada, North Dakota, Oregon, South Dakota, Utah, and Wyoming). Please refer to **Appendix 2** for a list of land use plans being amended (including Resource Management Plans (RMPs) and Management Framework Plans (MFPs)), a description of the existing GRSG management proposed for amendment and existing management not being proposed for amendment. This Proposed RMPA seeks to provide the BLM with locally relevant management actions and allocations that achieve rangewide GRSG conservation goals consistent with the agency's multiple use and sustained yield mission and in support of coordinated GRSG management efforts with federal, state, local, and Tribal partners.

The Federal Land Policy and Management Act of 1976 (FLPMA) directs the BLM to develop and periodically revise or amend its RMPs, which guide management of BLM-administered public lands. The planning process follows BLM planning regulations codified in 43 Code of Federal Regulations (CFR) Part 1600. BLM RMPs identify allowable and restricted uses of public land resources and include overall goals and objectives to manage, protect, and provide for the appropriate use of resources. RMPs also establish systems to monitor and evaluate resources and assess effectiveness of management practices. Consistent with the National Environmental Policy Act of 1969, as amended, (NEPA), the Proposed RMPA is supported by an EIS, which analyzes and discloses potential associated environmental impacts. The FEIS was developed in accordance with the Council on Environmental Quality (CEQ) NEPA implementing regulations at 40 CFR Part l500, and the Department of the Interior NEPA implementing regulations at 43 CFR Part 46[1].

1.2 GRSG PLANNING BACKGROUND

The greater sage-grouse (*Centrocercus urophasianus*) is a state-managed species dependent on intact functioning sagebrush ecosystems. This expansive sagebrush ecosystem habitat is managed by a mix of federal, Tribal, state, and local agencies, as well as private landowners. State and Tribal-led efforts to conserve the species and its habitat date back at least to the 1950s (Connelly et al., 2004). For the past three decades, state wildlife agencies, the BLM and other federal agencies, and many others in the range of the species have collaborated collaborating to conserve GRSG and its habitats. Approximately half of the existing GRSG habitat is managed by the BLM.

In 2010, the U.S. Fish and Wildlife Service (USFWS) determined that listing the GRSG under the Endangered Species Act of 1973 (ESA) was "warranted but precluded" by other priorities (USFWS, 2010c). USFWS made this determination based on two factors identified in section 4(a)(1) of the ESA: continued decline of GRSG habitats, and inadequacy of regulatory mechanisms guiding habitat management. In response, the BLM developed a management strategy, in coordination with the U.S. Forest Service (USFS) resulting in the adoption of the 2015 land use plan amendments. In September 2015, the BLM and USFS signed three Records of Decision and Approved RMPA/Land Management Plan Amendments, which amended 98 BLM and USFS

[1] Recent revisions to the CEQ's NEPA implementing regulations apply to any NEPA process begun after July 1, 2024 (40 CFR 1506.12). Since this EIS was initiated in November 2021, the BLM has utilized the requirements in place at the time of Project initiation. All references to the CEQ NEPA implementing regulations in this document are those effective in November 2021.

land use plans to include goals, objectives, and management allocations and actions for managing GRSG habitat on BLM-administered Public Lands and USFS lands in ten Western states (California, Colorado, Idaho, Montana, Nevada, North Dakota, Oregon, South Dakota, Utah, and Wyoming) (BLM, 2015a and 2015b; USFS, 2015). Subsequently, USFWS determined that the GRSG did not warrant listing under the ESA based in part on the regulatory mechanisms included in the RMP Amendments (USFWS, 2015b).

On March 31, 2017, the US District Court for the District of Nevada held that the BLM violated NEPA by failing to prepare a supplemental Environmental Impact Statement for the designation of sagebrush focal areas (SFAs) and other changes in habitat management areas in the 2015 Nevada and Northeastern California Greater Sage-Grouse Resource Management Plan Amendment. However, the court did not vacate or enjoin implementation of the 2015 Great Basin ROD, which also included Oregon, Idaho, Utah, and Southwestern Montana.

In October 2017, the BLM initiated another GRSG plan amendment process in all states except Montana, North Dakota, and South Dakota to consider specific changes to some GRSG management actions from the 2015 amendments, and to address the concerns identified by the US District Court for the District of Nevada. The planning process also sought to increase alignment with recently completed or updated state GRSG management plans. The purpose and need for the amendments built on the 2015 effort but focused specifically on modifying GRSG management to enhance cooperation and coordination with states and Tribes where applicable, aligning with updated Department of the Interior (DOI) and BLM policy directives and incorporating new or updated local science, research, and information. In 2019, the BLM signed six state-specific Records of Decision and Approved RMP Amendments which adjusted some, but not all of the goals, objectives, and management allocations and actions for managing GRSG habitat on BLM administered lands in seven of the ten Western states (California, Colorado, Idaho, Nevada, Oregon, Utah, and Wyoming) (BLM 2019d-i). Changes to GRSG management actions varied by state.

In October 2019, the US District Court for the District of Idaho issued an order preliminarily enjoining BLM from implementing the 2019 RODs but did not vacate the amendments or their RODs. In 2020, in response to the US District Court for the District of Idaho's order, the BLM prepared supplemental EISs for each state that participated in the 2019 amendments to address and clarify issues identified in the Court's injunction. BLM concluded that no further planning was necessary and the existing NEPA analyses supported the original 2019 RODs. RODs for those supplemental EISs were signed in January 2021 and made no further management decisions. Until the court makes a final ruling in the case or otherwise lifts the preliminary injunction, the BLM is enjoined from implementing the 2019 RODs, and the actions contained in the 2015 RODs remain in effect. However, since the 2019 RODs were not vacated, the associated management actions are being considered for amendment in this planning process.

Please refer to **Appendix 2** for a full description of the management direction from the 2015 and 2019 Approved RMP Amendments and RODs. The full set of 2015 and 2019 planning documents and the 2021 Supplemental EIS documents can be accessed through links on the BLM's GRSG website: https://www.blm.gov/programs/fish-and-wildlife/sagegrouse/blm-sagegrouse-plans.

1.3 Planning Area and Decision Area

The planning area is the geographic area within which the BLM will make decisions. A planning area boundary includes all lands regardless of ownership, but the BLM can only make decisions on public lands and federal mineral estate within the agency's jurisdiction. This rangewide amendment planning area includes all lands within the boundaries of BLM field offices that contain GRSG habitat, excluding the Bi-state distinct population segment (DPS) and the Columbia Basin DPS, which are addressed in other planning efforts. The planning area includes much of the western United States, comprising portions of California, Colorado, Idaho, Montana, Nevada, North Dakota, Oregon, South Dakota, Utah, and Wyoming, as shown on **Map 1.1a**, Surface Management Agencies in the Planning Area.

Within each of these states, the BLM applies its GRSG management direction to GRSG habitat in what are referred to as "Habitat Management Areas" or HMAs. These areas comprise only a portion of the planning area (**Map 1.1b**, Greater Sage-Grouse Habitat Management Areas). Every state includes priority habitat management areas (PHMA) and general habitat management areas (GHMA). BLM Idaho, Montana/Dakotas, Nevada, and Wyoming State Offices have also identified additional habitat management area designations within their states (please refer to **Chapter 2**, **Section 2.5** for a full description and **Appendix 3** for a description of the strategies applied by each state to identify HMAs).

For this Proposed RMPA/Final EIS, the decision area applies to areas within GRSG habitat management areas where BLM administers the lands, including areas where BLM administers subsurface minerals (**Map 1.1c**, Greater Sage-Grouse Habitat Management Areas on BLM Surface Administered Lands). The BLM decision area for some alternatives may also include areas near to, but outside the habitat management areas to address potential indirect impacts to habitat within the habitat management areas (identified in specific management alternatives). The decision area varies by alternative due to GRSG HMA boundary changes based on management strategies in various alternatives. The decision area does not include either the National Forest System surface lands or the federal mineral estate underlying National Forest System lands. For non-federal surface lands with underlying split federal mineral estate, only decisions associated with management/development of the underlying federal minerals are applicable.

1.4 Rangewide Resource Management Plan Amendments

1.4.1 Planning Criteria

Planning criteria are the standards, rules, and guidelines that "guide development of the resource management plan to ensure it is tailored to the issues previously identified" and "that BLM avoids unnecessary data collection and analysis" (43 CFR Part 1610.4-2). In conjunction with the planning issues, planning criteria ensure the process is focused. The criteria also help guide final plan selection and provide a basis for judging responsiveness of the planning options. The BLM developed preliminary planning criteria before public scoping meetings to set sideboards for focused planning and guide decision-making by topic. Preliminary planning criteria were included in the November 2021 Notice of Intent (86 FR 66331) and the BLM encouraged the public to comment on, and suggest additions to, the preliminary criteria through the scoping period. The BLM refined the preliminary planning criteria based on public input. The following criteria guide this RMPA effort:

- The RMPA and associated environmental analyses developed will be completed in compliance with FLPMA, as amended, and NEPA, as amended;
- The RMPA will be completed in compliance with all relevant federal laws and regulations, Executive Orders, and management policies of the BLM;
- Where existing planning decisions are still valid, those decisions may remain unchanged by this RMPA effort and would remain effective
- The RMPA will be limited to making RMP decisions specific to conservation of GRSG habitats, with consideration of impacts from climate change;
- The BLM will consider adequacy of conservation measures for GRSG habitats in existing RMPs;
- The RMPA takes into account climate change and the accelerating effects that climate change has on GRSG habitats;

- BLM RMPs shall be consistent with officially approved or adopted resource related plans, policies, and programs of other federal agencies, State agencies, local governments, and Native American Tribes to the maximum extent consistent with federal law and the purposes of FLPMA (FLPMA Section 202(c)(9) and 43 CFR Subpart 1610-.3-2);
- The BLM will use current scientific information, research, technologies, and results of inventory, monitoring, and coordination to determine appropriate management strategies that will enhance or restore GRSG habitats;
- Lands addressed in the RMPA will be BLM-managed public lands (including surface and sub-surface estate and split estate), for conservation of GRSG habitats; and
- The RMPA will recognize valid existing rights.

1.4.2 Purpose and Need

The BLM's purpose is to amend certain goals, objectives, allocations, and management direction for GRSG management in its RMPs to respond to updated scientific information and changing land uses and provide for consistent and effective rangewide conservation based on biological information that is responsive to locally relevant habitat variability. Following an internal review of the effectiveness of 2015 and 2019 RMP Amendment decisions, including the degree to which those decisions sufficiently addressed threats to greater sage-grouse habitats and continued population declines, while balancing the BLM's ability to manage public lands for other uses, and as informed by updated scientific findings and feedback received from Tribal, federal, state, and local agencies and the public during the scoping period, the BLM proposes to amend the following RMP elements:

- Clarifying the existing GRSG RMP goal
- GRSG habitat management area alignments to incorporate new science and improve alignment along state boundaries along with the associated major land use allocations, including management for non-habitat within habitat management areas
- Adoption of the Western Association of Fish and Wildlife Agencies (WAFWA) definition of "lek" and "lek status"
- Mitigation
- GRSG habitat objectives
- Disturbance caps
- Fluid mineral development and leasing objectives
- Fluid mineral leasing waivers, exceptions, and modifications
- Renewable energy development
- Rights-of-Way
- Minimizing threats from predation
- Livestock grazing
- Wild horse and burro management
- Areas of Critical Environmental Concern
- Adaptive Management

Some management concerns are localized to circumstances in individual States and the ecological diversity across the sagebrush ecosystem. As such, the purpose of this planning effort also includes amending specific RMP management actions associated with state-specific circumstances to facilitate GRSG habitat conservation efforts. Beyond the rangewide considerations detailed above, states considered additional targeted amendments to existing management direction. Each state determined the need to amend management actions independently and based on a review of updated scientific information, changing land uses, and locally relevant habitat variability. Management actions targeted for amendment in some states include saleable minerals, fire and fuels, vegetation and invasives, lands and realty actions, project screening, lek buffers, and interagency coordination. Inclusion of a management category for amendment in one state does not necessitate consideration of this category in other states or the consideration of the category rangewide. See **Section 2.5**, State Specific Circumstances, for more information.

Section 102 of the FLPMA, as amended, requires the BLM to manage public lands "in a manner that will protect the quality of scientific, scenic, historical, ecological, environmental, air and atmospheric, water resource, and archeological values; that, where appropriate, will preserve and protect certain public lands in their natural condition; that will provide food and habitat for fish and wildlife and domestic animals; and that will provide for outdoor recreation and human occupancy and use;". BLM policy further directs the BLM to proactively initiate conservation measures and to minimize or avoid potential adverse effects to prevent decline of sensitive species. Specifically, the BLM's Wildlife and Fisheries Management Manual, M-6500, directs the BLM to "conserve rare, vulnerable, and representative habitats, plant communities, and ecosystems", with specific objectives to "develop and implement plans to ensure that the characteristics of rare, threatened, or representative habitat types are maintained." and to "collaborate with other agencies, the States, and private groups to ensure protection of the best representative habitats/ecosystem/plant communities for each area.". The BLM's Special Status Species Management Manual, M-6840, directs the BLM to "to initiate proactive conservation measures that reduce or eliminate threats to Bureau sensitive species to minimize the likelihood of and need for listing of these species under the ESA."

The BLM is therefore considering amending RMPs to:

- Address continued GRSG habitat losses contributing to GRSG population declines. While GRSG populations experience natural fluctuations, monitoring indicates the most recent nadirs (low point of population cycles) are lower than the prior nadirs in most states. The U.S. Geological Survey[2] analyzed state-collected lek data and reported estimated rangewide population declines of nearly 80 percent from 1966-2021 and of 41 percent from 2002-2021. While some GRSG populations are stable to increasing, over 87 percent of areas throughout the range had declining populations since 2002. The quantity and quality of available habitat, as well as non-habitat factors such as disruptive activities and prolonged drought can affect the size and trend of GRSG populations. Analyses of satellite maps shows sagebrush availability across all land ownerships declined by approximately 3 percent (1.9 million acres) between 2012 and 2018. Nearly 60 percent of the sagebrush losses (approximately 1.1 million acres rangewide) occurred on BLM-administered lands. The BLM's 2021 *Greater Sage-Grouse Plan Implementation Rangewide Monitoring Report for 2015-2020*[3] identified 42 population triggers that had been tripped through 2020. Habitat triggers were tripped sixteen times, mostly the result of sagebrush loss to wildfires. The Monitoring Report also estimated habitat loss of less than one percent in GRSG priority habitat management areas (PHMA) rangewide due to anthropogenic disturbance, although losses due to wildfire were more extensive. The anthropogenic

[2] Coates, P.S., Prochazka, B.G., Aldridge, C.L., O'Donnell, M.S., Edmunds, D.R., Monroe, A.P., Hanser, S.E., Wiechman, L.A., and Chenaille, M.P., 2023, Rangewide population trend analysis for greater sage-grouse (*Centrocercus urophasianus*)—Updated 1960–2022: U.S. Geological Survey Data Report 1175, 17 p., https://doi.org/10.3133/dr1175.

[3] Herren, V., E. Kachergis, A. Titolo, K. Mayne, S. Glazer, K. Lambert, B. Newman, and B. Franey. 2021. Greater sage-grouse plan implementation: Rangewide monitoring report for 2015–2020. U.S. Department of the Interior, Bureau of Land Management, Denver, CO.

loss on BLM lands is less than what scientific literature has identified as the threshold where GRSG abandon leks (Kirol et al., 2020). Disturbance from infrastructure in General Habitat Management Areas (GHMA) and other state-specific habitat management area designations averaged approximately 1.58 percent.

- Ensure habitat management areas and associated decisions incorporate recent relevant science to prioritize management where it will provide conservation benefit and durability when considering the effects of climate change. Since the 2015 and 2019 planning efforts, hundreds of peer-reviewed scientific publications on GRSG and management of their habitats have been published. Some of these new publications are consistent with science the BLM previously considered while others identify new information. Several provide new spatial information on important population and habitat parameters for GRSG. USGS also compiled and summarized peer-reviewed journal articles, data products, and formal technical reports related to GRSG since January 2015 (Teige, et. al. 2023). The BLM considered this new information and relevant science in developing and analyzing proposed management on BLM-administered lands.

1.4.3 GRSG Management Not Considered for Rangewide Amendment

This RMPA is not reconsidering all existing GRSG management actions in the 2015 and 2019 RMP Amendments. Consistent with the planning criteria and purpose and need, management actions in the existing RMPs that do not need to be changed to meet the purpose and need will not be considered for amendment and will remain unaltered in the existing RMPs (see **Appendix 2** for the list of existing GRSG RMP goals, objectives, and management actions from each state, and which are being considered for amendment). **Table 2-1**, Alternatives Considered but Not Analyzed in Detail, identifies the GRSG management that relate to goals, objectives, and management actions from the 2015 and 2019 RMP Amendments that are not being considered for amendment as rangewide changes in this RMPA/EIS and associated rationale. Existing RMP management decisions related to these issues/management will continue to be applicable, unchanged by this effort.

1.5 Issues (Resource Topics) Analyzed in Detail

In the November 2021 Notice of Intent initiating this planning effort, the BLM invited the public to identify issues, management questions, or concerns related to the preliminary purpose and need (refer to **Section 5.4.1** for more information on scoping) to guide development of the impact analysis. Public comments were evaluated to identify resources that could potentially be affected by the GRSG sagebrush habitat management. The BLM compiled comments received from members of the public and various governmental and non-governmental groups to describe the issues and analysis concerns that are discussed in this document. (Refer to Scoping Report at: https://eplanning.blm.gov/eplanning-ui/project/2016719/570).

On March 15, 2024, the BLM released the Draft RMPA/Draft EIS for a 90-day public comment period, which closed on June 13, 2024. The BLM held thirteen public meetings, including two virtual meetings and eleven in-person public meetings, across the planning area. The BLM revised the EIS based on issues, management questions, and concerns raised during the public comment period.

When reviewing comments provided during scoping and the public comment period in context of the purpose and need, the BLM considered points of disagreement, debate, or dispute regarding anticipated environmental effects from the proposed management goal, management allocations, and management direction being considered in the alternatives and the Proposed RMP Amendment. When determining whether to retain a resource topic for more detailed consideration or analysis in this RMPA/EIS, the interdisciplinary team considered several questions, including:

- Is analysis of the issue necessary to make a reasoned choice between alternatives? That is, does it relate to how the proposed action or alternatives respond to the purpose and need?
- Is the resource issue/topic associated with a significant direct, indirect, or cumulative impact, or where analysis is necessary to determine the significance of impacts?

1.5.1 Issues/Resource Topics Considered/Analyzed

Decision-makers and the public need to understand the impacts each alternative would have on specific resources and resource uses. The following resource issues/topics are analyzed in detail in this RMP Amendment/EIS are:

- Special status species (including GRSG)
- Fish and wildlife
- Air resources and climate
- Soil resources
- Water resources
- Vegetation
- Riparian areas and wetlands
- Wild horses and burros
- Cultural resources
- Lands with wilderness characteristics
- Wildland fire ecology
- Livestock grazing
- Recreation
- Travel and transportation
- Mineral resources
- Lands and realty
- Areas of Critical Environmental Concern (ACECs)
- Tribal interests
- Social and economic conditions, including environmental justice

1.5.2 Issues/Resource Topics Considered but Not Analyzed in Detail

This Proposed RMPA and Final EIS consider the effects of the management goal, management allocations, and management actions on most public land resources and uses (see bulleted list in **Section 1.5** above). The following are issues/resource topics that were considered but not analyzed in detail and the supporting rationale:

- ***Paleontology:*** RMP-level management of GRSG would not substantially affect paleontological resources. There are no proposed disturbances that would adversely affect these resources, nor would any management for GRSG provide benefits to paleontological resources. Implementation could result in impacts, but analyses and mitigation would be better identified at the project level. Any impacts would be required to conform to existing paleontology law, policies, and RMP decisions.
- ***Visual Resources (VRM):*** Neither this RMPA effort nor existing GRSG management actions address VRM decisions. There are no proposed disturbances or alteration of the visual settings proposed in any of the alternatives. Implementation actions could result in impacts, but analysis and mitigation would be better identified at the project level, and any impacts would be required to conform to existing law, policies, and RMP decisions.
- ***Cave/Karst:*** RMP-level management of GRSG would not substantially affect cave and karst resources. There are no proposed disturbances, nor would any management for GRSG provide benefits to cave/karst resources.
- ***Forestry:*** There are no management actions specific to forestry in the GRSG amendments. GRSG habitat is not congruent to forestry resources.

- **Existing Special Designations other than new potential ACECs specifically for GRSG and Research Natural Areas in Oregon:** There are a variety of special designations that occur throughout the west that may overlap with GRSG habitat management areas. This includes the following:
  - Existing designated ACECs (whether for GRSG or other resources/values)
  - Wild and Scenic Rivers (suitable or eligible)
  - National Trails
  - National Monuments
  - National Conservation Areas
  - Congressionally-designated Wilderness Areas
  - Wilderness Study Areas

  These areas are identified and/or designated under a variety of statutory authorities, policies, and/or legislation. They include management specific to protect the values for which they were established. Decisions made through this RMPA would not supersede existing laws, regulations, policies, or existing RMP decisions directing management of any resources or values in these areas other than GRSG habitat. Existing management from those various sources is designed to manage/protect the associated values/resources for which these areas were identified/designated, which may include GRSG habitat. For example, GRSG essential winter range is listed in the Monument Proclamation, for the Upper Missouri River Breaks National Monument in Montana, and therefore requires special management attention that is complementary to other underlying management for which the Monument was established. Those GRSG values are considered in this RMPA. For all management associated with other non-GRSG resources and values in these areas, any authorized activities would need to be consistent with protection of those resources and values. This RMPA effort would only alter the existing management associated with GRSG habitat. All other existing management that is already designed to protect/manage the non-GRSG resources and values would remain unchanged. Because of existing management there would be no substantial impacts to the non-GRSG resources and values in these areas from the changes considered in this amendment.

1.6 STATUTORY AND REGULATORY CONTEXT

The BLM develops land use plans through a planning and NEPA process that includes public involvement. Section 202 of FLPMA and its implementing regulations direct the BLM to develop and periodically revise or amend its RMPs, which guide management of BLM-administered public lands (43 U.S.C. 1712, 43 CFR Part 1600). FLPMA further provides that the BLM "shall manage the public lands under principles of multiple use and sustained yield … except that where a tract of such public land has been dedicated to specific uses according to any other provisions of law it shall be managed in accordance with such law" (43 U.S.C. 1732(a)). FLPMA also directs the BLM to coordinate with other federal departments and agencies, state and local governments, and Tribal Nations to seek to promote consistency among land use plans across jurisdictions (43 CFR Subpart 1610.3-2).

NEPA directs "all agencies of the Federal Government…[to]…utilize a systematic, interdisciplinary approach which will ensure the integrated use of the natural and social sciences and the environmental design arts in planning and in decision making which may have an impact on man's environment" (42 U.S.C. 4332(A)). This Proposed RMPA and Final EIS examine a range of alternatives to resolve the issues in question. Alternatives represent complete but different means of satisfying the agency's identified purposes and needs.

1.7 Changes Between Draft RMPA/EIS and Proposed RMPA/Final EIS

The Proposed RMP/Final EIS incorporates changes based on public comments, cooperating agency input, and internal BLM reviews of the Draft RMPA and EIS. Additional detail has been added and editorial changes have been made throughout the document to improve clarity. Refer to Appendix 20 for a document section by section (chapters and appendices) summary of the changes made between the Draft and Final EIS.

The Proposed RMPA increases protections for GRSG from the Preferred Alternative while balancing public land uses by incorporating management direction approaches from all of the alternatives analyzed in the Draft RMPA and EIS. Specifically, priority habitat management areas (PHMAs) are identified as exclusion for solar and wind energy. PHMA remains an avoidance area for major rights-of-way but the exceptions for allowing development are strengthened. Areas within PHMA that require additional protection have been identified as PHMA with limited exceptions, to be managed as exclusion areas for major rights-of-way, and with no exceptions to the solar and wind energy exclusion allocation or to the no surface occupancy allocation for fluid minerals. Since the changes in management were consistent across the range, the areas were less suited to ACECs, which are generally tailored to different values and locations. These additional protections will provide the necessary conservation of these key areas of GRSG habitat given anticipated development threats and negative impacts from climate change, while ensuring an appropriate balance of public land uses.

In addition, between Draft and Final EIS, the BLM has clarified how the management direction from the 2015 and 2019 planning efforts is being amended by this Proposed RMPA. The management direction for renewable energy, rights-of-way, fluid minerals, livestock grazing, predation, wild horses and burros, adaptive management, mitigation, disturbance cap, saleable minerals, and leasable minerals has been refined and clarified in response to public and cooperating agency comments and internal review. The BLM also made updates throughout the document to clarify the ACECs being considered by the Proposed RMPA and the effects of the alternatives and Proposed RMPA on ACECs. Between the Draft and Final EIS, the BLM also updated the Habitat Management Areas for the states of Oregon, California, and Nevada based on updated science and input from State wildlife agencies and federal partners.

1.8 Consistency with State and Local Land Use Plans and Programs and Policies Therein

Section 202 of FLPMA and BLM's resource management planning regulations (43 CFR Subpart 1610.3-2) directs the BLM to coordinate planning efforts with Native American Tribes, federal agencies, and state and local governments. The BLM is directed to keep apprised of state, local, and Tribal plans; assure consideration is given to such plans; and assist in resolving inconsistencies between such plans and BLM plans. Subsection (c)(9) states, "Land use plans of the Secretary [of the Interior] under this section shall be consistent with state and local plans to the maximum extent he [or she] finds consistent with federal law and the purposes of this Act."

To the maximum extent practicable, the BLM will ensure consistency with officially approved or adopted resource-related plans of other federal, state, local, and Tribal governments and policies and programs contained therein, to the extent that they are consistent with the purposes, policies, and programs of federal laws and regulations applicable to public lands. The BLM follows the procedures set forth in the regulations to address any potential inconsistency. Where State and local government policies, plans, and programs differ, those of the higher authority will normally be followed, consistent with 43 CFR Subpart 1610.3-2(d).

Consistent with 43 CFR Subpart 1610.4-7 of the BLM Resource Management Planning regulations, the BLM made the Draft RMPA/EIS available to Governors, other federal agencies, state and local governments, and Native American Tribes for comment. State and local officials reviewed and provided input on the alternatives as cooperating agencies. All of the states have proposed suggested management approaches and adjustments to management direction specific to their state. Many counties also identified their preferences for specific management actions and their displeasure with others. As detailed in the Draft RMPA/EIS, several counties and some states asserted inconsistencies between State and local plans and specific components considered across the range of alternatives. Several of the specific inconsistencies raised were relevant to management direction considered for livestock grazing, closures to minerals and lands and realty actions, no surface occupancy stipulations for fluid minerals, disturbance caps, designation of Areas of Critical Environmental Concern, and the development of a single-species focused plan. Inconsistencies between State and local plans and Alternative 3, which provides the most protective measures to preserve GRSG and its habitat, were identified by multiple state and local governments.

The BLM has worked extensively with the ten State Governments within the planning area to promote consistency with each of the States' GRSG plans and with the GRSG plans of the many cooperating local and county governments. The feedback and input of State fish and wildlife agencies and local governments significantly shaped the Draft RMPA/EIS and the Proposed RMPA/Final EIS. Each BLM State Office has held numerous meetings with State wildlife agencies and county cooperating agencies to seek consistency with their respective plans. Additionally, the BLM and the States have coordinated on this planning effort through the Western Governor's Sage-grouse Task Force which has met frequently and consistently throughout this planning process.

Through input provided by Tribal, federal, state, and local agencies on the Draft RMPA/EIS, the BLM has identified known inconsistencies between the Proposed RMPA and state, local, and Tribal land use plans in **Appendix 23**. **Appendix 14**, **Section 14.1** also provides a cumulative effects analysis that addresses State and local conservation plans and efforts. The formal 60-day consistency review by the Governors occurs when the Proposed RMPA/Final EIS is submitted to the Governor of the states involved, as outlined in 43 CFR 1610.3-2(e) of BLM planning regulations. Information from these consistency review efforts will help inform BLM state-specific Approved RMPA and RODs.

1.9 Ongoing Actions

The BLM has numerous ongoing reviews of proposed projects, ranging from proposals for which the BLM has just received an application to those where the BLM is nearing a decision. The extent to which the GRSG Approved RMP Amendments and Records of Decision (RODs) will apply to these ongoing projects will depend on the stage of the project in the National Environmental Policy Act (NEPA) review and decision-making process. To maintain the orderly administration and management of the public lands, the BLM will be consistent with the GRSG Approved RMP Amendments/RODs unless the BLM issues a Draft EIS or Environmental Assessment for the project before the publication of the GRSG Approved RMP Amendments/RODs. The decision for such projects and any subsequent authorizations associated with the approval (such as the issuance of a right-of-way authorized by a decision) will be exempted from the requirements of this effort's approved GRSG planning decision. The BLM has the discretion to apply the GRSG Approved RMP Amendments/RODs to these exempted projects and will seek input from the project proponent prior to exercising such discretion.

In addition, the following projects will not be subject to the decisions made in the GRSG Approved RMP Amendment/RODs:

- Caldwell Canyon Revised Mine and Reclamation Plan (DOI-BLM-I000-2024-00041-EIS)
- Dodge Flatt II Solar Project (DOI-BLM-NV-C020-2024-0001-RMP-EA)
- Bridge Creek Area Allotment Management Plans (DOI-BLM-ORWA-B060-2021-0004-EIS)
- HiTech Lithium Exploration Plan of Operation (DOI-BLM-ORWA-V000-2023-0045-EA)
- BLM Wyoming June 2022 Competitive Oil and Gas Lease Sale (DOI-BLM-WY-0000-2024-0007-EA)
- BLM Wyoming 2025 First Quarter Competitive Oil and Gas Lease Sale (DOI-BLM-WY-0000-2024-0006-EA)
- BLM Wyoming 2025 Second Quarter Competitive Oil and Gas Lease Sale (DOI-BLM-WY-0000-2024-0008-EA)

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Chapter 2. Alternatives

2.1 Introduction

This chapter provides a summary of the six alternatives considered in the Draft Environmental Impact Statement (EIS) and a complete description of the Proposed RMP Amendment (**Section 2.4**). The Proposed RMP Amendment was developed in response to public, cooperating agency, and Tribal comments on the Draft EIS and represents the seventh alternative being considered in this Final EIS. The Proposed RMP Amendment includes a combination of management direction identified in several of the alternatives analyzed in the Draft EIS. The Proposed RMP Amendment, detailed in **Section 2.4**, identifies rangewide management allocations and management direction that are applicable to all states (**Table 2-2**, **Table 2-3**, **Table 2-4**, and **Table 2-5**). The rangewide direction is followed by additional state specific management direction, organized by state in **Section 2.5**.

A detailed description of the Draft EIS alternatives can be found in **Appendix 21**, Alternatives. **Appendix 2**, Existing GRSG Management in BLM RMPs, identifies all existing GRSG management (inclusive of both 2015 and 2019 ARMPAs) for each state and identifies whether the existing management direction is being proposed for amendment by this plan amendment effort. Alternative 1 represents the management direction from the 2015 RMPA and Alternative 2, the No Action Alternative, represents the management direction from the 2019 RMPA. Only a subset of management actions from the 2015 and 2019 efforts are being considered for amendment and the proposed changes in that management are described in Alternatives 3, 4, 5, 6, and the Proposed RMP Amendment. The existing decisions from the 2015 and 2019 planning efforts that are not identified in the Proposed RMP Amendment (or in the alternatives analyzed in the Draft EIS) will remain in place and are described in **Appendix 2**.

This chapter also describes alternatives considered but eliminated from detailed analysis in **Section 2.3, Table 2-1**.

2.2 Alternatives

The RMPA and EIS consider a range of alternatives designed to meet the BLM's Purpose and Need (**Section 1.4.2**). The alternatives respond to updated scientific information and changing land uses and provide for consistent and effective rangewide conservation based on biological information that is responsive to locally relevant habitat variability.

Following is a summary of the alternatives analyzed in the Final EIS. A detailed description of the Alternatives 1-6 and introductory information on the resource topics addressed in the management direction can be found in **Appendix 21**. A summary comparison of the alternatives and the Proposed RMP Amendment is provided in **Table 2-14**.

Alternative 1 (Applicable Decisions from the 2015 ARMPA)

Alternative 1 includes the applicable decisions from the 2015 Approved RMPAs (ARMPA) that are being analyzed for potential amendment as part of this planning effort. It does not include all the goals, objectives, and actions from the 2015 ARMPAs. Under Alternative 1, the BLM would re-adopt the applicable GRSG habitat management area (HMA) boundaries, goals, objectives, and actions from the 2015 Records of Decision (ROD)/ARMPAs (as updated through plan maintenance). Due to the U.S. District Court of Idaho's preliminary injunction preventing implementation of the 2019 amendments (see explanation in Alternative 2 summary below) this alternative reflects how the BLM is currently managing GRSG habitat on public lands. This includes designation of some areas of PHMA as Sagebrush Focal Areas (SFA) with a recommendation to withdraw them from mineral location and entry under the Mining Law of 1872.

Alternative 2 – No Action (Applicable Decisions from the 2019 ARMPA)

Alternative 2 is the No-Action Alternative and includes the applicable decisions from the 2019 Greater Sage-Grouse ROD/ARMPAs efforts except in Montana/Dakotas, which did not amend their RMPs in 2019. This is the No Action because it reflects the management language currently in the BLM's approved land use plans. The U.S. District Court for the District of Idaho has issued a preliminarily injunction, preventing the BLM from implementing the 2019 amendments, but not vacating them or their Records of Decision. Because the 2019 RODs/ARMPAs were not vacated, they are the existing management plans. Under this alternative the BLM would apply the management from the 2019 ARMPA. SFAs would be removed from the BLM RMPs in all states except Oregon and Montana; these areas would still be managed with all the protections of PHMA but would no longer include a recommendation for withdrawal (including in the Oregon SFAs).

Alternative 3

Alternative 3 provides the most protective measures to preserve GRSG and its habitat of the alternatives analyzed. Alternative 3 would update the Habitat Management Area (HMA) boundaries based on new information and science that has become available since the 2015 and 2019 planning efforts. All HMAs would be managed as priority HMA (PHMA). The BLM would close PHMA to new fluid mineral leasing, saleable minerals/mineral materials permits, and nonenergy leasable minerals leasing (development associated with existing permits and leases would not be precluded). PHMA would be recommended for withdrawal from location and entry under the Mining Law of 1872 and unavailable for livestock grazing. PHMA would also be ROW exclusion areas. Where there are currently designated wild horse and burro herd management areas overlapping PHMA, the wild horse and burro herd management area would become a Herd Area that is not managed for wild horses and burros. Under Alternative 3, the BLM would designate 32 GRSG habitat ACECs.

Alternative 4

Alternative 4 would update the habitat management area boundaries and associated management based on new information and science that became available since the 2015 and 2019 efforts. While many of the allocations would be similar to Alternatives 1 and 2, the habitat management areas are updated to reflect new science. Under Alternative 4, in Wyoming, all PHMA would be managed with no surface occupancy stipulations for new oil and gas leases (all other states have this stipulation in PHMA in this and the other alternatives in the Proposed RMP Amendment). In addition, management associated with some of the major minimization measures (e.g., disturbance cap and adaptive management) is adjusted to address cross-boundary coordination of shared populations, rangewide biological and managerial concerns based on monitoring, and experience gained from implementing management for GRSG since 2015. Alternative 4 allows compensatory mitigation to be used under specific conditions. Additional compensatory mitigation may be required where habitat and/or population adaptive management thresholds have been met. Areas previously identified as SFAs are generally managed as PHMA. The primary difference between management of SFAs in the 2015 Plans and PHMAs in this planning effort is that PHMA would not include a recommendation for withdrawal or prioritization strategies for oil and gas leasing and grazing permit renewals.

Alternative 5

Alternative 5 was identified as the preferred alternative in the Draft EIS. Alternative 5 considers other potential alignments of habitat management areas and associated management to try to balance GRSG conservation with public land uses. If state governments updated the GRSG management area boundaries in their specific state plans, the BLM is considering those boundaries on public lands in Alternative 5. HMAs are similar to but refined from Alternative 4 and restrictions would generally be similar to Alternative 4; with the exception of Wyoming which would follow the oil and gas management direction in Alternative 2; and the fact that Alternative 5 considered options with fewer restrictions on resource uses and provided more opportunities for considering compensatory mitigation to offset impacts on GRSG and its habitat than Alternative 4. Areas previously identified as SFAs are generally managed as PHMA. The primary difference between management of SFAs in the 2015 Plans and PHMAs in this planning effort is that PHMA would not include a recommendation for withdrawal or prioritization strategies for oil and gas leasing and grazing permit renewals.

Alternative 6

Under Alternative 6, management for all habitat management areas and the resource topics being considered in the range of alternatives would be the same as described for Alternative 5 except that under Alternative 6, 32 ACECs are proposed for designation. The same ACECs proposed for designation under Alternative 3 would be considered but the management direction for these areas would be less restrictive compared to Alternative 3.

Proposed RMP Amendment

The Proposed RMP Amendment increases protections for GRSG and its habitat from the Preferred Alternative (Alternative 5) in the Draft EIS. The Proposed RMP Amendment, described in detail below in **Section 2.4** and **Section 2.5**, identifies PHMA as exclusion for solar and wind and NSO for fluid minerals with exceptions. PHMA remains an avoidance area for major rights of way but the exceptions for allowing development are more restrictive. Areas within PHMA requiring additional protections have also been identified. Within these areas referred to as PHMA with limited exceptions, there are no exceptions to the solar and wind exclusion allocation or for the NSO allocation for fluid minerals. PHMA with limited exceptions are also exclusion areas for major rights of way. These additional protections in the Proposed RMP Amendment are designed to provide the necessary protections for GRSG and its habitat in light of anticipated development threats and negative impacts from climate change such as drought.

2.3 ALTERNATIVES CONSIDERED BUT NOT ANALYZED IN DETAIL

The BLM considered several alternatives and components of alternatives that were subsequently dismissed from detailed analysis. These are summarized in **Table 2-1** below. Consistent with the BLM's NEPA Handbook H-1790-1, alternatives were eliminated from detailed analysis for the following reasons:

- It is ineffective (it would not respond to the purpose and need).
- It is technically or economically infeasible.
- It is inconsistent with the basic policy objectives for the management of the area.
- Its implementation is remote or speculative.
- It is substantially similar in design to an alternative that is analyzed.
- It would have substantially similar effects to an alternative that is analyzed.

Additional details on alternatives proposed by the public during scoping can be found on the BLM's National NEPA Register website: https://eplanning.blm.gov/eplanning-ui/project/2016719/570 and additional detail on alternatives proposed during the public comment period on the Draft RMPA and EIS can be found in **Appendix 22**, Responses to Substantive Public Comments on the Draft EIS.

Table 2-1. Alternatives Considered but Not Analyzed in Detail

Alternative	Rationale for Dismissal From Detailed Analysis
2015 and 2019 Alternatives Considered but Not Analyzed in Detail The BLM reviewed all the alternatives considered but not analyzed in detail in the separate 2015 and 2019 planning processes. Such dismissed alternatives include a USFWS-listing alternative; managing all designated habitats as ACECs; eliminating recreational hunting; closing GRSG habitat to OHV use; adopting county-specific plans to BLM-administered lands; increased grazing alternative; and leasing GRSG habitat for oil shale and tar sands development or including stipulations for such development.	The rationale provided in those documents for dismissing them from detailed analysis still apply. The prior alternatives dismissed from detailed analysis are, therefore, dismissed from detailed analysis for the same reasons as described previously. Detailed descriptions of these alternatives and the rationales for dismissal are provided in Section 2.2 of the November 2018 Northwest Colorado Greater Sage-Grouse PRMPA and FEIS, Section 1.5.2 of the November 2018 Idaho Greater Sage-Grouse PRMPA and FEIS, Sections 1.5.3 and 2.2 of the November 2018 Nevada and Northeastern Greater Sage-Grouse PRMPA and FEIS, Sections 1.5.3 and 2.2 of the November 2018 Oregon Greater Sage-Grouse PRMPA and FEIS, Sections 1.5.3 and 2.2 of the November 2018 Utah Greater Sage-Grouse PRMPA and FEIS, Section 1.6.3 of the November 2018 Wyoming Greater Sage-Grouse PRMPA and FEIS. Section 1.6.4 and 2.11 of the June 2015 Lewistown FO Greater Sage-Grouse PRMPA and FEIS, Section 2.4 of the June 2015 Billings and Pompeys Pillar National Monument PRMP and FEIS, Chapter 2 from the June 2015 HiLine PRMP and FEIS, Chapters 1 and 2 of the June 2015 Miles City FO PRMP and FEIS, Chapter 2 from the June 2015 South Dakota Proposed RMP/Final EIS, and Sections 1.6 and 2.11 of the June 2015 North Dakota Greater Sage-Grouse PRMPA and FEIS. These sections are hereby incorporated by reference into this EIS.
A COT and NTT Specific Alternative The BLM, the USFWS, states and other federal agency partners prepared the NTT (2011) and the Greater Sage-grouse Conservation Objectives: Final Report (COT Report–2013) reports to identify rangewide GRSG conservation objectives and conservation measures that would inform the USFWS 2015 decision under the Endangered Species Act and inform partners and provide guidance for the BLM to consider through land use planning. The BLM considered developing an alternative that would establish the NTT and COT reports' conservation objectives and conservation measures as land use planning direction.	**Alternative would not respond to the purpose and need** The NTT and COT reports, published in 2011 and 2013, do not address how the implementation of their GRSG conservation measures would relate to other uses of the public lands—such as fluid mineral development and livestock grazing. Moreover, the NTT and COT reports do not quantify the GRSG conservation benefits of each respective conservation measure. They are not compendiums that, standing alone, represent best available or most current science and, therefore, they do not meet the purpose and need. The BLM utilized the reports to inform development of alternatives, consistent with the BLM's previous planning efforts in 2015 and 2019. Additional context related to the COT and NTT reports and rationale why they were not included as specific alternatives in this effort is provided in **Appendix 6.**

Alternative	Rationale for Dismissal From Detailed Analysis
State Specific Alternatives During the alternative development process, the States of Idaho and Wyoming each suggested a "state alternative."	**Alternative would have substantially similar effects to an alternative that is analyzed; Alternative is ineffective/would not respond to the purpose and need; Alternative is inconsistent with the basic policy objectives for the management of the area** The BLM determined that most of the actions included in each subject alternative were already evaluated among other alternatives the BLM analyzed in detail. In some instances, the exact language was already in the range of alternatives or was incorporated in Alternative 5. In other instances, the proposed language was substantially similar to language already being considered, or that would result in substantially similar effects. In very few instances, the BLM determined the proposed language was not consistent with the purpose and need (e.g., removing the disturbance cap), and included recommendations that were not consistent with BLM policies. Because the RMP-level actions in the submissions are considered in the range of alternatives, developing a stand-alone state alternative is not necessary for consideration of effects.
Alternative that establishes rangewide protection measures to minimize disturbance to GRSG habitat given other BLM management responsibilities. Such measures could include design features, disturbance and density caps, and buffers around important GRSG habitat types.	**Alternative would not respond to the purpose and need** The BLM included several management tools in the 2015 amendment efforts to avoid and minimize disturbance of GRSG habitats. A primary tool was identifying HMAs and making land use allocations associated with the different land uses and HMA priorities. Another was disturbance and density caps to limit infrastructure at or below levels of GRSG tolerance as indicated by research. Other management tools included required design features (RDFs), application of lek buffers, seasonal limitations, and constraints on noise and tall structures, all of which would be considered and applied when analyzing a proposal. As part of the current effort, the BLM is considering amending HMAs, allocations, and disturbance caps. However, after reviewing existing plans, available literature, and habitat and population trends, changes to existing language on RFDs and lek buffers, as well as the other minimization measures, would not be proposed for amendment during this plan amendment because such a change would not be consistent with updated scientific information, nor would it allow the BLM to be responsive to biological information that considers locally relevant habitat variability. • There is no single buffer distance that would be appropriate for all populations and habitats across the range of GRSG (Manier et al. 2014). Lek buffers are generally used to conserve breeding and nesting habitats and are developed and applied as a uniform tool used in the lack of more accurate local information. As more specific data are collected on nesting habitats the applicability of generalized buffers across GRSG range will become less important to identifying and managing seasonal habitats. As described above, lek buffers are not the only or final conservation tool to avoid or minimize disturbance. • GRSG habitats vary across the species' range, with topography and vegetation influencing GRSG use of an area within a given buffer. These differences influenced state management decisions in the prior efforts. Application of buffers, and subsequent consideration of departures (either larger or smaller) from these buffers based on site-specific information, was adjusted to the landscape characteristics and management strategy applied in each state. A rangewide buffer standard would be inconsistent with both landscape characteristics and GRSG management strategies. Therefore, existing lek buffer language will remain in place unless state-specific circumstances warrant adjustments in that state (Idaho is addressing lek buffers in their state-specific, Additional Management Direction (refer to **Table 2-8**).

Alternative	Rationale for Dismissal From Detailed Analysis
	• Since the prior planning efforts, no publications reviewed research related to buffer sizes or provided broad recommendations for buffers to be applied throughout the range. In the absence of new literature, and because local conditions and strategies drive the role of lek buffers in avoiding and minimizing disturbance, there is no rationale to reconsider use of lek buffers across the range. • Similarly, each prior amendment effort included an appendix with a series of required design features (RDFs) to be considered and applied when considering authorizations. These RDFs were developed in coordination with state partners and cooperating agencies and were adjusted to the major issues associated with each BLM State Office's amendment effort. These RDFs have been considered as tools to avoid or minimize the effects of specific projects in each state.
Alternative that amends existing rangewide management actions that may have unintended effects, such as additional surface disturbance associated with burying power lines or co-locating powerlines	**Alternative would have substantially similar effects to an alternative that is analyzed** Under the Proposed RMP Amendment, and in the alternatives, any disturbance occurring in PHMA would need to meet disturbance cap requirements. Similarly, major rights of way in PHMA are avoidance with specific criteria that must be met in order to allow a major right of way and avoidance in GHMA. In PHMA with limited exception areas, major rights of way are excluded with stringent criteria that must be met in order to allow a major right of way. In GHMA major and minor rights must apply appropriate state minimization measures to maintain habitat. The mitigation direction also requires that in all GRSG habitat management areas, consistent with valid existing rights, that the BLM will apply the mitigation hierarchy when authorizing third-party actions resulting in GRSG habitat loss and degradation to achieve a minimum standard of no net habitat loss. Thus, while the Proposed RMP Amendment does not specifically develop design criteria for the burying or co-locating of power lines, the management direction certainly anticipates threats from disturbance associated with rights of way and addresses them not only in the PHMA disturbance cap management direction but throughout the proposed management direction within PHMA and GHMA. Impacts associated with burying and collocating powerlines would be considered during project planning-level and impacts documented as part of the NEPA process.
Alternative that considers land tenure adjustments as a conservation tool to consolidate land ownership into more manageable areas	**Alternative would not respond to the purpose and need** Existing language in the 2015 and 2019 GRSG RMPAs regarding land tenure adjustments allow for potential ownership adjustments that could be beneficial to GRSG conservation and so the topic is not addressed by this amendment effort. The BLM is only proposing to amend a subset of 2015 and 2019 GRSG RMP Amendment decisions that the BLM found were not sufficiently and appropriately addressed and that did not need to be updated based on new scientific information or changes in land use.
Alternative that amends vegetation/habitat management strategies to sustain resilient and resistant GRSG and sagebrush habitat while avoiding unintended consequences to other species that occupy these habitats	**Alternative would not respond to the purpose and need** The 2015 GRSG RMPA included substantial vegetation/habitat management strategies in GRSG habitat. This included documentation before using sagebrush reduction treatment types and prescribed fire. Where pinyon/juniper encroachment is a concern management actions focused where treatments should be prioritized. Existing management also includes the critical need to coordinate treatments with partners, incorporate GRSG habitat objectives in monitoring treatments, and considers an array of treatment types to achieve GRSG habitat

Alternative	Rationale for Dismissal From Detailed Analysis
	objectives, including the ability to consider the use of targeted livestock grazing. These actions were presented in the context of managing for GSRG habitat considering biological and ecological resistance and resilience when planning and applying treatments. Because the 2015 management actions provided these sideboards, considerations, and desired conditions, few, if any changes to these actions were made in the 2019 RMPA effort. Similarly, after reviewing existing management actions, in context of new science, existing RMP management actions for vegetation/habitat management strategies are sufficient, and no changes need to be considered. The BLM is only proposing to amend a subset of 2015 and 2019 GRSG RMP Amendment decisions that the BLM found were not sufficiently and appropriately addressed and that did not need to be updated based on new scientific information or changes in land use. The 2015 and 2019 vegetation/habitat management decisions were not identified as needing amendment.
Alternative that considers management strategies that could limit the vast acreages of GRSG and sagebrush habitat lost to wildland fire and invasive species	**Alternative would not respond to the purpose and need** The 2015 GRSG Plans included many management actions addressing the threat of wildland fire in GRSG habitat management areas. This included prioritizing suppression efforts to limit loss of GRSG habitat, guidance for suppression efforts, the need for proactive efforts such as fuel breaks and fuel reduction projects, and considerations and commitments associated with reclamation and restoration after wildland fires in GRSG habitat management areas. The management included requirements for use of prescribed fire in GRSG habitat management areas, as well as the importance of coordinating all levels of fire management (suppression, pre-suppression, and restoration) with partners across the landscape. There were few changes to these wildland fire management actions in the 2019 Plans as they were already consistent with state strategies. Reviewing existing wildland fire and invasive species RMP management action shows existing wildland fire and invasive species management action are sufficient for RMP-level decision-making, and no changes need to be considered. Any management changes necessary in wildland fire management to reduce wildland fire risk to GRSG would be made at the project/implementation level. While changes to existing wildland and invasive species management actions will not be considered, changes to other management actions will be considered based on the threats from wildland fire and invasive species. Management actions that could limit the potential for ignition sources or the prevalence of or spread of fine fuels and invasives that contribute to uncharacteristically large and intense wildfires will be considered. The effect of wildland fire on GRSG habitat quantity and quality will also be considered when evaluating habitat management areas. This includes the potential for habitat management areas to be durable in the face of changing conditions associated with climate change. The potential effects of the alternatives on the number, size and intensity of wildfires and the spread of invasive species and their impacts on GRSG habitat quality and quantity are considered in this EIS.

Alternative	Rationale for Dismissal From Detailed Analysis
Alternative that considers amendments to recreation and travel and transportation management direction to protect GRSG and sagebrush habitat	**Alternative would not respond to the purpose and need** Recommendations for recreation and travel management received during public scoping are either already in the existing RMP language from 2015 and 2019 or are not RMP-level decisions. Such actions would be consistent with existing management or are not applicable at the RMP-level so no changes in RMP management actions need to be considered. The BLM is only proposing to amend a subset of 2015 and 2019 GRSG RMP Amendment decisions that the BLM found were not sufficiently and appropriately addressed and that did not need to be updated based on new scientific information or changes in land use. The 2015 and 2019 travel and transportation management decisions were not identified as needing amendment. As noted, the travel and transportation allocations of open, limited, and closed are not being addressed by this RMPA. Nor does the RMPA make any implementation level travel and transportation decisions and, as such, is not addressing any existing travel and transportation plans. However, changes in HMA boundaries in the alternatives and the Proposed RMP Amendment could potentially change areas where the 2015 and 2019 RMP Amendment allocations are applied. For example, an area that is currently open (and not designated as an open off-highway vehicle area) could become limited due to an area that was not previously identified as habitat (in 2015 or 2019) and is identified as either GHMA or PHMA in an alternative (including the Proposed RMP Amendment) in this RMPA. Areas that are identified as GHMA and PHMA follow the limited allocation and management direction identified in the 2015 and 2019 Amendments. The effects of the HMA boundaries on travel and transportation allocations, by state, are described in the Transportation and Travel Management sections in **Appendix 10** and **Chapter 4**, and in **Appendix 9**, **Tables 4-4** – **4-7**.
Alternative where AUMs in GRSG habitat are based on prolonged drought, warmer temperatures, and reduced grass production. Alternative that conducts a capability and suitability-type analysis of grazing conflicts with GRSG needs; apply mandatory, measurable conservative use periods; and avoid the breeding period, hot season, and winter use in GRSG habitats in any lands where grazing might continue. Alternatives that specify acceptable livestock grazing utilization, trampling levels, and shrub structural protections and other mandatory and enforceable	**Alternative would have substantially similar effects to an alternative that is analyzed** Under Alternatives 4 and 5 and Proposed RMP Amendment the BLM will consider adjustments to active AUMs, timing, intensity, duration, and frequency of grazing are completed at the allotment scale based on site-specific conditions to meet or make progress towards meeting Land Health Standards for special status species (including greater sage-grouse). In **Appendix 15**, Livestock Grazing Management Best Practices and Design Features and Supplemental Information, drought response and addressing vegetation recovery is specifically addressed. For these reasons, the BLM feels the alternatives considered in this EIS are substantially similar to the proposed alternative. Adjustments to the existing number of AUMs are completed at the allotment scale based on site-specific conditions to meet management objectives during grazing authorization renewals, AMP development, or other appropriate implementation-level planning consistent with the BLM's Land Health Standards and livestock grazing regulations (43 CFR Part 4180.2(e)(9)). Additionally, temporary adjustments can be made annually to livestock numbers, the number of AUMs, and season of use within the range of the terms and conditions and in accordance with applicable regulations. The BLM is better suited to make adjustments that respond to drought and to develop terms and conditions for how grazing in specific areas should be conducted during implementation-level decisions related to allotment management plans or term permit renewals through activity- and implementation-level decision making at the allotment level. While the RMPA does not specify exactly how AUMs should be adjusted or provide methods for identifying appropriate utilization in the

Alternative	Rationale for Dismissal From Detailed Analysis
terms and conditions for both upland and riparian vegetation. Alternative relative to livestock grazing management to facilitate sagebrush recruitment and survival. That alternative should develop allotment management plans, cooperatively with willing permittees, with objective utilization levels sufficient to facilitate sagebrush recruitment and survival.	management direction, existing BLM grazing policy allows the BLM to consider a wide spectrum of management responses and the consideration of GRSG habitat objectives in meeting the BLM's Land Health Standards.
Alternatives for constructing exclosures to use as ungrazed reference areas: identify that during land health evaluations, small (10 acres or less) reference areas would be considered in priority sage-grouse habitat to exclude livestock use for the purposes in aiding the BLM's ability to establish control areas when analyzing impacts to permitted activities such as livestock grazing and better inform management decisions.	**Alternative would not respond to the purpose and need** The BLM is only proposing to amend a subset of 2015 and 2019 GRSG RMP Amendment decisions that the BLM found were not sufficiently and appropriately addressed and that did not need to be updated based on new scientific information or changes in land use. Ungrazed livestock controls was not identified as a need for amendment at the rangewide scale but is addressed as a state specific circumstance in Oregon. As part of the state-specific management direction for Oregon, the BLM has an objective to manage "Key RNAs" as baseline reference areas for sagebrush plant communities and would make all or portions of some of the Key RNAs unavailable to livestock grazing; providing ungrazed comparison areas for research (refer to **Appendix 17**).
Alternative that follows the same approach used by the Ely District that implements sagebrush habitat restoration in a systematic fashion at a watershed scale.	**Alternative would not respond to the purpose and need** The 2015 GRSG RMPA included substantial vegetation/habitat management strategies in GRSG habitat. This included documentation before using sagebrush reduction treatment types and prescribed fire. Where pinyon/juniper encroachment is a concern management actions focused where treatments should be prioritized. Existing management also includes the critical need to coordinate treatments with partners, incorporate GRSG habitat objectives in monitoring treatments, and considers an array of treatment types to achieve GRSG habitat objectives, including the ability to consider the use of targeted livestock grazing. These actions were presented in the context of managing for GSRG habitat considering biological and ecological resistance and resilience when planning and applying treatments. Because the 2015 management actions provided these sideboards, considerations, and desired conditions, few, if any changes to these actions were made in the 2019 RMPA effort. Similarly, after reviewing existing management actions, in context of new science, existing RMP management actions for vegetation/habitat management strategies are sufficient, and no changes need to be considered. The BLM is only proposing to amend a subset of 2015 and 2019 GRSG RMP Amendment decisions that the BLM found were not sufficiently

Alternative	Rationale for Dismissal From Detailed Analysis
	and appropriately addressed and that did not need to be updated based on new scientific information or changes in land use. The 2015 and 2019 vegetation/habitat management decisions were not identified as needing amendment.
Alternative that includes close coordination with local and state fire managers for coordinated fire suppression in GRSG habitat and for aggressive fuels reduction projects and postfire rehabilitation.	**Alternative would not respond to the purpose and need** While not a planning level decision, the 2015 ARMPAs speak to coordination across ownerships and managerial responsibilities. In addition, while specific fire suppression efforts, identification and implementation of fuels reduction projects, and postfire rehabilitation, including coordination across multiple agencies and jurisdictions, are critical to successfully reducing wildfire risks, they are conducted at the site-specific scale.
Alternative that defers SFA designation to states.	**Inconsistent with the basic policy objectives for the management of the area** The BLM coordinates closely with states in the identification of habitat areas but cannot defer the designation of such areas on BLM-administered lands to the states. The management needed for public lands, whether PHMA, GHMA, or other designations, needs to occur in the BLM's land use plans to comply with FLPMA. However, states can recommend management of certain areas through this process. The BLM would not identify SFAs under Alternatives 2,3,4,5,6, and the Proposed RMP Amendment.
A deferral alternative of federal land and minerals in southwestern Montana from oil and gas leasing pending revision of the Dillon RMP. The BLM should also evaluate a deferral alternative that would commit to not lease in the Beaverhead, Big Hole, and Centennial valleys until it revises the 2006 Dillon RMP.	**Alternative is substantially similar in design to an alternative that is analyzed; Alternative is ineffective/would not respond to the purpose and need** An alternative that defers leasing in a given area would be substantially similar in effect to an alternative that considers closing an area to leasing. The BLM has developed a range of alternatives related to areas available or not available for oil and gas leasing, as well as stipulations for leasing activities to address the continued GRSG habitat losses and declines in GRSG populations. Alternative 3 considers closing PHMA to oil and gas leasing.
Alternative that focuses on increasing development, including additional mineral leasing and development, wind and solar, or rights-of-way.	**Alternative would not respond to the purpose and need** An alternative that decreases stipulations/restrictions in an effort to encourage more development would not be consistent with the purpose and need to address the continued GRSG habitat losses and declines in GRSG populations. In addition, mineral leasing and granting rights-of-way are implementation-level decisions. The RMP identifies areas available or not available for such uses as mineral and any stipulations required for protection of GRSG. The RMP does not include any implementation decisions such as leasing areas or granting rights-of-way.
Alternative that considers removing the disturbance cap.	**Alternative would not respond to the purpose and need** As explained in the BLM's Purpose and Need, this planning effort addresses the continuing losses of GRSG habitat and the associated population declines. Research across the species' range has identified relationships between various anthropogenic developments and GRSG avoidance behavior or lek abandonment. An alternative that considers removing a tool that addresses a threat to GRSG would not be consistent with the

Alternative	Rationale for Dismissal From Detailed Analysis
	purpose and need. The BLM's purpose is to amend a subset of the 2015 and 2019 GRSG RMP Amendment goals, objectives, allocations and management actions to respond to updated scientific information and changing land uses and provide for consistent and effective rangewide conservation based on biological information that is responsive to locally relevant habitat variability. The BLM does not believe removing the disturbance cap would serve to provide for consistent and effective rangewide conservation given updated biological scientific information.
Alternative that is a climate action plan/multiple-use alternative that considers policies that require optimizing the domestic development of minerals.	**Alternative would not respond to the purpose and need** The purpose and need of this planning process is to address the continued GRSG habitat losses and declines in GRSG populations. Considering an alternative that focuses on increasing activities that are known to impact GRSG would not be consistent with the purpose and need. In Alternative 1, which reflects the 2015 RMP Amendment, Sagebrush Focal Areas were recommended to be withdrawn from location and entry under the 1872 Mining Law. Alternatives 2,4, 5, and 6 do not identify Sagebrush Focal Areas and do not recommend any areas for mineral withdrawal. BLM-administered lands in the planning area are open to mineral development as per the 1872 Mining Law unless otherwise withdrawn.
Alternative that balances economic, social, and conservation considerations.	**Alternative's implementation is remote or speculative; Alternative is substantially similar in design to an alternative that is analyzed** Some scoping comments recommended consideration of an alternative that balances considerations for conservation with economic and social needs. As a concept without more specific suggestions the recommendation was too general to develop a specific alternative around. However, many of the alternatives considered in detail address differing levels of management constraints within GRSG habitat and their associated effects on public land uses.
Alternative focused on multiple use: avoid public lands that are off limits to use; instead provide active management and appropriate mitigation measures that can be implemented based on site-specific information.	**Alternative would not respond to the purpose and need; Alternative is substantially similar in design to an alternative that is analyzed** All the BLM's alternatives comply with the direction in FLPMA that public lands be managed "under principles of multiple use and sustained yield…except that where a tract of such public land has been dedicated to specific uses according to any other provisions of law it shall be managed in accordance with such law" (43 USC 1732(a)). Beyond that, an alternative that does not avoid disturbance eliminates the primary tool research has shown protects GRSG and their habitat, and therefore would not be consistent with the purpose and need. In addition, all the alternatives considered in detail apply the full mitigation spectrum of avoiding impacts, then minimizing effects if avoidance is not possible, and then providing compensatory mitigation for residual effects. Alternative 3 focuses on avoidance whereas alternatives 2 and 5 provide more consideration for compensatory mitigation and consideration of local circumstances. Given the general nature of the alternative proposed, the current range of alternatives include actions that are similar in both content and effect.

Alternative	Rationale for Dismissal From Detailed Analysis
Alternative that is consistent with the October 5, 2020, Humboldt County approved Policy on Rangeland Management and Health and with other policies on livestock grazing. The BLM should also consider the references cited within the county's policy as part of the overall body of science used to inform any new BLM RMPA.	**Alternative would not respond to the purpose and need; Alternative is inconsistent with the basic policy objectives for management of the area** The BLM must comply with its grazing regulations which require managing for land health standards, including providing habitat for special status species, including GRSG. In addition, as a rangewide conservation effort, a county-focused plan for a species that uses large landscapes that may include multiple counties is too narrow. As part of this planning process, we have coordinated and sought input from many cooperating local and county governments. The BLM works to find a balance among uses and needs as reflected in these local government plans, and has done so in the preparation of the Draft RMPA/EIS. The BLM is aware that there are specific state or local laws relevant to aspects of public land management that are discrete from, and independent of, federal law. However, the BLM is bound by federal law. Therefore, there may be inconsistencies that cannot be reconciled. The FLPMA requires that the BLM's land use plans be consistent with state and local plans "to the extent…practical." In a situation where state and local plans conflict with federal law, the BLM must follow federal law. Thus, while state, county and federal planning processes, under FLPMA, are required to be as integrated and consistent as practical, the federal agency planning process is not bound by or subject to county plans, planning processes, or planning stipulations. An alternative that adopts a county policy would also be too narrowly focused and inconsistent with the purpose and need because it would not address the conservation of GRSG habitat and would likely conflict with BLM grazing policy/management.
Alternative that establishes management direction to address threats from wildfire and invasive plants	**Alternative would not respond to the purpose and need** The BLM recognizes and agrees that wildfire and invasive vegetation are threats to greater sage-grouse and its habitat. Although the BLM recognizes the threats of wildfire and invasive vegetation to GRSG and its habitat, the BLM, in this RMP amendment is not amending the management direction from the 2015 and 2019 RMPA RODs that relate to wildfire and invasive vegetation because the direction provided by these existing RODs sufficiently and appropriately addresses these threats. Based on the internal review of the effectiveness of 2015 and 2019 RMP Amendment decisions and the degree to which those existing decisions sufficiently and appropriately addressed existing threats, continued population decline, and updated scientific findings; and informed by public and state partner input; the BLM determined that the existing wildfire and invasive vegetation management direction from the 2015 and 2019 amendments did not warrant amending. Although the BLM determined these topics were outside the purpose and need of this amendment effort, the BLM will continue to address the threats of wildfire and invasive vegetation through the continued implementation of the management direction that addresses these topics in the 2015 and 2019 Amendments (refer to existing management direction described in **Appendix 2**).
Alternative in which land disposal is permitted where compensatory mitigation offsets any net impacts.	**Alternative would not respond to the purpose and need; Alternative is substantially similar in design to an alternative that is analyzed** The BLM did not address land tenure adjustments in GRSG habitat in this planning effort. The existing GRSG management direction from the 2015 and 2019 RMP Amendments would remain in place which identify Priority Habitat Management Areas as land tenure zone 1, where the objective is to retain the lands in public ownership.

Alternative	Rationale for Dismissal From Detailed Analysis
	Addressing an alternative that would allow for the adjustment of these land tenure allocations does not meet the purpose and need of this amendment. The BLM did not address land tenure because as noted in the Purpose and Need, the BLM is only proposing to amend a subset of 2015 and 2019 GRSG RMP Amendment decisions that the BLM found were not sufficiently and appropriately addressed and that did not need to be updated based on new scientific information or changes in land use. The 2015 and 2019 land tenure decisions were not identified as needing amendment.
Alternative using oil & gas potential as criteria for addressing fluid mineral leases in GRSG habitat.	**Alternative is substantially similar in design to an alternative that is analyzed; Alternative would have substantially similar effects to an alternative that is analyzed** The Proposed RMP Amendment revises the fluid mineral Objective. The Objective, described in **Table 2-4** calls for the BLM to manage fluid mineral leasing and development (including geothermal) in GRSG habitat management areas to avoid, minimize, and compensate for adverse impacts to GRSG habitat to the extent practical under the law and BLM jurisdiction. Draft EIS Alternatives 1, 2 (in some states), and 4 consider language to guide leasing. Under the Proposed RMP Amendment, no specific objective or management action would specify a fluid mineral leasing strategy. However, its absence does not remove the objective to manage public lands to provide suitable GRSG habitat at the HAF mid-, fine- and site-scales. Fluid mineral leasing would be considered in GRSG habitat management areas consistent with the Secretary's discretion under the Mineral Leasing Act (as amended), as well as applicable BLM regulations and policies, and in conformance with RMP goals, objectives, stipulations, and required design features to avoid, minimize, and compensate impacts to GRSG.
Alternative that utilizes a set of 17, interrelated conservation measures to address greater sage-grouse decline that are organized into 7 primary categories: brood rearing habitat, winter habitat, climate change, drought, livestock grazing, rights of way, travel, and sagebrush reserves.	**Alternative is substantially similar in design to an alternative that is analyzed; Alternative would have substantially similar effects to an alternative that is analyzed; Portions of the Alternative would not respond to the purpose and need** The BLM did not develop an alternative that identified the exact combination of 17 measures identified by the commenting organization because the conservation measures proposed were substantially similar to those proposed by the BLM in Alternatives 1, 3, 4, 5, and 6 and in the Proposed RMP Amendment and would have substantially similar effects as the alternatives analyzed. Additionally, portions of the proposal did not meet the purpose and need for the RMP Amendment. The BLM's identification of Habitat Management Areas are on key population (e.g., Doherty et al. 2016, Coates et al., 2021b), genetic (e.g., Cross et al., 2018, Oyler-McCance et al., 2022) connectivity (e.g., Row et al. 2018, Cross et al., 2023) habitat (e.g., Doherty et al., 2016, Wann et al., 2022, Doherty et al., 2022) and climate change (Palmquist et al., 2021, Rigge et al., 2021c) and coordinated with state authorities (such as wildlife agencies) to identify and update GRSG habitat management areas (HMA). These HMAs account for and include seasonal habitats (nesting, brood-rearing habitat and winter) and the effects of climate change including drought. In the RMPA, the BLM analyzed six alternatives and developed a Proposed RMP Amendment that proposes varied management approaches to address the threats to GRSG habitat and specifically propose approaches for livestock grazing, rights of way, and conservation of habitats through the identification of potential ACECs, Priority HMAs, and Priority HMAs where limited exceptions should apply. While the BLM did not use the terminology "sagebrush reserves", the management approaches

Alternative	Rationale for Dismissal From Detailed Analysis
	proposed for ACECs, Priority HMAs, and Priority HMAs with limited exceptions provide the types of conservation approaches commonly associated with a "reserve". The BLM did not address travel and transportation because as noted in the Purpose and Need, the BLM is only proposing to amend a subset of 2015 and 2019 GRSG RMP Amendment decisions that the BLM found were not sufficiently and appropriately addressed and that did not need to be updated based on new scientific information or changes in land use. The 2015 and 2019 travel and transportation decision were not identified as needing amendment.
Alternative that includes the Strategic Areas identified for Oregon in 2015 Draft and Final EIS.	**Alternative is substantially similar in design to an alternative that is analyzed; Alternative would have substantially similar effects to an alternative that is analyzed; Portions of the Alternative would not respond to the purpose and need** The BLM is not identifying Strategic Areas in Oregon. Strategic areas were discussed in the BLM's Draft and Final EIS for the 2015 Oregon RMP Amendment. They were not identified in the BLM's ROD for the 2015 RMP Amendment. In this RMP Amendment effort, the BLM is choosing to focus management direction that protects and conserves GRSG in Priority and General GRSG Habitat Management Areas (PHMA and GHMA). The BLM reviewed new scientific publications since our previous planning efforts on key population (e.g., Doherty et al. 2016, Coates et al., 2021b), genetic (e.g., Cross et al., 2018, Oyler-McCance et al., 2022) connectivity (e.g., Row et al. 2018, Cross et al., 2023) habitat (e.g., Doherty et al., 2016, Wann et al., 2022, Doherty et al., 2022) and climate change (Palmquist et al., 2021, Rigge et al., 2021c) and coordinated with state authorities (such as wildlife agencies) to identify and update GRSG habitat management areas (HMA). The HMAs are identified using inventory data on habitat use and occupancy and reflect the dynamic nature of the vegetation communities that make-up GRSG habitat. Within the HMA types identified rangewide: PHMA, PHMA with limited exceptions, and GHMA, the BLM has proposed management direction focused on preserving and maintaining these habitats through limitations on public land uses, creating a disturbance cap, and through implementation of a mitigation and adaptive management strategy. This management direction complements existing management actions that the BLM takes to identify priority restoration areas and consider GRSG habitat as part of that prioritization process. Addressing a prioritization process through the identification of Strategic Areas in Oregon is outside the purpose and need and scope of this amendment. The BLM did not address a restoration prioritization process because as noted in the Purpose and Need, the BLM is only proposing to amend a subset of 2015 and 2019 GRSG RMP Amendment decisions that the BLM found were not sufficiently and appropriately addressed and that did not need to be updated based on new scientific information or changes in land use. The 2015 and 2019 restoration decision were not identified as needing amendment.
Alternative that establishes sagebrush reserves that encompasses centers of sage-grouse abundance on the landscape and protect a sufficiently large proportion of habitat to sustain biological processes.	**Alternative is substantially similar in design to an alternative that is analyzed; Alternative would have substantially similar effects to an alternative that is analyzed** Although the BLM is not referring to areas where GRSG habitat conservation will be applied as "reserves", the BLM is proposing conservation in the types of habitat areas proposed and they are similar in size and expanse as suggested. The BLM is proposing GRSG conservation based on population abundance and ensuring an adequate amount of area to sustain biological processes. In this RMP Amendment effort, the BLM is choosing to focus

Alternative	Rationale for Dismissal From Detailed Analysis
	management direction that protects and conserves GRSG in Priority and General GRSG Habitat Management Areas (PHMA and GHMA). The BLM reviewed new scientific publications since our previous planning efforts on key population (e.g., Doherty et al. 2016, Coates et al., 2021b), genetic (e.g., Cross et al., 2018, Oyler-McCance et al., 2022) connectivity (e.g., Row et al. 2018, Cross et al., 2023) habitat (e.g., Doherty et al., 2016, Wann et al., 2022, Doherty et al., 2022) and climate change (Palmquist et al., 2021, Rigge et al., 2021c) and coordinated with state authorities (such as wildlife agencies) to identify and update GRSG habitat management areas (HMA). The HMAs are identified using inventory data on habitat use and occupancy and reflect the dynamic nature of the vegetation communities that make-up GRSG habitat. Within the HMA types identified rangewide: PHMA, PHMA with limited exceptions, and GHMA, the BLM has proposed management direction focused on preserving and maintaining these habitats through limitations on public land uses, creating a disturbance cap, and through implementation of a mitigation and adaptive management strategy. The development of a "reserve" system is sufficiently similar to the conservation strategy that the BLM is currently proposing in Proposed RMP Amendment and in the alternatives in the Draft EIS including Alternative 3 that proposed the highest levels of protection across GRSG habitat. The effects of the proposed reserve system would be sufficiently similar to that of the Proposed RMP Amendment.
Alternative that includes the nominated Sagebrush Sea Area of Critical Environmental Concern (ACECs).	**Alternative is inconsistent with BLM policy objectives for management of the area; Alternative would not respond to the purpose and need** The BLM received the "Sagebrush Sea" ACEC nomination during scoping. This nomination includes approximately 48.2 million acres public land in the planning area. The nomination is based on sage-grouse priority areas of conservation referred to as PACs in the US Fish and Wildlife Service's (USFWS) 2013 Conservation Objectives Team Report (COT Report) as well as 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." The BLM did not identify the Sagebrush Sea as potential ACEC in any of the Draft EIS alternatives because the area did not meet the ACEC relevance and importance criteria (1610.7-2 (d)) because the BLM believes the PAC criteria utilized in identifying the Sagebrush Sea nomination no longer reflects the most up to date science on habitat connectivity, populations, effects to habitat from climate change, and genetic information across the range of the species. In this RMP Amendment effort, the BLM is choosing to focus management direction that protects and conserves GRSG in Priority and General GRSG Habitat Management Areas (PHMA, PHMA with limited exceptions, and GHMA). The BLM reviewed new scientific publications since our previous planning efforts on key population (e.g., Doherty et al. 2016, Coates et al., 2021b), genetic (e.g., Cross et al., 2018, Oyler-McCance

[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.

Alternative	Rationale for Dismissal From Detailed Analysis
	et al., 2022) connectivity (e.g., Row et al. 2018, Cross et al., 2023) habitat (e.g., Doherty et al., 2016, Wann et al., 2022, Doherty et al., 2022) and climate change (Palmquist et al., 2021, Rigge et al., 2021c) and coordinated with state authorities (such as wildlife agencies) to identify and update GRSG habitat management areas (HMA). The HMAs are identified using inventory data on habitat use and occupancy and reflect the dynamic nature of the vegetation communities that make-up GRSG habitat. Analyzing the Sagebrush Sea would not meet the BLM's purpose and need to amend a subset of 2015 and 2019 GRSG RMP Amendment decisions based on new scientific information or changes in land use.
Alternative that includes the following Oregon ACEC nominations received during either scoping or the comment period on the Draft EIS: All areas within PHMA McDermitt Caldera Firestone Basin Ibex Butte Packsaddle Draw-Horseshoe Ridge Coyote Hills Irish Hill-Big Lake Catlow Valley Beatys Butte Riddle Creek West Steens Grassy Ridge Oregon Canyon Mountains Hog Creek Ridge Star Mountain Louse Canyon Table Mountain Juniper Ridge aa-Tiipi Flat Nominations for ACECs in Oregon previously evaluated in the 2015 Oregon RMP Amendment: Willow Virtue Flat Trout Creek	**Alternative is inconsistent with BLM policy objective for management of the area;** The BLM reviewed all of the nominations received for Oregon during the scoping and Draft EIS comment period and only found two areas that could potentially meet the ACEC relevance and importance criteria for greater sage-grouse: Louse Canyon and Soldier Creek. The BLM considered areas identified as PHMA in Oregon as well previously identified Oregon Sagebrush Focal Areas and Priority Areas of Conservation in light of updated scientific information in order to determine if any areas within Oregon that were either newly nominated or previously nominated and evaluated in the 2015 RMP Amendment met the relevance and importance criteria. BLM Oregon's ACEC review, assessment, and evaluation process focused on the new GRSG scientific information on key population (e.g., Doherty et al. 2016, Coates et al., 2021b), genetic (e.g., Cross et al., 2018, Oyler-McCance et al., 2022) connectivity (e.g., Row et al. 2018, Cross et al., 2023) habitat (e.g., Doherty et al., 2016, Wann et al., 2022, Doherty et al., 2022) and climate change (Palmquist et al., 2021, Rigge et al., 2021c) and coordinated with state authorities (such as wildlife agencies) to identify and update GRSG habitat management areas (HMA). The BLM Oregon ACEC review, assessment, and evaluation process did not consider or consider in detail potential historic, cultural, scenic, or non-GRSG fish and wildlife values in accordance with the purpose and need for this planning effort. (Nominations that addressed resource values beyond greater sage-grouse will be considered by the BLM during future planning efforts.) The BLM Oregon assessment considered all existing, designated ACECs and Research Natural Areas when located in PHMA (existing and new/proposed). This review and assessment of all PHMA/PACs also included many of the proposed, analyzed, and not-designated ACEC areas from the 2014/2015 EIS alternatives (when located in existing or new PHMA and assessing based only on the new science information). During the assessment process BLM Oregon discussed and coordinated cross border issues and locations with the BLM Nevada and BLM Idaho. The BLM Oregon also coordinated with the Oregon Department of Fish and Wildlife during the assessment process to identify potential ACEC locations/areas using their population and habitat criteria. As noted above, the assessment process for all PHMA (existing and proposed) in Oregon resulted in identification of two areas that the BLM evaluated to determine if they met the relevance and importance criteria. After evaluating the two areas (Louse Canyon and Soldier Creek), the team concluded that both areas met the relevance criteria for fish and wildlife resource (specific to GRSG and the new science), but that neither area met the importance criteria (more than locally significant). Because none of the nominated areas were

Alternative	Rationale for Dismissal From Detailed Analysis
Star Mountain Red Hills Lone Mountain Jackass Goose Frederick Butte East Warner Diable Peak Cow Creek Corner Buck Creek Beatys Butte Antelope Abert Rim	identified as having relevance and importance, the BLM did not identify any of the nominated ACECs in Oregon as potential ACECs in the Draft or Final EIS.
Alternative that would increase protections for existing ACEC is Oregon: Abert Rim Black Canyon Castle Rock Coal Mine Basin Devils Garden Lava Beds Fish Creek Rim Foley Lake Foster Flat Guano Creek-Sink Lakes Hawksie-Walksie High Lakes Juniper Mountain Kiger Mustang Lake Ridge Long Draw North Ridge Bully Creek Rahilly-Gravelly Red Knoll South Bull Canyon Spanish Lake Spring Mountain	**Alternative would not respond to the purpose and need** In reviewing potential areas for nomination as ACECs in the Draft EIS, the Oregon team evaluated whether existing ACECs should receive additional levels of protection than already afforded by their existing RMP decisions. The team also noted that some district designated ACECS and RNAs (designated in district specific Resource Management Plans underlying the 2015 ARMPA) were in part designated with specific GRSG/GRSG habitat relevance/importance values along with special management considerations. In addition, the 2015 GRSG ARMPA added special management considerations for additional ACECs/RNAs. During the assessment process for this EIS the team noted that many of these district-specific and 2015 ARMPA ACECS/RNAs are in appropriate locations relative to the new science data. Through this evaluation process the BLM did not identify any increased level of protections needed for any of the identified ACECs with the exception of the High Lakes ACEC which is in PHMA and has been identified in the Proposed RMP Amendment as an area where PHMA with limited exceptions management direction will apply. It was determined that providing additional protections to the existing ACECs identified, aside from the management direction already proposed for the GRSG HMAs was outside the purpose and need for the amendment because the BLM is only proposing to amend a subset of 2015 and 2019 GRSG RMP Amendment decisions that the BLM found were not sufficiently and appropriately addressed and that did not need to be updated based on new scientific information or changes in land use.

Alternative	Rationale for Dismissal From Detailed Analysis
Stockade Mountain Toppin Creek Butte	
Alternative that includes the Nevada Department of Wildlife Population Management Units nominated ACEC.	**Alternative is inconsistent with BLM policy objectives for management of the area;** The BLM Nevada reviewed all of the nominations received during the scoping and during the Draft EIS comment period including the proposal to nominate the Nevada Department of Wildlife Population Management Units (PMUs) as an ACEC. The PMUs include all habitat management areas as well as areas of non-habitat within the Nevada and northeastern California sub-region. The BLM evaluated the PMUs for consistency with ACEC policy and concluded that these areas generally meet the relevance criteria for fish and wildlife resource (specific to GRSG), but did not meet the importance criteria (more than locally significant). Because the nominated areas did not meet both relevance and importance criteria, and because GRSG habitat within the PMUs are already identified for GRSG-specific management, the BLM did not identify the PMUs as a potential ACEC.
Alternatives consistent with state and local plans	**Alternative is substantially similar in design to an alternative that is analyzed; Alternative would have substantially similar effects to an alternative that is analyzed; Alternative would not respond to the purpose and need;** The BLM has worked extensively with the ten state governments within the planning area to promote consistency with each of the states' GRSG plans and with the GRSG plans of the many cooperating local and county governments. The feedback and input of state fish and wildlife agencies and local governments significantly shaped the Draft Plan Amendment/Draft Environmental Impact Statement (EIS) and the Proposed RMP Amendment/Final EIS. Each BLM State Office has held numerous meetings with state wildlife agencies and county cooperating agencies to seek consistency with their respective plans. Additionally, the BLM and the states have each participated in over twenty meetings as part of Western Governor's Sage-grouse Task Force, including weekly meetings preparing the alternatives in the fall of 2023. In analyzing a range of alternatives to meet the BLM's purpose and need for action, it is recognized that some alternatives will align with state and local plans to differing degrees. The BLM works to find a balance among uses and needs as reflected in these local government plans and has done so in the preparation of the Draft RMPA/EIS. The FLPMA requires that the BLM's land use plans be consistent with state and local plans "to the extent…practical." In a situation where state and local plans conflict with federal law, the BLM must follow federal law. The BLM has identified known inconsistencies with Tribal, state, and local plans in **Chapter 1**, **Section 1.8** and **Appendix 23**. The BLM has also provided a cumulative effects analysis that addresses each state's GRSG plans in **Appendix 14**, **Section 14.1**. The BLM did not consider an alternative that directly incorporates the entirety of state or local plans as many of the components therein are substantially similar to alternatives considered or are substantially similar in effect to alternatives analyzed in detail. Moreover, such an alternative would not meet the BLM's purpose and need for this planning effort.

2.4 DETAILED DESCRIPTION OF THE PROPOSED RMP AMENDMENT

This section describes the Proposed RMP Amendment rangewide goal, objectives, and management direction in **Table 2-2**, **Table 2-3**, **Table 2-4**, and **Table 2-5** for the resource topics identified for amendment in the purpose and need (**Chapter 1**, **Section 1.4.2**). The rangewide management direction is organized by Habitat Management Area designation and applies to all states unless specifically identified. **Table 2-2** identifies the Proposed RMP Amendment's goal. **Table 2-3** describes the management direction that applies in Priority Habitat Management Areas (PHMA), **Table 2-4** describes the management direction for areas within PHMA receiving limited exceptions, and **Table 2-5** describes the management direction that applies in General Habitat Management Areas (GHMA). Following this rangewide, HMA-specific description of the management direction, **Section 2.5** provides additional, state specific management direction organized by state.

Table 2-2. GRSG Goal

Proposed RMP Amendment Goal
Conserve, enhance, restore, and manage GRSG habitat to support persistent, healthy populations, consistent with Section 102 of the Federal Land Policy Management Act, as amended, BLM's Special Status Species Management Policy (BLM-M-6840, and BLM's Wildlife and Fisheries Management Manual (BLM-M-6500)) and in coordination and cooperation with state wildlife agencies and appropriate state authorities. Habitat conservation and management should maintain existing connectivity between GRSG populations.

Habitat Management Area Alignments

The BLM reviewed new scientific publications since previous planning efforts on key population (e.g., Doherty et al. 2016, Coates et al., 2021), genetics (e.g., Cross et al., 2018, Oyler-McCance et al., 2022) connectivity (e.g., Row et al. 2018, Cross et al., 2023) habitat (e.g., Doherty et al., 2016, Wann et al., 2022, Doherty et al., 2022) and climate change (Palmquist et al., 2021, Rigge et al., 2021) and coordinated with state authorities (such as wildlife agencies) to identify and update GRSG habitat management areas (HMA) as a component of this RMP Amendment effort. The HMAs are identified using inventory data on habitat use and occupancy and reflect the dynamic nature of the vegetation communities that make-up GRSG habitat. The HMA boundaries are not identified using survey-grade assessments (e.g., comprehensive on-the-ground surveys and edge verifications) and, in some states, are the result of large-scale modeling. Therefore, not every acre within an HMA boundary may be GRSG habitat. BLM will address areas of non-habitat within an HMA in accordance with the **Criteria Based Management for Non-Habitat** management direction described in **Table 2-3** below.

The BLM applies its management allocations and management direction for GRSG within these HMAs. Those allocations and management direction are described in the tables that follow. Although the BLM has identified and mapped the HMAs to encompass multiple land ownerships, reflecting the wide-ranging ecological needs of GRSG, the management allocations and management direction that follow only apply to BLM-administered lands, including areas where BLM administers subsurface minerals. Following are the rangewide HMA categories that are identified in each state in the planning area followed by a description of additional, state-specific HMAs that have been identified. Refer to **Appendix 3** for a description of the strategies applied by each state to identify HMAs. See **Appendix 1** for maps of the HMAs.

Table 2-3. Habitat Management Areas

Proposed RMP Amendment Allocation
GRSG habitat management areas would be identified as shown on **Map 2.7**. Acres by state and rangewide are shown in **Table 2-15**. Information on state-by-state GRSG HMA mapping strategies is in **Appendix 3**.
Rangewide Habitat Management Areas
Priority Habitat Management Areas (PHMA) have the highest value to maintaining sustainable GRSG populations and can include breeding, late brood-rearing, winter concentration areas, and migration or connectivity corridors. The BLM intent for these areas is to maintain and enhance habitat conditions that will support persistent and healthy GRSG populations through management to minimize habitat loss and degradation. **PHMA with limited exceptions** are areas within PHMA where additional protections to support conservation of GRSG habitat would reduce impacts from highly probable resource threats.
General Habitat Management Areas (GHMA) are lands that are, or have the potential to become, occupied seasonal or year-round habitat outside of PHMA, managed to sustain GRSG populations. These areas are defined differentially by state wildlife management agencies, but generally are of poorer GRSG habitat quality with reduced occupancy when compared to PHMA. Some state wildlife agencies have identified areas of GHMA as important for restoration, connectivity, or seasonal habitats. The intent for GHMA is to maintain habitat conditions to support GRSG populations consistent with the state agency designations of recovery, connectivity, or seasonal habitats.
State-Specific Habitat Management Areas Additional, state-specific habitat management areas have been identified in Colorado, Idaho, Montana/Dakotas, Nevada/California, Utah, and Wyoming. Refer to **Appendix 3** for a description of the strategies applied by each state to identify HMAs and for updates that have been made to these areas between the Draft and Final EIS.
Colorado **Linkage Management Area (LMA)** are defined as areas that have been identified as broader regions of connectivity important to facilitate the movement of GRSG and to maintain ecological processes.
Idaho **Important Habitat Management Areas (IHMA**) are defined as lands that encompass moderate to high-quality GRSG habitat and populations necessary for providing a management buffer for PHMA, connecting patches of PHMA, and in some cases supporting important populations and habitat independent of PHMA. The intent for IHMA is to maintain habitat conditions that will support persistent and healthy GRSG populations.

Proposed RMP Amendment Allocation
Montana/Dakotas **Unique Habitat Management Areas (HMAs):** Areas identified that need different objectives or management to address unique challenges. For example, these are areas identified as habitats by state agencies but contain ongoing and imminent impacts due to oil and gas development and associated infrastructure, habitat conversion, mining, disease, and/or the peripheral nature of the population. Due to the unique circumstances management actions are needed that emphasize long-term reclamation and habitat goals, and maintain connectivity, in order to provide/enhance habitat for recovery of GRSG populations. These include three areas: • **Little Missouri HMA**: Identified core area by the states of Montana and North Dakota. This area contained high-quality GRSG habitat in Montana and encompasses the remaining GRSG habitat in North Dakota. However, a substantial portion of the area is a unitized oil and gas field (the Cedar Creek Anticline). Formerly occupied habitat has been converted or degraded, an outbreak of West Nile Virus impacted bird numbers, and GRSG are challenged by being on the periphery of their range. Unique management is needed to maintain connectivity of sagebrush and GRSG habitat between Montana and North Dakota and focus restoration efforts. • **South Carter HMA:** Identified core area by the state of Montana. However, this area is primarily developed or existing bentonite claims. Unique management is needed to balance GRSG habitat and mineral development, in the short term, while planning for longer-term reclamation. • **Connectivity HMA**: 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, including but not limited to Montana Connectivity areas. This HMA boundary represents where stopover sites may exist, likely within a matrix of degraded or converted habitat or non-habitat (such as in Montana general habitat within the HiLine). 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.
Nevada/California **Other Habitat Management Area (OHMA)**: Areas with appropriate environmental conditions for Greater Sage-Grouse that are less used by Greater Sage-Grouse or have marginal habitat suitability.
Utah **General Habitat Management Area - Connectivity Habitat Management Area (GHMA- Connectivity):** Areas within GRSG GHMA habitat that contain an increased level of biological importance because they provide for connectivity between localized areas of PHMA, above that of regular GHMA, based on new science (Row et al. 2018) and telemetry studies.
Wyoming **Stewardship Habitat Management Area (SHMA)**: 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.

Table 2-4. Priority Habitat Management Area (PHMA) Allocations and Management Direction

This table identifies the resource topics and the rangewide amendments being proposed for application in PHMA. The table describes the rangewide amendments in the left hand column and the right hand column identifies where there are state-specific differences to the rangewide direction. The table describes if the Proposed RMP Amendment is amending the "objective", "allocation", or "management direction" for the resource topic identified. In some instances, the Proposed RMP Amendment addresses all three of these planning categories for a resource topic while in other resource topics only one or two of the categories are being proposed for amendment. All three planning categories are identified for each resource topic and if it is not being proposed for amendment it will be identified as "N/A", not applicable. In those "N/A" instances, the 2015 or 2019 Amendment decision is not being proposed for amendment and remains in place. The existing 2015 and 2019 Amendment decisions are described in **Appendix 2**. **Appendix 2** provides a description of the decisions that remain in place and how and where that management direction is being proposed for amendment by this amendment.

GRSG habitat management areas would be identified and managed as shown on **Map 2.7**. Acres by state and rangewide are shown in **Table 2-15**. Information on state-by-state GRSG HMA mapping strategies is in **Appendix 3**.

<table>
<tr><th colspan="2">Proposed RMP Amendment for PHMA</th></tr>
<tr><th>Objective/Allocation/Management Direction</th><th>State-Specific Differences</th></tr>
<tr><td colspan="2">Utility Scale Solar</td></tr>
<tr><td>Utility scale solar projects are projects with nameplate capacity (theoretical output registered with authorities) of 5 megawatt (MW) or higher that deliver electricity to the electricity transmission grid (refer to Glossary).

Objective: N/A
Allocation: Exclusion for utility scale solar testing and development
Management Direction:
Exception Criteria
Testing and development could only occur if the following three criteria are met:
1) The area is determined to be non-habitat or unsuitable, lacks the ecological potential to become marginal or suitable habitat, and does not provide important connectivity between habitat areas (as determined by a qualified biologist and confirmed by the BLM using criteria such as the Habitat Assessment Framework and coordinated with appropriate state authority) and/or the topography/areas of non-habitat create an effective barrier to impacts.
2) The project is designed to prevent indirect disturbance to or disruption of adjacent seasonal habitats.
3) Infrastructure as proposed or conditioned (including disturbance cap and mitigation requirements) would not impair habitat use by GRSG (as determined in coordination with the state wildlife agency and other appropriate state authorities) and will meet the RMP GRSG goal and habitat objectives.

<u>OR</u>

1) If co-location of the proposed authorization with existing disturbance will result in no additional impacts to those already associated with the existing major infrastructure, including indirect disturbance to or disruption of adjacent seasonal habitats.</td><td>Oregon: In addition to the rangewide language, refer to Table 2-11 for state-specific management direction.</td></tr>
</table>

Proposed RMP Amendment for PHMA	
Objective/Allocation/Management Direction	**State-Specific Differences**
To approve an authorization based on any of the above exception criteria, after coordination with the BLM State Office and appropriate State agency, the Authorized Officer must document that the proposed action satisfies the criteria listed above. If the State agency does not concur with granting the authorization, the Authorized Officer must provide rationale for how the criteria are met considering the information the State provides.	
Utility Scale Wind	
Utility-scale wind projects are projects larger than 1 megawatt (MW) (refer to Glossary). **Objective:** N/A **Allocation:** Exclusion for utility scale wind testing and development (including met towers). **Management Direction:** **Exception Criteria** Testing and development could only occur if the following three criteria are met: 1) The area is determined to be non-habitat or unsuitable, lacks the ecological potential to become marginal or suitable habitat, and does not provide important connectivity between habitat areas (as determined by a qualified biologist and confirmed by the BLM using criteria such as the Habitat Assessment Framework and coordinated with appropriate state authority) and/or the topography/areas of non-habitat create an effective barrier to impacts. 2) The project is designed to prevent indirect disturbance to or disruption of adjacent seasonal habitats. 3) Infrastructure as proposed or conditioned (including disturbance cap and mitigation requirements) would not impair habitat use by GRSG (as determined in coordination with the state wildlife agency and other appropriate state authorities) and will meet the RMP GRSG goal and habitat objectives. <u>**OR**</u> 1) If co-location of the proposed authorization with existing disturbance will result in no additional impacts to those already associated with the existing major infrastructure, including indirect disturbance to or disruption of adjacent seasonal habitats. To approve an authorization based on any of the above exception criteria, after coordination with the BLM State Office and appropriate State agency, the Authorized Officer must document that the proposed action satisfies the criteria listed above. If the State agency does not concur with granting the authorization, the Authorized Officer must provide rationale for how the criteria are met considering the information the State provides.	**Oregon:** In addition to the rangewide language, refer to **Table 2-11** for state-specific management direction.
Fluid Minerals (including geothermal)	
Objective: Manage fluid mineral leasing and development (including geothermal) in GRSG habitat management areas to avoid, minimize, and compensate for adverse impacts to GRSG habitat to the extent practical under the law and BLM jurisdiction. *No specific objective or management action would specify a fluid mineral leasing strategy. However, not including specific leasing prioritization language or a leasing strategy does not remove the desired condition to manage public lands to provide suitable GRSG habitat at the HAF mid-, fine- and site-scales. Fluid mineral leasing would be considered in GRSG*	**Wyoming**: <u>Allocation.</u> Open to leasing (unless already closed) subject to no surface occupancy (NSO) within 0.6 mi of leks and seasonal limitations (breeding, nesting, early brood-rearing and winter habitat) and Controlled Surface Use (CSU) (density and

Proposed RMP Amendment for PHMA	
Objective/Allocation/Management Direction	**State-Specific Differences**
habitat management areas consistent with the Secretary's discretion under the Mineral Leasing Act (as amended), as well as applicable BLM regulations and policies, and in conformance with RMP goals, objectives, stipulations, and required design features to avoid, minimize, and compensate impacts to GRSG. **Allocation:** Open to leasing subject to no surface occupancy (NSO) (unless otherwise closed). Refer to the following NSO exceptions. **Management Direction:** **Management Action to Address Development in Areas Already Leased:** When considering exploration and development on areas leased for fluid mineral resources in PHMAs, including geothermal, application of measures to avoid, minimize, rectify, reduce and/or mitigate potential impacts will be considered through completion of the environmental record of review (43 CFR Part 3162.5 and 36 CFR Part 228.108), including appropriate documentation of compliance with NEPA. Such measures may include existing lease stipulations, project design, operator-committed measures, RMP required design features (RDFs), and local conditions of approval (COAs). The BLM will work with project proponents to promote measurable GRSG conservation objectives such as, but not limited to, consolidation of project related infrastructure to reduce habitat fragmentation and loss and to promote effective conservation and connectivity of seasonal habitats and PHMAs. The BLM will continue to work with project proponents and the state wildlife agency and other appropriate state authorities to site their projects in a manner that honors their lease rights 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 PHMAs. Surface use rights associated with existing leases will be recognized and respected. For proposed operations in PHMA, the Surface Use Plan of Operations (refer to 43CFR Part 3162.3-1(f)) shall address, at a minimum, the applicable RDFs in the RMP. Seasonal habitats or project features related to potential GRSG 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. In this process the BLM will evaluate whether each conservation measure is reasonable and consistent with surface use rights as part of the environmental review process (e.g., 43 CFR Part 3101.12). **NSO Exceptions** a) **Exception 1 -** The Authorized Officer may consider and grant an exception to the NSO stipulation within 0.6 miles of active leks in PHMA if it can be demonstrated that development and surface occupancy would have no direct impacts to or disruption of GRSG or its habitat based on at least one of the following conditions– after documenting the review of available information associated with the site proposed for the exception – both internally compiled and as provided by State, County and other local agencies, tribal governments, project proponents, other federal agencies, or interested stakeholders: 1. The location of the proposed authorization is determined to be non-habitat (refer to Glossary; as determined by a qualified biologist and confirmed by BLM using methods such as the Habitat	disturbance) in PHMA outside of the 0.6-mi NSO buffer. <u>Modification</u>: The Authorized Officer may consider and grant a modification to the fluid mineral lease NSO stipulation, allowing for surface occupancy only after documenting that a review of available information, in coordination with the appropriate State agency, establishes that the NSO or a portion of the NSO area is nonessential (e.g., the lek upon which the NSO is centered is not active), or that the proposed action could be conditioned so as to maintain the function or utility of the site for the seasonal habitat, life-history, or behavioral needs of the GRSG, including (but not limited to) reproductive display, daytime loafing/staging activities, and nesting. This state-specific difference replaces the rangewide management direction in the first paragraph of the Modification management direction. **Colorado**: <u>Management Direction.</u> Exception 1: The same exception would apply in PHMA within 1 mile of active (CO occupied) leks. Exception 2: Beyond 1 mile from active (CO occupied) leks **Montana/Dakotas:** <u>Management Direction.</u> No exception would be applied w/in 0.6 miles of active leks. Refer to **Appendix 16**: Montana/Dakotas Oil and Gas Lease Stipulations for Exception language beyond .6 miles from an active lek. **Idaho:** <u>Allocation.</u> NSO allocation and exceptions apply to PHMA with the following variances.

Proposed RMP Amendment for PHMA	
Objective/Allocation/Management Direction	**State-Specific Differences**
Assessment Framework), 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 (whether adjacent seasonal habitat are within 0.6 miles of an active lek or greater than 0.6 miles from active leks) that would impair their biological function. II. Topography/areas of non-habitat create an effective barrier to adverse impacts (e.g., protected from visual and audible disturbances to GRSG and its habitat). III. By co-locating the proposed authorization with existing disturbance, no additional impacts would be realized above those already associated with the existing similarly sized infrastructure, including indirect disturbance to or disruption of adjacent seasonal habitats that would impair their biological function. Beyond considering an exception where no direct or indirect impacts on GRSG or its habitat would occur, an exception could also be considered if the proposed location on public lands would be undertaken as an alternative to a similar action occurring on a nearby non-public lands parcel (for example, due to landownership patterns), and development on the public parcel in question would eliminate impacts on more important and/or limited GRSG habitat (e.g., wet meadows, brood-rearing habitat, etc.) on the non-public nearby parcel; this exception must also include measures sufficient to allow the BLM to conclude in its documenting analysis that such benefits will endure for the duration of the proposed action's impacts on public lands (e.g., confirmation of an easement). To approve this exception based on any of the above criteria, after coordination with the appropriate State agency, the Authorized Officer must document, that the proposed action satisfies at least one of the criteria listed above. If the State agency does not concur with granting the exception, the Authorized Officer must provide rationale for how the criteria are met considering the information the State provides. 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 (e.g., could be part of the APD NEPA process) and all exceptions granted would be tracked in a public place and the exception tracker would be consulted when exceptions are being considered. If the area associated with the proposed development seeking the exception (e.g., well pad, compressor station, etc.) is in an area (neighborhood lek cluster or as appropriate an alternative adaptive management unit as described and allowed in the adaptive management section) that has met one of the adaptive management thresholds (hard or soft) (refer to Adaptive Management section in this table), no exceptions would be considered until the causal factor analysis is completed. If the causal factor analysis concludes that development associated with the type of activity seeking the exception is or could contribute to the threshold being met or not recovering, no exception would be granted. If the causal factor analysis is inconclusive on cause, exceptions could be considered by the authorized officer.	Management Direction. Exception 1: would apply to 3.1-mile buffers of active and pending active leks. NSO Exception #1 would also be subject to screening criteria (PHMA: MD SSS 29); Exception 2 would apply to areas beyond 3.1-miles of active and pending active leks. **Oregon:** For NSO Exception 1, refer to **Table 2-11**. Exception 2 would apply to PHMA beyond 3.1 miles of active and pending active leks. **Nevada/California:** Management Direction. Exception 1 would apply to 3.1-mile buffers of active and pending active leks. Exception 2 would apply to areas beyond 3.1-miles of active and pending active leks.

Proposed RMP Amendment for PHMA	
Objective/Allocation/Management Direction	**State-Specific Differences**
b) **Exception 2 -** The Authorized Officer may consider and grant an exception to the NSO stipulation associated with the remainder of PHMA beyond 0.6 miles from active leks 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, County and other local agencies, tribal governments, project proponents, other federal agencies, or interested stakeholders: I. The criteria presented in Exception #1. **OR** II. Granting the exception must be in conformance with the RMP GRSG goal and habitat objectives, and the impacts anticipated by the proposed activity would be addressed through application of the mitigation hierarchy, including consideration of compensatory mitigation in accordance with compensatory mitigation direction in the Mitigation section. To grant this exception based on the use of compensatory mitigation, the compensatory mitigation direction in the Mitigation section must be followed, though the compensation project must be completed and habitat functionality documented before the exception is granted. The compensation must also provide offsetting benefits to the population being impacted. If it can be demonstrated by a qualified biologist and confirmed by the BLM, based on site-specific information (using tools such as the Habitat Assessment Framework), that the project cannot be avoided or minimized and granting the mitigated exception would not result in adverse effects to GRSG seasonal habitats.	
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 (e.g., could be part of the APD NEPA process) and all exceptions granted would be tracked in a public place and the exception tracker would be consulted when exceptions are being considered.	
If the area associated with the proposed development seeking the exception (e.g., well pad, compressor station, etc.) is in an area (neighborhood cluster) that has met one of the adaptive management thresholds (hard or soft) (refer to Adaptive Management Section), no exceptions would be considered until the causal factor analysis is completed. If the causal factor analysis concludes that development associated with the type of activity seeking the exception is or could contribute to the threshold being met or not recovering, no exception would be granted. If the analysis is inconclusive on cause, exceptions could be considered.	
NSO Modifications The Authorized Officer may consider and grant a modification to the fluid mineral lease NSO stipulation, allowing for surface occupancy only where: 1) an exception is granted, as described above, for the primary disturbance (e.g., well pad, compressor station), **and** 2) the potential associated infrastructure related to the development is not individually precluded by other actions (e.g., roads, pipelines, power lines that could otherwise be considered through a ROW).	**Oregon:** No modification to NSO within 3.1 miles of active or pending active leks.

Proposed RMP Amendment for PHMA	
Objective/Allocation/Management Direction	**State-Specific Differences**
While the NSO stipulation could be modified for these additional developments, they must still comply with other GRSG management actions (e.g., mitigation, disturbance cap, minerals/energy density, seasonal restrictions, RDFs, etc.) if an exception to the NSO is granted. Prior to modifying the area subject to the NSO stipulation, the potential modification shall be subject to public review for at least a 30-day period (e.g., could be part of the APD NEPA process). If the area (neighborhood cluster) associated with the proposed exception has met one of the adaptive management thresholds (hard or soft) (refer to Adaptive Management section in **Table 2-3**), no modification would be considered until the causal factor analysis is completed. If the causal factor analysis concludes that development associated with the type of activity seeking the exception is or could contribute to the threshold being met or not recovering, no modification would be granted. If the analysis is inconclusive on cause, modifications could be considered. **NSO Waiver** The Authorized Officer may consider and grant a waiver of the NSO stipulation on an existing lease after documenting, in coordination with the appropriate State agency, that the lease with the GRSG NSO stipulation is no longer in PHMA. This would only be applicable on leases that were issued when the parcel was in PHMA, then the PHMA boundaries were subsequently adjusted 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 (e.g., could be part of the APD NEPA process).	
Disturbance Cap Exceptions and Waivers For fluid mineral (including geothermal) disturbance cap exceptions and waivers, follow the direction for Disturbance Cap exceptions and conditions found in this table (**Table 2-3**). In addition, prior to granting an exception to the disturbance cap stipulation for fluid minerals, the potential exception shall be subject to public review for at least a 30-day period (e.g., could be part of the APD NEPA process). **Disturbance Cap Modifications** None. **Disturbance Cap Waivers** The Authorized Officer may consider and grant a waiver of the stipulation on an existing lease if the area mapped as PHMA when the lease was issued is no longer mapped as such through the appropriate planning process (i.e., plan maintenance or amendment). Prior to waiving the disturbance cap stipulation for a given area, the potential waiver shall be subject to public review for at least a 30-day period (e.g., could be part of the APD NEPA process).	

Proposed RMP Amendment for PHMA	
Objective/Allocation/Management Direction	**State-Specific Differences**
Seasonal Constraints/Stipulations Exception The Authorized Officer may consider and provide temporary relief from seasonal constraints (identified in the 2015 and 2019 RMPAs, refer to **Appendix 2**) by granting an exception after documenting the review of available information, including best available science, associated with the site proposed for the exception. This direction applies in PHMA, GHMA, and all other state identified HMAs. While the BLM considers information from all sources, the State wildlife agency can provide information directly associated with bird use (including whether GRSG populations are not using the seasonal habitat during that year's seasonal life cycle period if available). Based on this information and recommendation, and documented variability in climatic conditions (e.g., early/late spring, long/heavy winter), use patterns, or other applicable information the Authorized Officer may consider a one-time exception if development associated with it will not have direct/indirect negative impacts on GRSG and/or their habitat. **Season Constraints/Stipulations Modifications** The BLM can and does grant modifications to seasonal restrictions if the BLM, in coordination with the state wildlife agency and other appropriate state authorities, on a case-by-case basis, determines that granting the modification would not adversely impact the population being protected. The authorized officer may consider and grant a modification to the dates and areas associated with seasonal timing restrictions based on one of the criteria described below – after documenting the review of available information associated with the site proposed for the modification, if: 1) The geographic and temporal conditions demonstrate that any modification (shortening/extending seasonal timeframes) is justified on the basis that it serves to better protect or enhance GRSG and its habitat than if the strict application of seasonal timing restrictions are implemented. Under this scenario, modifications can occur if one or more of the following conditions can be documented: a. A proposed authorization is expected to have beneficial or neutral impacts on GRSG and its habitat. b. Topography or other factors eliminate direct and indirect impacts from visibility and audibility to GRSG and its habitat. c. There are documented local variations that indicate the seasonal life cycle periods are different than presented. 2) Modifications are needed to address an immediate public health and/or safety concern in a timely manner (e.g., maintaining a road impacted by flooding). **Season Constraints/Stipulations Waiver** The Authorized Officer may consider and grant a waiver of the stipulation on an existing lease if the area that was mapped as a GRSG habitat management area (regardless of type) when the lease was issued is no longer mapped as such through the appropriate planning process (i.e., plan maintenance or amendment). **Tracking Waivers, Exceptions, or Modifications** Refer to **Appendix 7**, Greater Sage-grouse Monitoring Framework, Measure 6 for tracking requirements.	

Proposed RMP Amendment for PHMA	
Objective/Allocation/Management Direction	**State-Specific Differences**
Saleable Minerals/Mineral Materials	
Objective: N/A **Allocation**: Closed, but Open for new free use permits and Open for the expansion of existing pits. **Management Direction:** N/A	**Idaho**: Refer to **Table 2-8** for Idaho Additional Management Direction. **Montana/Dakotas:** Refer to **Table 2-9** for Montana specific direction on mineral materials management. **Oregon:** Refer to Oregon Additional Management Direction **Table 2-11**. **Wyoming**: Open for new free use permits and expansion of existing pits subject to occupancy, seasonal limitations, disturbance, density, and the BLM can verify the expansion would not adversely impact any adjoining seasonal habitat, otherwise closed.
Nonenergy Leasable Minerals	
Objective: N/A **Allocation**: Closed to new leases but allow expansion of existing operations. **Management Direction**: N/A	**Colorado:** Refer to additional management direction in **Table 2-7**. **Nevada/California**: Closed but can consider project level considerations. Refer to Nevada/California Additional Management Direction **Table 2-10**. **Wyoming**: Open to the expansion of existing operations subject to occupancy, seasonal limitations, disturbance, and density, but closed to new leases except in situations required for human health and safety (e.g., ventilation shafts for underground mining operations).

Proposed RMP Amendment for PHMA	
Objective/Allocation/Management Direction	**State-Specific Differences**
Coal	
Objective: N/A **Allocation:** N/A **Management Direction**: **States w/ coal resources (Colorado, Montana/Dakotas, Utah and Wyoming):** Unless a suitability process has already been conducted that considered GRSG HMAs, 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 agency and the determination of essential habitat for maintaining GRSG as per the suitability criteria at 43 CFR Part 3461.5(o)(1) will consider site-specific information associated with lease nomination areas as part of the unsuitability process. **States without coal resources (Idaho, Nevada/California, and Oregon):** No management direction due to the absence of the mineral.	
Locatable Minerals	
Objective: N/A **Allocation:** Open, unless currently withdrawn. **Management Direction**: N/A	
Major Rights of Way	
Objective: N/A **Allocation:** Avoidance for new major ROWs (linear features such as overhead transmission lines, distribution pipelines, and large non-linear surface disturbing projects. Refer to glossary). **Management Direction**: If during consideration of a proposed ROW action (project level authorization) the determination of whether it is a major or minor ROW is questioned, with supporting rationale, the Authorized Officer (AO), in consultation with the BLM State Office lead(s), will make the final determination. Authorizations may be granted if one of the criteria below and the additional conditions are met. **Major Rights of Way Avoidance Criteria:** 1) RMP designated corridors within PHMA are open to consideration of a new major ROW in the category of ROW for which the corridor was designated if co-location of the proposed authorization within the existing ROW disturbance results in minimal impacts similar to those already associated with the existing major infrastructure, including indirect disturbance to or disruption of adjacent seasonal habitats. 2) The ROW can be routed through, or located within, non-habitat/unsuitable (as determined by a qualified biologist and confirmed by the BLM using criteria such as the Habitat Assessment Framework and coordinated with State wildlife agencies and other appropriate state authority) and lacks the ecological potential to become suitable habitat. ROWs shall not disrupt connectivity between habitat areas and	**Idaho:** In addition to the rangewide management direction for major rights of way in PHMA, new major ROWs in PHMA are subject to Anthropogenic Disturbance Screening Criteria (MD SSS 29). Refer to **Table 2-8** for Idaho specific direction on major ROW management. **Montana/Dakotas:** Refer to **Table 2-9** for Montana specific direction on ROW management, including unique HMA types. **Oregon**: Additionally, PHMA would be buffered by 0.5 miles such that both GHMA and Non-Habitat within the 0.5 mile PHMA buffer would also be Avoidance, unless the same criteria are met as the rest of PHMA. See **Table 2-11** for additional Oregon ROW management.

Proposed RMP Amendment for PHMA	
Objective/Allocation/Management Direction	**State-Specific Differences**
should be designed to prevent indirect disturbance to or disruption of adjacent seasonal habitats (as disclosed in the environmental analysis). a. Applicants must clearly demonstrate to the Authorized Officer (AO) and State Sage-grouse lead that no viable alternatives exist for placement of facilities outside the avoidance area prior to analyzing placement within an avoidance area. Considerations can include wildfire risk, human health and safety, and national security. The ROW must be the minimum necessary to achieve the ROW's purpose and would not otherwise be viable in an area that is "open" to ROWs. 3) The proposed location on public lands would be undertaken as an alternative to a similar action occurring on a nearby non-public lands parcel (for example, due to landownership patterns), and development on the public parcel in question would eliminate impacts on more important and/or limited GRSG habitat (e.g., wet meadows, brood-rearing habitat, etc.) on the non-public nearby parcel. The ROW must be the minimum necessary to achieve the ROW's purpose and would not otherwise be viable in an area that is "open" to ROWs. *If one or multiple of the avoidance criteria can be met, the ROW must also meet the following conditions in order to be permitted in PHMA:* a) Micro-siting while developing the major ROW is required to limit impacts and maintain connectivity corridors between seasonal habitats. This includes using topography and non-habitat as effective barrier to adverse impacts and co-location with existing, similarly sized, infrastructure. b) Where the development of the major ROW is outside a designated corridor, apply minimization measures (e.g., disturbance cap, seasonal constraints, tall structure limitations, RDFs, nest and perch deterrents). c) Residual direct and indirect impacts would be mitigated through compensatory mitigation to achieve the mitigation standard. If requiring compensatory mitigation both inside and outside of RMP-designated corridors disincentivizes location in the designated corridor or another route that has lesser impacts to GRSG, the Authorized Officer may consider adjusting the compensatory mitigation requirement if doing so reduces impacts to GRSG compared to an alignment that otherwise requires compensatory mitigation (e.g., development in an RMP-designated corridor that has existing transmission lines already present). When considering adjustments to the BLM's no net loss compensatory mitigation requirement for a major ROW (see GRSG mitigation action), the Authorized Officer shall coordinate with the applicable State agencies to ensure compliance with compensatory mitigation required by State policies or regulations that go beyond BLM's compensatory mitigation requirement.	
Minor Rights-of-Way	
Objective: N/A **Allocation:** Avoidance as per direction in the 2015 GRSG plan amendment (unchanged by this Proposed RMP Amendment except for the State-Specific Differences identified for Colorado, Idaho, Montana/Dakotas, and Wyoming).	**Colorado:** Refer to Colorado Additional Management Direction in **Table 2-7**.

Proposed RMP Amendment for PHMA	
Objective/Allocation/Management Direction	**State-Specific Differences**
Management Direction: N/A	**Idaho:** Refer to Idaho specific management direction in **Table 2-8**. **Montana/Dakotas:** Exclusion within 0.6 miles of active leks and within crucial winter range. Avoidance in designated corridors in those areas, and in the remainder of PHMA. Refer to **Table 2-9**.
Areas of Critical Environmental Concern (ACECs)	
No ACECs are proposed for designation.	
Livestock Grazing	
Objective (RM-1): Specific to GRSG habitat, manage livestock grazing in a manner that meets or makes progress toward meeting the Land Health Standard for special status species, and applies the guideline that addresses "restoring, maintaining, or enhancing habitats of...special status species to promote their conservation" (43 CFR Part 4180.2(e)(9) or subsequent changes to regulations or policy). **Allocation (RM-1)**: The presence of GRSG HMAs would not affect whether an area is available for livestock grazing; maintain existing areas designated as available or unavailable for livestock grazing. During grazing authorization renewals, Allotment Management Plan development, or other appropriate implementation-level planning, BLM will follow all applicable livestock grazing regulations including 43 CFR Subpart 4120 – Grazing Management and 43 CFR 4180.2 Standards and Guidelines for Grazing Administration or any subsequent revisions. In conformance with these regulations, BLM will consider adjustments to active AUMs, timing, intensity, duration, and frequency of grazing are completed at the allotment scale based on site-specific conditions to meet or make progress towards meeting Land Health Standard for special status species. Additionally, temporary adjustments of timing, intensity, duration, and frequency of grazing can be made annually to livestock numbers, the number of AUMs, and season of use within the range of the terms and conditions and in accordance with applicable regulations. In managing livestock grazing, consider and apply where appropriate the livestock grazing best management practices and design features in **Appendix 15**. **Management Direction** **RM-1**: During the land health assessment (LHA) process, use the criteria identified in the Sage-Grouse Habitat Assessment Framework (BLM-TR-6710-1 - Stiver et al. 2015 – as revised) and other BLM approved methodology to provide multiple lines of evidence (which are consistent with BLM Manual 1283) for determining whether vegetation structure, condition, and composition are meeting or making significant progress towards meeting the Land Health Standards (LHS) for BLM special status species – which includes GRSG referencing appropriate ESD, associated State and Transition Model (STM) and existing ecological condition information. For GRSG, the standard would generally be met when vegetation conditions provide for suitable GRSG habitat at the HAF site	**Oregon:** Refer to Oregon specific management direction in **Table 2-11** for objective language specific to Oregon. **Idaho:** Refer to Idaho specific management direction for livestock grazing under **Table 2-8**.

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Objective/Allocation/Management Direction	**State-Specific Differences**
scale (refer to **Table 8-1, Appendix 8**), based on existing ecological condition, ecological potential, and existing vegetation information. Where the LHS for SSS habitat (including GRSG) is not being met – as indicated by an unsuitable site-scale HAF assessment relative to site potential – and existing livestock grazing is a significant causal factor (43 CFR Part 4180, BLM H-4180-1 or subsequent changes to regulations or policy), adjustments to livestock grazing practices and activities will be made at the authorization, allotment or activity plan level and in accordance with applicable regulations (43 CFR Part 4180.2) or subsequent changes to regulations or policy). Any adjustments to grazing will be made based on current ecological potential according to ESD, associated STM and existing ecological state. **RM-2**: In PHMA, when fully processing grazing authorizations where the special status species standard is not being met, specific to GRSG habitat, and current livestock grazing has been identified as a significant causal factor (43 CFR Part 4180, BLM H-4180-1 or subsequent changes to regulations or policy), the NEPA analysis must include in at least one alternative specific thresholds and defined responses to be included in the terms and conditions of the grazing authorization. One or more defined responses will allow the authorizing officer to implement adjustments to livestock grazing during the term of the authorization that have already been analyzed in a NEPA document. Thresholds specific to GRSG habitat would be developed to maintain or move PHMA toward providing suitable GRSG habitat (e.g., **Table 8-1, Appendix 8**), and be designed to address the LHA findings (see MA RM-2) that warranted the HAF assessment rating, and consider ecological site potential, and relevant locally specific conditions, and Land Health Standards (43 CFR Part 4180.2 or subsequent changes to regulations or policy). **RM-3**: During the grazing authorization renewal process, evaluate all existing livestock management range improvements with respect to their effect on GRSG and GRSG habitat. Consider removal or modification of projects that negatively affect GRSG or GRSG habitat. Functional projects needed for management of sensitive species habitat or other sensitive resources should be maintained but consider implementing improvements in a manner less impactful to GRSG (Refer to **Appendix 15** for Livestock Grazing Management Best Management Practices and Design Features). **RM-4**: Design new range improvement projects (any activity or program relating to rangelands which is designed to improve forage, change vegetative composition, control patterns of use, provide water, stabilize soil and water conditions and provide habitat for livestock and wildlife) to enhance livestock distribution or management and to control the duration, timing and intensity of utilization, including application of new technologies such as virtual fencing. In PHMA, focus authorization of new water developments and structural range improvements (e.g., fences) to projects that have a nominal or incidental effects or that are beneficial to GRSG seasonal habitats. Any new structural range improvements should be placed along existing disturbance corridors or in the least suitable habitat, to the extent practical, and are subject to appropriate design features (**Appendix 15**).	

<table>
<tr><th colspan="2">Proposed RMP Amendment for PHMA</th></tr>
<tr><th>Objective/Allocation/Management Direction</th><th>State-Specific Differences</th></tr>
<tr><td>RM-5: Identify fences in high-risk areas - especially within 1.2 miles of an active lek (Christiansen 2009; Stevens 2011) - or other areas identified as important seasonal habitats or areas of GRSG concentration in coordination with the state wildlife agency or other appropriate state authority. Evaluate if the fence is needed and/or up to BLM wildlife friendly fencing standards (BLM H 1741). If the fence is unnecessary, remove it. If the fence is needed to support management, mark fences (install reflective fence markers) in high risk or important areas (Christiansen 2009; Stevens 2011). Where marking fences does not reduce fence-related GRSG mortality, modify fences. Modification could include re-routing, altering construction materials, drop fencing, or limiting perching of predators. New fences within high-risk areas would only be authorized if at least one of the following criteria is met:

a) It is consistent with the overall RMP GRSG objective.
b) Local terrain features shield nearby habitat or reduce the habitat importance.
c) The fence is constructed with high visibility markers to reduce GRSG strikes.

Monitoring of existing fences to assess mortality risk is recommended in all GRSG habitats.

RM-6: At the time a permittee or lessee voluntarily relinquishes grazing preference and the associated authorization, the BLM will consider whether to offer the permit for re-authorization to other grazing applicants or if the public lands where that permitted use was authorized shall be used for other resource management objectives. This does not apply to or impact grazing preference transfers, which are addressed in 43 CFR Part 4110.2-3.

When a permittee or lessee voluntarily relinquishes grazing preference and associated grazing authorization, 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 wildfire or vegetation treatments. Temporary use of reserve common allotments would not be allowed due to drought or overuse of allotments.</td><td></td></tr>
<tr><td colspan="2">Wild Horse and Burro</td></tr>
<tr><td>Objective: N/A
Allocation: N/A
Management Direction:
Management Action 1:
Where wild horses and burros overlap with GRSG:
a. Manage wild horse and burro populations within established appropriate management levels (AML).
b. Incorporate GRSG habitat objectives into wild horse and burro management (e.g., herd management area plans, AML) monitoring, and gather prioritization, with prioritization of such activities in PHMA, then GHMA.</td><td>Wyoming: Management Action 1 (c) would not apply in Wyoming.</td></tr>
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<tr><td>c. Prioritize gathers in GRSG PHMA unless removals are necessary in other areas to address higher priority issues, including herd health impacts.

Management Action 2: Manage wild horse and burros herd management areas in GRSG habitat (or portions of the herd management area overlapping or within GRSG habitat) within the established AML ranges to achieve and maintain GRSG habitat objectives and achieve or make significant progress towards achieving LHS, considering the full suite of approaches to maintain AML, including temporary fertility control and non-reproducing, or partially non-reproducing herds.

Management Action 3: If GRSG site scale habitat objectives are not being met in PHMA and GHMA, evaluate AMLs and adjust, if necessary, through the NEPA process where wild horse or burro use is identified as significant causal factor to not meeting LHS, or is a factor in the area not meeting the GRSG habitat objectives.</td><td></td></tr>
<tr><td colspan="2">Predation</td></tr>
<tr><td>Objective: Reduce predation from increased numbers of predators resulting from anthropogenic disturbance and habitat loss and function.
Allocation: N/A
Management Direction:
Management Action 1: Apply minimization measures and BMPs to new, existing, and renewal of authorizations and activities to minimize threats from predators shown to pose a threat to GRSG, consistent with applicable law. This includes, but is not limited to stopping, slowing, and/or discouraging the incursion of predators, increased levels of predators, or predators expanding into new areas. Minimization measures and BMPs include, but are not limited to, the following:
a. Limit the footprint for all proposed projects to the smallest area necessary to achieve the project objectives in order to reduce habitat loss.
b. Place project components within existing disturbance areas whenever possible to minimize habitat loss.
c. Eliminate or minimize external food resources from anthropogenic sources (e.g., trash resources from human activities, road killed animals, carcass dumps).
d. Reduce or prevent opportunities for raven and raptor perching and nesting through such measures as nest/perch deterrents and regular maintenance.

Management Action 2: For authorizations that require expanded or new or renewal of energy or transmission related energy, mining, and infrastructure as identified in Table 7-4 in Appendix 7, Greater Sage-grouse Monitoring Framework) in PHMA the project proponent is required to submit a predator management plan to minimize influx and support of new predators as a result of the new project. The requirement to prepare a predator management plan could be waived as a result of site-specific circumstances and with State Director concurrence. The predator management plan shall be coordinated with state and federal agencies (e.g., USFWS and APHIS) as appropriate. The predator management plan will:</td><td>Idaho: Refer to Idaho specific management direction under Table 2-8 for predation.

Oregon: Management Action 2 also applies in GHMA.

Nevada/California: Management action 2 also apply in GHMA. In addition to the rangewide, see Table 2-10 for additional language for NV/CA.</td></tr>
</table>

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a. Outline how the project will be designed to minimize threats to GRSG beyond the natural range of variability from predators; b. Describes project design features to reduce or eliminate threats from predators (e.g., reducing raven and raptor perching and nesting by burying powerlines, locating structures out of line of site of breeding and nesting habitat, using tubular non-branching material for structures, etc.); c. Describe and outline the coordination and concurrence with state and federal agencies, if appropriate (e.g., USFWS, APHIS, etc.); d. Include a monitoring strategy to assess efficacy of the predator management plan and GRSG population response. **Management Action 3:** The BLM will collaborate with appropriate state agencies, other landowners, federal agencies (e.g., USFWS, APHIS, etc.), and Tribal governments, as appropriate and consistent with BLM policy, in their efforts to minimize impacts from predators on GRSG where impacts have been documented (e.g., reduced recruitment of GRSG from predation), including providing needed authorizations to support predator management actions.	
Application of Habitat Objectives	
Objective: **Objective SSS [X]:** Within GRSG habitat management areas provide suitable habitat by managing for connected mosaics of sagebrush and associated communities that provide for seasonal habitats, dispersal, and migration, while limiting widespread anthropogenic disturbances and fragmentation. This objective will be accomplished by applying RMP land use allocations and management actions among HMAs, proactive habitat treatments, and project-level application of mitigation (avoiding, minimizing, and compensating, per MS-1794 and H-1794) for internal and external project proposals. **Objective SSS [Y]:** Manage GRSG habitat management areas to provide seasonal habitats at the HAF Site Scale (Level 4) by providing for habitat characteristics that support seasonal habitat needs, including adequate protective cover and food needed to survive and reproduce. Seasonal habitats may include areas where sagebrush is the current dominant vegetation type, sagebrush is a primary shrub species within the various states of the ecological site, or dominated by other vegetation types but still provides GRSG habitats, such as mesic areas. This objective will be accomplished through the combination of RMP land use allocations and management actions and restoration – based on ecological potential, current vegetative condition, and existing seasonal values – and the project-level application of mitigation (avoiding, minimizing, and compensating, per MS-1794 and H-1794) for internal and external project proposals (refer to Mitigation direction in this table (**Table 2-3**). **Allocation:** N/A **Management Direction:** **Management Action SSS [X1]:** Assess the suitability of GRSG habitat at HAF mid- and fine-scales (HAF Levels 2 and 3, respectively) based on the methods in the Sage-grouse Habitat Assessment Framework (HAF, Stiver et al. 2015, BLM TR 6710-1, as revised; see **Appendix 8**).	

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Management Action SSS [X2]: Design and implement projects that will maintain or improve habitat suitability, availability, and connectivity, based on site location, existing seasonal values, and habitat needs using the results of mid- and fine-scale habitat assessments and other complementary research, tools, or information and in coordination with partners across land management jurisdictions. **Management Action SSS [Y1]:** Assess suitability of GRSG habitat at the HAF site-scale (Level 4) based on the methods in Sage-grouse HAF (Stiver et al. 2015, BLM TR 6710-1, as revised; **Appendix 8**) utilizing current geographically applicable research on seasonal habitat requisites of GRSG (see **Appendix 8**). Updates to seasonal habitat indicators and ESDs will be developed locally and coordinated with partners (see **Appendix 8**). **Management Action SSS [Y2]:** Maintain, improve, or restore the suitability of GRSG seasonal habitats using the Habitat Indicators Table (see **Appendix 8**) to inform measurable project objectives during implementation-level planning for BLM-permitted and BLM-initiated site-specific actions in HMAs, in coordination with applicable partners. Use the results of site-scale habitat assessments and other best available information to inform management decisions and the design and implementation of habitat projects.	
Mitigation	
Objective: Implement the mitigation hierarchy, with an emphasis on avoiding and minimizing habitat loss. Compensatory mitigation in arid sagebrush ecosystems is challenging, often taking decades to achieve with no guarantee of durability and is not appropriate in all situations. Where impacts remain following application of available avoidance and minimization measures, project proponents must ensure compensatory mitigation minimally achieves no net habitat loss considering both direct and indirect effects (refer to compensation section below). **Allocation:** N/A **Management Direction:** **Management Action**: In all GRSG habitat management areas and consistent with valid existing rights and applicable law, BLM will apply the mitigation hierarchy when authorizing internal and third-party actions resulting in GRSG habitat loss and degradation (including indirect impacts) to achieve a minimum standard of no net habitat loss (refer to **Appendix 7**, Monitoring Framework for table of activities related to habitat loss and degradation). BLM will apply mitigation in accordance with the BLM mitigation handbook and other mitigation related BLM policy, CEQ regulations (40 CFR Part 1508.1(y)), and comply with the most recent State agency and/or State regulatory requirements (refer to the state mitigation policies, regulations, and/or authorities, as applicable). **Application of Mitigation Hierarchy:** *Avoidance*: Avoiding impacts is defined by not taking certain action or parts of an action (CEQ regulations; 40 CFR Part 1508.1(y)). Impact avoidance in GRSG habitats is the priority since restoration of most sagebrush systems can take decades. While the avoidance priority is reflected in many PHMA allocations, BLM may also determine on a case-by-case basis to avoid impacts by not issuing an authorization in areas open to development. *Minimization*: Where avoidance is not possible, impacts can be minimized through managing the severity of a project impact at a specific location. If impacts to GRSG habitats cannot be avoided, minimization measures will be applied (e.g., minimizing the disturbance footprint, lek buffers, BMPs, and RDFs). BLM can consider	**Colorado:** Refer to Colorado Additional Management Direction in **Table 2-7**. **Oregon:** In addition to the rangewide language, refer to **Table 2-11** for mitigation requirements for free-use saleable developments. **Montana/Dakotas:** In addition to the rangewide language, refer to **Table 2-9** for state-specific mitigation standard.

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site-specific minimization measures beyond those listed in this plan, through site-specific environmental review to meet the no net habitat loss standard. Minimization does not eliminate project impacts and remaining residual impacts may require compensatory mitigation for habitat loss or degradation. *Compensation*: Where avoidance or minimization will not fully offset a project's impacts compensatory mitigation is required and will at minimum meet the requirements of the state wildlife agency or other appropriate state authority, and BLM/DOI mitigation policy. Prior to identifying compensatory mitigation, BLM must document the avoidance and minimization applied and why they are not effective at eliminating all impacts (i.e., residual effects), as well as documenting how compensatory mitigation is an appropriate tool for the situation. Any impacts that cannot be avoided or minimized to no net habitat loss would be compensated at a level and in a manner to fully offset both direct and indirect (e.g., disturbance, noise, changes in water availability) impacts from the project to habitat function as identified at the project-level. Compensatory mitigation amounts shall comply with the most recent State agency and/or State regulatory and or policy requirements, including net conservation gain standards, as appropriate, and be consistent with BLM mitigation policy. In States without a mitigation requirement, compensatory mitigation should minimally apply a no net habitat loss standard, considering key factors such as the nature of residual impacts (including indirect and direct impacts), and the types, attributes, amount, sites, and mechanisms of the compensatory mitigation (e.g., H-1794-1 Chapter 3.5). Establishing no net loss will require full restoration of functional habitats or enhancement of habitats such that the habitat can support the number of GRSG present prior to disturbance at the apex of the population cycle. The metrics identified in the HAF should be used to determine if restoration actions provide GRSG habitat. Where restoration is not possible, preservation (e.g., conservation easements, acquisition of inholdings) can be used to offset impacts and should be designed to protect uniquely important habitats (e.g., limiting winter habitats, connectivity corridors) or areas of GRSG habitats that are at a high risk of conversion. Mitigation should be prioritized to occur within the same habitat area as the proposed impact so that it benefits the populations affected by the project (e.g., within the same neighborhood cluster (Coates et al. 2021), or if not possible, same HAF fine scale area (Stiver et al., 2015, as revised), or nearest equivalent HMA (e.g., PHMA, GHMA)). The compensation project must be planned, funded, and approved by the operator, BLM, surface owner, in coordination with the appropriate state agency prior to construction, surface occupancy, or surface disturbing activities. Compensatory mitigation should be completed prior to initiating the activity causing the need for compensation and monitored for retention and efficacy unless inconsistent with state law. Compensatory mitigation shall be durable and resilient, ensuring GRSG habitat will persist (barring any natural disaster). The project proponent will be responsible for ensuring the durability and success of any compensatory mitigation associated with their project. Compensatory mitigation will not be required for activities implemented to conserve species listed as threatened or endangered under the Endangered Species Act. Compensatory mitigation is not required by the BLM for operations conducted under the Mining Law of 1872, but operators may always voluntarily engage in compensatory mitigation. Minimization actions and	

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compensation should be discussed with project proponents/operators and incorporated into alternatives when appropriate. Compensation may also be required by state regulations. Refer to **Appendix 7**, Greater Sage-grouse Monitoring Framework, Measure 5, for compensatory mitigation tracking requirements.	
Disturbance Cap	
Objective: N/A **Allocation**: N/A **Management Direction**: If direct habitat disturbance from existing and proposed infrastructure developments exceeds either: 1) 3% at the project scale (refer to description below) in all states, or 2) 3% at the Habitat Assessment Framework (HAF) Fine Scale habitat selection area for all states (or Colorado management zones and populations – refer to **Table 2-7**); New infrastructure projects would be deferred to the extent allowable under applicable laws (such as the Mining Law of 1872), or valid existing rights: d. until such time as the percentage of habitat disturbance in the areas has been reduced below the cap threshold through restoration of existing disturbance to meeting habitat objectives or increasing the amount of suitable habitat through restoration, or e. redesigned to not result in additional surface disturbance (co-location), redesigned to move it outside of habitat in PHMA (refer to non-habitat criteria), or redesigned to move it outside PHMA. **Disturbance Cap Calculation** <u>Numerator</u> For all states, the disturbance cap calculation is limited to the following specific activities, whether existing projects or new proposals (refer to **Appendix 7** for additional details on how these items would be monitored): • Oil and gas wells and development facilities • Coal mines • Wind developments (e.g., towers, sub-stations, etc.) • Solar fields • Geothermal development facilities • Mining (active locatable, nonenergy leasable and saleable/mineral material developments) • Roads (transportation features with a maintenance intensity of level 3 or 5 – refer to BLM Technical Note 422 – Roads and Trails Terminology, 2006 or as updated (does not include two-tracks) • Railroads • Power lines • Communication towers • Other vertical infrastructure, as well as developed rights-of-way with habitat loss (e.g., pipelines) • Coal bed methane ponds (at the project scale)	**Colorado:** Cap calculated at Management Zone population scales. **Idaho:** Refer to Idaho specific management direction in **Table 2-8**. **Wyoming:** Same as the rangewide, with the following changes: 1) 5% at the project scale. Disturbances associated with the state's Disturbance Density Calculation Tool (DDCT) approaches (e.g., wildfire and agricultural) in the numerator (agriculture disturbance data would be provided by the state, since no such activities are permitted on public lands). **Oregon:** See Additional Management Direction in **Table 2-11**. **Montana/Dakotas:** See Additional Management Direction in **Table 2-9**. **Nevada:** Management Direction 2: In Nevada, the Authorized Officer may grant an exception to the disturbance cap at the HAF fine scale if the project meets criteria associated with the project-scale assessment (including requirements for exceptions and conditions), is in compliance with the Nevada Greater Sage-grouse Conservation Plan and Conservation Credit System (CCS) as required by Nevada regulation (Nevada Revised Statutes (NRS) Chapter 232.16 and Nevada Administrative Code (NAC) 232.162-232.480), and the offsetting compensatory

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• Meteorological towers (e.g., wind energy testing) (at the project scale) • Nuclear energy facilities (at the project scale) • Airport facilities and infrastructure (at the project scale) • Military range facilities and infrastructure (at the project scale) • Hydroelectric plants/facilities (at the project scale) Where such data are available, this disturbance is measured by the footprint of direct disturbance of the PHMA area where habitat is removed (including staging areas, dispersed structures, parking lots, equipment storage areas, etc.), or by the distance between the outermost lines for transmission lines. When considering new project proposals, any project associated with the above list that has been approved/authorized but not yet constructed should be treated as though it were already constructed when calculating the disturbance cap to account for authorized but not yet constructed disturbance. No other activities or actions beyond those listed in the above list are included when calculating the cap (e.g., wildfire, agriculture, vegetation treatments, residences, barns, fencing or range improvements, etc.). A disturbed area is included in the numerator until it has been restored to provide equal or improved habitat function as was provided by the area before the disturbance. BLM will coordinate with State agencies and use available HAF and land health data in determining if the habitat function of an area has been restored. Consistent with the BLM's responsibility to consider cumulative impacts when making decisions for activities on public lands, the disturbance percentage includes acres from the above disturbances regardless of land ownership, where such data are available. This will only inform decision-making on public lands and cannot impact private property rights. Wildfire and agriculture would not be included in the numerator at the HAF Fine Scale. <u>Denominator</u> At the project scale, the assessment area (denominator) is determined by identifying the extent of the GRSG PHMA that supports the GRSG population potentially affected by the proposed project that is also located in PHMA ; it is not to be limited to the area where indirect impacts are anticipated. The project scale denominator should include the PHMA used by the potentially affected local GRSG population, including the associated seasonal habitats and the transition zones between those habitats (only within PHMA) associated with where the project is proposed. If sufficient monitoring information is not available to identify the portions of the PHMA used by the potentially affected local GRSG population, identify project level boundaries using an approach similar to the DDCT approach developed by the State of Wyoming: 1) Determine potentially affected active leks by placing a 4-mile buffer around the proposed area of physical disturbance related to the proposed project. All active leks located within the 4-mile project buffer and within PHMA will be considered affected by the project. 2) Next, place a 4-mile buffer around each of the affected active leks. 3) All PHMA within the 4-mile project buffer, combined with the 4-mile lek buffer(s), creates the project analysis area for each individual project, absent other monitoring data.	mitigation (or credits per the Nevada CCS Manual) occur within the HAF fine scale where the project occurs. The CCS was developed to meet regulatory requirements established by NRS Chapter 232.162 to fulfill compensatory mitigation requirements for anthropogenic disturbances and to achieve a net conservation gain to Greater Sage-grouse (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 NAC 232.400-232.480 in 2019.

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If there are no active leks within the 4-mile project buffer, the project scale analysis area will be that portion of the 4-mile project buffer within PHMA. "Pending leks" and other similarly defined state-based lek categories can be considered as active leks based on inclusion from the state wildlife agency or appropriate state authority. In Colorado, BLM would use the state management zones (refer to **Table 2-7**). At the HAF Fine Scale, the assessment area (denominator) is the acres of PHMA within the boundaries of the HAF Fine Scale habitat delineation area. Calculation of the 3% cap would include all acres of PHMA in the Fine Scale area as the denominator. In Colorado, BLM would use the state identified populations (refer to **Table 2-7**). At either scale, all areas in PHMA would be included in the denominator unless specific information documents otherwise (i.e., seasonal habitat maps for the HAF Fine Scale assessment area). Any potential areas that are unsuitable at the HAF site scale are treated neither as habitat nor disturbance, which results in the area being removed from the denominator piece of the formula. The denominator includes all lands (regardless of land ownership) to help the BLM consider the cumulative impacts of disturbances on GRSG when considering projects on public lands. **Disturbance Cap Exceptions** Authorized Officer may consider projects on public lands that could result in exceeding the disturbance cap across all ownership at the **<u>project scale</u>** only if the project meets the criteria for one of the following categories of exceptions and also meets the following conditions applicable to that exception: **Categories** for **Disturbance Cap Exceptions:** a. If the disturbance is associated with the renewal or re-authorization of existing infrastructure in previously disturbed sites or expansions of existing infrastructure that do not result in new direct, indirect, or cumulative impacts on GRSG and its habitat, and is documented. b. If a technical team evaluates and concludes site-specific GRSG habitat and population information, combined with project design elements – including compensatory mitigation, indicates the proposed project is expected to improve the condition of GRSG habitat within the proposed project analysis area. The technical team should consist of, at a minimum, a BLM field office biologist and a biologist from the appropriate State agency. The methods, rationale, and data used in developing recommendations shall be retained as part of the project record. c. If the disturbance is within an RMP designated utility corridors, the disturbance cap may be exceeded if site specific NEPA analysis indicates doing so will decrease impacts to GRSG habitat in comparison to siting a project outside the designated corridor. This exception is limited to projects that 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. The disturbance cap cannot exceed 3% at the HAF fine scale. (Note: A plan amendment would be required for the development of new corridors and, as necessary, would need to appropriately address any changes in the disturbance cap.)	

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d. If the environmental review document(s) explains how the GRSG RMP goals and objectives will be met, including compliance with the RMP's GRSG mitigation strategy (**Table 2-4**) of avoidance first (e.g., locating the proposed projects outside PHMA, colocation within footprint of existing disturbance, etc.), then minimization (including application of RDFs, etc.) with appropriate documentation. The environmental review document must also consider the cumulative effects of other exceptions granted in adjacent project scale units. If avoidance is not possible and minimization does not address all direct, indirect, and cumulative impacts, compensatory mitigation can be considered, in coordination with the appropriate State agency. **If one or more of the exception criteria can be met, the activity associated with the disturbance must also meet all of the following conditions in order to be permitted:** a. If the exception relies on compensatory mitigation: 1. the mitigation must be completed prior to the disturbance that results in the exceedance of the disturbance cap and provide the same or better value habitat based on site limitations, or better based on site limitations, **<u>AND</u>** 2. The compensation must be implemented_in the same HAF Fine Scale unit as the potential development. Consideration may be given to providing compensatory mitigation in adjacent fine-scale HAF areas if doing so will more effectively provide the offsetting benefit. b. All disturbance cap exceptions MUST have concurrence from the State Director. c. If proposed disturbance cap exception is requested in an area (neighborhood lek cluster or as appropriate an alternative adaptive management unit) that has met one of the adaptive management thresholds, no exceptions to the disturbance cap at the project scale would be considered until the causal factor analysis is completed and cause identified and corrected unless the disturbance is needed for the protection of human life and safety, as concurred by the State Director. d. All disturbance cap exceptions will be tracked by the BLM state sage-grouse lead and provided for cumulative analyses for any proposed development within the same neighborhood cluster or appropriate biological area. All requests for the use of compensatory mitigation to exceed the disturbance cap should be reviewed by the technical team for likelihood of success and efficacy of offsetting impacts to the affected habitats and associated populations. e. There would be no exceptions to the 3% PHMA disturbance cap at the **<u>HAF Fine Scale</u>** in any state unless: i. The disturbance is needed for the protection of human life and safety, as concurred by the State Director. f. All HAF Fine Scale disturbance cap exceptions approved by the State Director will be tracked by the BLM State sage-grouse lead. g. In the event of a conflict between the project scale and HAF fine scale disturbance caps, the Authorized Officer may consider and grant an exception to the disturbance cap at the HAF fine scale if, in	

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Objective/Allocation/Management Direction	**State-Specific Differences**
coordination with the appropriate State agency, it is determined that the impact to GRSG of the habitat disturbance resulting in the disturbance cap being met is better assessed at the project scale. h. Apply the disturbance cap to the extent consistent with applicable law (such as the Mining Law of 1872) and valid existing rights.	
Adaptive Management	
Objective: Address unanticipated negative impacts to GRSG from potential changes in habitat conditions before consequences become severe or irreversible. **Allocation:** N/A **Management Direction:** **Management Action:** The BLM must consider the best available information regarding habitat and population thresholds. This includes state wildlife agency population trend analyses; annual population trend results published using the Hierarchical Population Monitoring Framework (specifically the Targeted Annual Warning System procedures [TAWS]; Coates et al., 2021) and subsequent updates or revisions; geospatial data sources for habitat degradation such as Rangeland Condition Monitoring Assessment and Projection (RCMAP) and LandFire; and any scientifically defensible future tools that support understanding of habitat and population trends. The BLM will produce an annual summary of any adaptive management thresholds reached and associated response. An annual review of habitat and population information between the BLM and associated state wildlife agency and other appropriate state authorities is encouraged even if no thresholds are identified. **Adaptive Management Units:** To accurately assess any anomalies or thresholds being met, and any necessary responses, monitoring of habitat and population trend should be evaluated at the same scale. The BLM will use neighborhood clusters identified by USGS (Coates et al., 2021) to track habitat conditions and population trend analyses. A neighborhood cluster generally represents a GRSG population unit and includes local aggregations of leks and the seasonal habitats used by GRSG attending those leks. Habitat trends can also be monitored at smaller scales (e.g., lek level) as identified by state wildlife agency plans for GRSG, or at larger scales such as the Habitat Assessment Framework (HAF) Fine-Scale if appropriate. Neighborhood clusters are generally nested within the HAF Fine-Scale unit, though some exceptions occur. The causal factor analysis (CFA) should list the analysis units relevant to the threshold in question. The response required to address thresholds may need to be addressed at multiple scales. **Habitat Adaptive Management Thresholds:** 1. A soft habitat threshold is met when any single occurrence or combination of occurrences in PHMA in a neighborhood cluster result in the loss of more than 5% of the area capable of supporting sagebrush in a given year (including wildfire). Where a neighbor cluster overlaps with more than one habitat designation (e.g., PHMA and GHMA) the percent habitat loss will be calculated on the PHMA (and in Idaho PHMA and IHMA) only. Baselines for calculating sagebrush loss will be determined by the sagebrush base layer delineated using the most recent LandFire data (detailed in **Appendix 7**) available at the time of publication of the Approved RMPA and ROD.	

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2. A hard habitat threshold will be met when existing sagebrush extent, as described in the first bullet, within a neighborhood cluster drops below 65% of the area capable of supporting sagebrush (Aldridge et al., 2008; Connelly et al., 2000). A hard habitat threshold will also be met if a soft habitat threshold is met (as calculated from baseline described above) in 4 consecutive years (≥5% decline in each of 4 consecutive years). A hard or soft habitat threshold can be reversed if restoration of sagebrush vegetation communities within the neighborhood cluster returns to the sagebrush conditions and/or habitat function that existed prior to meeting a habitat threshold. The assessment to reverse a habitat threshold should occur in collaboration with the state wildlife agency and other appropriate state authorities. If the neighborhood cluster cannot be restored to original sagebrush conditions and/or habitat function due to ecological or disturbance limitations (e.g., intense fire killed soil microfauna, dense anthropogenic activities) restoration and/or habitat enhancement in adjacent neighborhood clusters can be considered to increase the number of GRSG supported in those areas. In these situations, habitat threshold reversal occurs when there are sufficient numbers of GRSG (abundance) to allow for recovery of regional population numbers to those present at or before the threshold was met as described below. This will be done in coordination with appropriate state agencies. If enhancing habitats in adjacent areas does not reverse the threshold further assessment may be necessary to determine if the area in which the habitat threshold was met should still be considered GRSG habitat. **Population Trend Adaptive Management Thresholds:** State wildlife agencies and other appropriate authorities should alert the BLM to population concerns as determined by the entity's internal assessments. The BLM will also review the annual results of TAWS and other available scientific information (including other tools included in the USGS Sage-Grouse Population Monitoring Framework) examining population trends in PHMA in determining if those trends indicate potential habitat concerns. Since State wildlife agencies receive lek specific information from TAWS and the other tools contained in the USGS Sage-Grouse Population Monitoring Framework, in advance of the publicly released neighborhood cluster analyses used by the BLM, they can also provide early alert to the BLM when population thresholds (soft or hard) are met to initiate a causal factor analysis. (Note: the BLM does not receive lek specific information from TAWS, nor is it included in the annual publication on neighborhood cluster analyses). If a threshold is identified, the BLM (including the Authorized Officer) and the state wildlife agency will coordinate to confirm that data presented indicate that a threshold has been met, preferably within 60 days to allow a nimble response to a habitat causal factor. If the identified threshold was in error, the data supporting reversal of the threshold will be documented. If there is disagreement in the analyses, BLM and the state wildlife agency will coordinate to identify the source of the error and document all discussion. If there is still disagreement, the finding will be elevated to the appropriate BLM State Director who will work in coordination with the BLM State and National sage-grouse biologist, and local BLM field biologist as needed to determine if a causal factor team should be convened to	

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Objective/Allocation/Management Direction	**State-Specific Differences**
determine if any potential underlying habitat factor may be contributing to the population trend anomaly. The BLM State Director will then advise the state wildlife agency head of the BLM recommendation. **Interpretation of TAWS model results will be as follows:** 1. A soft population trend threshold is equivalent to a TAWS watch (a 2 consecutive year, negative rate of population change at the neighborhood cluster that shows a population decline that is either different or more rapid than that of the associated climate cluster; Coates et al., 2021). 2. A hard population trend threshold is equivalent to a TAWS warning (a 2 out of 3 (fast) or 3 out of 4 (slow) consecutive year negative rate of population change at the neighborhood cluster that is either different or more rapid than those of the associated climate cluster; Coates et al., 2021). **A hard or soft population trend threshold can be reversed if the following criteria are met:** 1. Population trends at the neighborhood cluster scale realigns for a minimum of three consecutive years with the climate cluster trend as indicated by the TAWS model (i.e., no longer a TAWS “watch” or “warning”); OR 2. There are sufficient numbers of GRSG (abundance) to allow for recovery of population numbers to those present at or before the threshold was met, based on local growth rates determined by the state wildlife management agency, and BLM has the concurrence of the state wildlife management agency and other appropriate state authorities; **OR** 3. The BLM and partners determine the threshold alert was in error. Data and other information supporting reversal of the threshold will be documented. **Causal Factor Analysis:** If a habitat or population threshold is met the BLM, along with state wildlife management personnel and other stakeholders with knowledge of local conditions will initiate an assessment as soon as alerted to a threshold being hit to determine the causal factor(s). The composition of the CFA team will be determined at the implementation level, and should minimally include the local BLM biologist, BLM state sage-grouse lead, and a representative from the state wildlife agency. Additional subject matter experts and other affected parties can be added as necessary for individual site-specific analyses or as consistent with existing CFA team structures. The analysis shall be detailed in a written report that includes but is not limited to descriptions of existing land uses, landownership patterns, history of population and habitat trends in the area, condition of the habitat, cause(s) of habitat and/or population decline, recommendations of management actions to address the potential causes of decline, and the data and expertise used to reach conclusions presented in the report. Any substantive disagreements between CFA team members will be noted in the report along with the basis for the disagreement. The report will be submitted to the local BLM manager, the BLM state sage-grouse lead in the state(s) the threshold was met, and the BLM national sage-grouse coordinator as well as all members on the CFA team as soon as the analyses are complete.	

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Adaptive Management Responses: When any adaptive management threshold is met, (and population thresholds confirmed with the state wildlife agency) a rapid assessment may be completed to identify “obvious” causes. Obvious causes are those easily identified such as a large wildfire or other discrete event. If the rapid assessment identifies the cause, a formal CFA will not be needed. Rapid assessments can be conducted by the BLM or appropriate state agency, or both, but results should be confirmed by all. Documentation of the cause will be submitted to the local BLM manager, the BLM state sage-grouse lead in the state(s) the threshold was met, and the BLM national sage-grouse coordinator as well as all members on the CFA team. Existing permitted activities and new discretionary activities in the affected areas can continue unless those activities are causing mortality to GRSG or direct loss or degradation of occupied GRSG habitat. If an obvious causal factor cannot be identified in the rapid assessment, a CFA to identify potential causes of the adaptive management threshold being met will be completed on a timeframe established by the CFA team, but not longer than 12 months from the initial alert. If a soft threshold is met, new discretionary activities can be considered during the completion of the CFA as long as those activities do not result in mortality of GRSG or GRSG habitat loss and degradation. However, if a CFA for a soft threshold is not completed within the established time frame, no new discretionary activities will be authorized after that time until a CFA is completed, as legally allowed. New authorizations, or reauthorization of existing permits can then be considered if similar activities were not contributing to factors resulting in meeting either a population or habitat threshold. Project level NEPA will specifically evaluate if the new permitted activity could result in the threshold being sustained or met again. If a hard threshold is met no new proposed permitted activities will be authorized until a CFA is completed. Project level NEPA will then specifically evaluate if the new permitted activity could result in additional or cumulative impacts to GRSG. The CFA team can alter the level of the threshold met (soft to hard, or hard to soft) based on their review and if supported by local data. For example, habitat loss of 5% results in a soft threshold, but if the loss is of limited crucial habitat (e.g., the only winter or mesic habitat in the neighborhood cluster) the CFA team can request hard threshold management responses be implemented. Similarly, a local assessment of habitat loss meeting a hard threshold may be reversed if the loss is of marginal areas, or areas documented as not supporting GRSG. These threshold reversals must be supported by data and fully detailed in a written report. Final determination of the reversal will be made by the authorizing officer, in consultation with the local CFA team. The CFA team can expand the analysis and management response to adjacent neighborhood clusters based on their review. For example, migratory populations that utilize multiple neighborhood clusters may require increased protection during other seasonal habitats and use areas to reverse population declines. The CFA team should also identify if a threshold is met as the result of actions on non-BLM lands that negatively affect habitat or populations on BLM lands.	

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If the CFA identifies the cause for habitat or population declines BLM will modify any permitted activity identified as a causal factor, as legally allowable to reduce, mitigate or eliminate the impact on BLM lands in coordination with the permit holder. Monitoring of the affected habitat or population (or both if appropriate) will be necessary to assess the efficacy of the modification. For new authorizations project level NEPA will specifically evaluate if the proposed new activity could result in contributing to sustaining the threshold or result in the threshold being met again. New authorizations may be subject to more restrictions appropriate for the specific resource, as determined necessary by local information. **Exceptions to limitations imposed for exceeding thresholds include**: 1. Renewal of existing activities that require a permit if: a. The activity is scheduled within 60 days of when a threshold is met and identified, and b. The project proponent can show significant negative economic impacts (i.e., documented loss of income equivalent to the income potential of the event), and c. The renewal can only be considered if it does not result in known impacts to habitats or populations. 2. Activities essential for human health and safety in a current or likely catastrophic event (e.g., repair of dams, emergency vehicle access). 3. ES&R activities essential to restoration after a wildfire. 4. Grazing permits that will expire within the same year the threshold is identified. A permit or lease to extend the current grazing practice for less than 10 years may be renewed until the causal factor analysis is completed. If grazing is not determined as a causal factor to an adaptive management threshold, grazing permit or lease renewal can proceed normally. If grazing is a contributing cause to an adaptive management threshold, the terms and conditions of the grazing permit or lease will need to be examined and modified to reduce or eliminate the impact. 5. Continuing the terms and conditions for livestock grazing when a permit or lease has expired or was terminated due to a grazing preference transfer in accordance with Section 402(c)(2) of the FLPMA as amended by Public Law No. 113-291. BLM will work with proponents identified in the above exceptions to reduce potential impacts on GRSG habitats. If the neighborhood in which a population trend threshold is met is 50% or greater GHMA, lek level threshold analyses should be conducted to determine which leks are contributing to the trend deviation. If meeting the threshold is the result of lek attendance declines entirely within GHMA new permits can be considered prior to completing a CFA if that activity is not in conflict with any GHMA designation identified by the state wildlife agency (restoration, connectivity, seasonal, or other), and if that activity will not negatively impact habitats or populations in the adjacent PHMA. If a reduction in the ability for the habitat to support GRSG occurs as a result of habitat impacts, additional restrictions may be necessary to preclude further habitat losses. Local responses to thresholds in GHMA can be considered if deemed necessary by the BLM and the appropriate state agency. A	

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similar analysis will be conducted if a neighborhood cluster covers mixed landownerships. If the threshold is the result of habitat conditions on non-BLM administered lands, new authorizations can be considered if the activity will not negatively impact habitats or populations in the adjacent lands or contribute to indirect or cumulative impacts. The restrictions from meeting soft or hard habitat or population trend thresholds will be removed once the criteria for reversing the threshold, described above are met. If a threshold is met as the result of actions on adjacent non-BLM lands, new authorizations can be considered if the activity will not negatively impact habitats or populations or contribute to indirect or cumulative impacts. Habitat improvement projects should also be considered if likely to reverse the threshold. **Habitat Threshold due to Wildfire**: If wildfire results in a habitat threshold being met, an assessment of the impact on affected GRSG habitat will be conducted by BLM staff and appropriate state agency personnel to determine the actual extent of habitat loss (which can include an assessment of burn severity – did the wildfire burn hot enough to kill the sagebrush) within the wildfire perimeter. This review may be done in addition to any BLM ESR review. No new discretionary authorizations that would result in additional habitat loss within PHMA in affected neighborhood clusters will be authorized until the assessment of habitat impacted is completed (this can include the initial rapid assessment if the results indicate the threshold can be reversed). If the assessment indicates wildfire severity is such that habitat services (the ability of the area to provide food, cover, water, and connectivity at the time just prior to the wildfire) for GRSG within the wildfire perimeter remain and the area can support the same abundance of GRSG that was present prior to the wildfire the threshold will be considered reversed. If habitat assessment determines the PHMA influenced by the wildfire can no longer support GRSG populations at levels prior to the wildfire, new infrastructure projects or permits may be deferred if consistent with applicable law (such as the Mining Law of 1872), and valid existing rights until an assessment demonstrates the habitat can support GRSG at the levels that existed prior to the wildfire event have been restored. Authorizations may be considered if the proposed project will have no direct or indirect impact to GRSG or their habitats. The associated determination must be documented in a report to the BLM state sage-grouse lead, the BLM state director and the National BLM GRSG coordinator. If the wildfire event precludes restoration to GRSG habitat permanently, further assessment may be necessary to determine if the area should still be considered GRSG habitat. **Multi-factorial CFAs:** Where there are multiple potential causes identified the BLM may consider implementing additional restrictions specific to the identified causes on existing or new authorizations in the area, consistent with permits/surface use rights in coordination with the permit holder and the state wildlife management agency and other appropriate state authorities. Any restrictions will be determined by the authorizing officer, with the documented biological rationale from BLM field biologists. In addition to considering project-level restrictions, the BLM should direct	

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habitat improvement projects specific to the causes identified to the neighborhood cluster and surrounding clusters. **Inconclusive CFAs:** If no cause for a habitat or population decline can be determined the BLM may consider implementing additional restrictions on existing or new authorizations in the area, consistent with permits/surface use rights in coordination with the permit holder and the state wildlife management agency. Any restrictions will be determined by the authorizing officer, with the documented biological rationale from BLM field biologists. Following Inconclusive CFAs, the CFA team should monitor the area and include any new or changing information in the annual adaptive management report or as an addendum to the CFA. New authorizations must disclose a threshold has been met and consider the proposed activity's potential cumulative impact to either the habitat or population trend (dependent on which threshold has been met). In addition to considering project-level restrictions, the BLM should direct habitat improvement projects to the neighborhood cluster and surrounding clusters. CFAs that are not completed within the time frame identified by the CFA team will not be considered inconclusive and should be prioritized for completion.	
Criteria Based Management for Non-Habitat	
Objective: N/A **Allocation:** (no allocation identified but allocations can be affected if non-habitat criteria are met) **Management Direction** (can affect HMA allocation and management direction, see Tables above): Habitat management areas include areas where the BLM will apply goals, objectives, and management actions for conservation of GRSG. The HMAs are identified using inventory data on habitat use and occupancy and reflect the dynamic nature of the vegetation communities that make-up GRSG habitat. The HMA boundaries are not identified using survey-grade assessments (e.g., comprehensive on-the-ground surveys and edge verifications) and, in some states, are the result of large-scale modeling. Therefore, not every acre within an HMA boundary may be GRSG habitat. Additionally, because GRSG habitat use and occupancy and vegetation communities are dynamic, the BLM will use up-to-date high-quality information, including through field investigations, where appropriate, to make adjustments to the management actions to be applied within identified HMA boundaries. In accordance with existing law, regulation and policy, inventories will continue to be conducted to provide information on GRSG habitat and distribution (BLM Manual 6840 .04 D 3; BLM-M-6840 .04 E 2). In the mapped GRSG HMAs, there may be areas of non-habitat (areas that lack the ecological potential to provide principal habitat components necessary to support GRSG) and where conformance with the RMP would not support GRSG conservation (refer to definitions for existing habitat, potential habitat, and non-habitat in glossary). If during consideration of a proposed action (project level authorization) within GRSG PHMA, GHMA, IHMA (in ID), Unique HMAs (in MT)/DKs, SHMA (in WY) and OHMA (in NV/CA) potential non-habitat is identified by the BLM, a project-specific review should be conducted by a BLM biologist (or reviewed and accepted for confirmation). This review should use published, scientific methods (preferably more than one) for identifying GRSG habitat (e.g., Stiver et. al. 2015 [as revised], NRCS ecological site descriptions (ESDs) and	**Nevada/California**: In Nevada and California, the project-specific review to consider which HMA criteria and management (e.g., in PHMA, GHMA, OHMA) should apply can include areas that provide more conservation value than the current designation identifies as well as areas of non-habitat. In the State of Nevada, the project-specific review will include representatives from BLM, NDOW, and the SETT at a minimum and include both spatial analyses and field derived information. On California BLM-managed lands, the review will include state representatives and include both spatial analyses and field derived information. USGS may be included in the project-specific review to advise on model accuracy and identification of model parameters that resulted in the mapped categorization. Consistent use of the USGS model results is an objective of this collaborative review. Any proposed change in HMA allocation for the

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associated state and transition models) and be coordinated with the appropriate state agencies. Any discrepancies between the mapped GRSG HMAs and the site-specific conditions will be disclosed, with supporting data (e.g., vegetation monitoring, state and transition models, ecological site descriptions, etc.) and analyzed as a component of the NEPA process. However, indirect and direct impacts to adjacent GRSG populations and their habitats (including potential habitat) still need to be considered when planning and authorizing projects in these non-habitat areas. All management objectives and decisions associated with each management area type will apply unless all the following criteria are documented: 1. Project is proposed in verified non-habitat. 2. There are no indirect impacts to adjacent habitat or individual or populations of GRSG occupying these adjacent areas due to project design and required design features (e.g., minimize noise, preclude tall structures, require perch deterrents, etc.), as demonstrated in the project's NEPA document. Indirect impact consideration includes the following: (1) The project does not impact connectivity, i. Within or between populations, ii. Between seasonal habitats (e.g., nesting, early brood rearing, winter, etc.), or iii. Within or between existing habitat. 3. Any project related access through/across GRSG habitat (as verified through site-specific field checks) only occurs on existing routes, and the proposed action would not include new roads or upgrades to roads that would change the vehicle use, vehicle type, or traffic volume during the applicable season of GRSG use, subject to valid existing rights, throughout all stages of the proposed project. 4. Coordination with the appropriate state and federal agency biologists and other appropriate staff has been documented. If coordination is not possible the reasons will be documented. All proposed actions, including those in the same area, would need to undergo individual analysis to confirm the criteria are met prior to authorization. Exempting a proposed project from the management actions that would otherwise be required in a GRSG habitat management area identified on the maps in this RMPA because the proposal has been determined to be in non-habitat, based on the above criteria, would not change the GRSG habitat management area boundaries as identified in the RMP. The determination to exempt a proposed project from the management actions that would otherwise be required in the GRSG habitat management area identified in maps in this RMPA, when supported by science and consistent with the criteria above, may only be made by the Authorized Officer. However, if there is not concurrence between the coordinating federal and/or state wildlife biologists, then the determination will be at the discretion of the BLM State Director.	area resulting from the review must be approved by the State Director.

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Definition of Lek	
Objective: N/A **Allocation:** N/A **Management Direction:** Use the Western Association of Fish and Wildlife Agencies (WAFWA) lek definitions (Cook et. al., 2022). (Refer to Glossary and **Appendix 4**). Unless otherwise specifically noted, when language in the RMPs uses the term "lek" it applies to the WAFWA definition for "active lek."	**Colorado:** The WAFWA active lek definition applies to "occupied leks" as defined by Colorado Parks and Wildlife. **Oregon:** The lek definition applies to "active lek" AND "pending active lek". **Nevada/California/Idaho**: The lek definition applies to "active lek" AND "pending active lek". **Wyoming:** The active lek designation applies to "occupied leks" as defined by Wyoming Game and Fish Department.

Table 2-5. Priority Habitat Management Areas (PHMA) with limited exceptions Allocations and Management Direction

This table identifies the resource topics and the rangewide amendments being proposed for application in PHMA with limited exceptions. The table describes the rangewide management category in the left-hand column, the proposed allocations and management direction in the middle column, and the state-specific differences to the rangewide direction in the right hand column. The table describes if the Proposed RMP Amendment is amending the "objective", "allocation", or "management direction" for the resource topic identified. In some instances, the Proposed RMP Amendment addresses all three of these planning categories for a resource topic while in other resource topics only one or two of the categories are being proposed for amendment.

GRSG habitat management areas would be identified and managed as shown on **Map 2.7**. Acres by state and rangewide are shown in **Table 2-15**. Information on state-by-state GRSG HMA mapping strategies is in **Appendix 3**.

Proposed RMP Amendment for PHMA with limited exceptions		
Management Category	**Allocation and Management Direction**	**State-Specific Differences**
All the PHMA allocations and management direction described in Table 2-4 apply except as described below for Utility Scale Solar, Utility Scale Wind, Fluid Minerals (including Geothermal), Saleable Minerals/Material Management, Nonenergy Leasable Minerals, and Major Rights of Way.		
Utility Scale Solar	**Allocation:** Exclusion without exceptions for utility scale solar testing and development.	—
Utility Scale Wind	**Allocation:** Exclusion without exceptions for utility scale wind energy testing and development (including met towers).	—
Fluid Minerals (including Geothermal)	**Allocation:** NSO and no Waivers/Exceptions/Modifications	—
Saleable Minerals/Material Management	**Allocation:** Closed, but Open for new free use permits (within 1/4 mile of an existing improved roads and not located within 3.1-miles of a lek) and expansion of existing pits if: 1. the proposed disturbance will be less than 40-acres; or 2. the BLM can verify the area is not habitat and the expansion would not adversely impact any adjoining seasonal habitat.	**Wyoming**: Closed, but Open for new free use permits and expansion of existing pits subject to occupancy, seasonal limitations, disturbance, density, and the BLM can verify the expansion would not adversely impact any adjoining seasonal habitat. **Montana**: Same as PHMA, see **Table 2-9**. **Oregon:** Refer to **Table 2-11** for additional management direction.

<table>
<tr><th colspan="3">Proposed RMP Amendment for PHMA with limited exceptions</th></tr>
<tr><th>Management Category</th><th>Allocation and Management Direction</th><th>State-Specific Differences</th></tr>
<tr><td>Nonenergy Leasable Minerals</td><td>Allocation: Closed to new leases including fringe acreage leasing (i.e., no expansion of existing leases).</td><td>Wyoming: Closed to new leases including fringe acreage leasing (i.e., no expansion of existing leases) except in situations required for human health and safety (e.g., ventilation shafts for underground mining operations).</td></tr>
<tr><td>Major Rights of Way</td><td>Allocation: Exclusion for Major Rights of Way (ROW) (linear features such as overhead transmission lines, distribution pipelines, and large non-linear surface disturbing projects (refer to glossary) with the following exceptions.

Management Direction:
If during consideration of a proposed ROW action (project level authorization) the determination of whether it is a major or minor ROW is questioned with supporting rationale, the Authorized Officer (AO), in consultation with the State Office lead(s), will make the final determination.

Major Rights of Way Exception Criteria
Exceptions will be granted if the criterion below and the additional conditions are met.
1. RMP designated corridors within PHMA with limited exceptions are open to consideration of a new major ROW in the category of ROW for which the corridor was designated if co-location of the proposed authorization within the existing ROW disturbance results in minimal impacts to those already associated with the existing major infrastructure, including indirect disturbance to or disruption of adjacent seasonal habitats.

If the avoidance criterion can be met, the ROW must also meet the following conditions in order to be permitted in PHMA with limited exceptions:

a) The ROW must be the minimum necessary to achieve the ROW's purpose and would not otherwise be viable in an area that is "open" to ROWs.
b) Micro-siting is required to limit impacts and maintain connectivity corridors between seasonal habitats. This includes using topography and non-habitat as effective barrier to adverse impacts and collocation with existing, similarly sized, infrastructure.
c) Residual direct and indirect impacts would be mitigated through compensatory mitigation to achieve the mitigation standard.</td><td>Montana: Exclusion with no exceptions within 0.6m of leks and in crucial winter range. Refer to Table 2-9.</td></tr>
</table>

Proposed RMP Amendment for PHMA with limited exceptions		
Management Category	**Allocation and Management Direction**	**State-Specific Differences**
	If requiring compensatory mitigation both inside and outside of RMP-designated corridors disincentivizes location in the designated corridor or another route that has lesser impacts to GRSG, the Authorized Officer may consider adjusting the compensatory mitigation requirement if doing so reduces impacts to GRSG compared to an alignment that otherwise requires compensatory mitigation (e.g., development in an RMP-designated corridor that has existing transmission lines already present). When considering adjustments to the BLM's no net loss compensatory mitigation requirement for a major ROW (see GRSG mitigation action), the Authorized Officer shall coordinate with the applicable State agencies to ensure compliance with compensatory mitigation required by State policies or regulations that go beyond BLM's compensatory mitigation requirement.	

Table 2-6. General Habitat Management Area (GHMA) Allocations and Management Direction

This table identifies the resource topics and the rangewide amendments being proposed for application in GHMA. The table describes the rangewide management category in the left-hand column, the proposed allocation and management direction in the middle column, and state-specific differences to the rangewide direction in the right hand column. The table describes if the Proposed RMP Amendment is amending the "objective", "allocation", or "management direction" for the resource topic identified. In some instances, the Proposed RMP Amendment addresses all three of these planning categories for a resource topic while in other resource topics only one or two of the categories are being proposed for amendment. All three planning categories are identified for each resource topic and if it is not being proposed for amendment it will be identified as "N/A", not applicable. In those "N/A" instances, the 2015 or 2019 Amendment decision is not being proposed for amendment and remains in place. The existing 2015 and 2019 Amendment decisions are described in **Appendix 2**. **Appendix 2** provides a description of the decisions that remain in place and how and where that management direction is being proposed for amendment by this amendment.

GRSG habitat management areas would be identified and managed as shown on **Map 2.7**. Acres by state and rangewide are shown in **Table 2-15.** Information on state-by-state GRSG HMA mapping strategies is in **Appendix 3**.

Proposed RMP Amendment for GHMA Allocations and Management Direction		
Management Category	**Allocation and Management Direction**	**State-Specific Differences**
Utility Scale Solar	**Objective:** N/A **Allocation:** Open with applicable state specific minimization measures from the 2015 and 2019 GRSG Plan Amendments, and compensatory mitigation, to maintain habitat supporting GRSG populations consistent and concurrent with state agency habitat designations (e.g., restoration, connectivity, seasonal, or other), and to preclude negative impacts to any adjacent PHMA habitats. **Management Direction:** N/A	**Colorado:** Avoidance for solar development. Development could be authorized if the Authorized Officer can document that there would be no negative impacts to any PHMA habitats or important seasonal habitats in GHMA. Refer to Colorado Additional Management Direction in **Table 2-7**. **Oregon:** Avoidance for solar development. Refer to **Table 2-11** for state specific management direction. **Idaho:** Open in GHMA, subject to RDFs, buffers, and mitigation. Refer to **Table 2-8** for state specific management direction. **Montana/Dakotas:** Exclusion w/in 2 miles of leks, UMRBNM, and crucial winter habitat. Avoidance in rest of GHMA. Refer to **Table 2-9** for state specific management direction on unique HMAs. **Utah:** Avoidance in GHMA connectivity areas. Development could be authorized if the Authorized Officer can document that there would be no negative impacts to any PHMA habitats or important seasonal habitats in GHMA connectivity areas. New ROWs in the remainder of GHMA (non-connectivity) could be considered if they apply the

Proposed RMP Amendment for GHMA Allocations and Management Direction		
Management Category	**Allocation and Management Direction**	**State-Specific Differences**
		pertinent management for discretionary activities in GHMA identified in MA-SSS-5 (Utah ARMPA). **Wyoming:** Open with applicable state specific minimization measures from the 2015 and 2019 GRSG Plan Amendments, and compensatory mitigation, to maintain habitat supporting GRSG populations consistent and concurrent with state agency habitat designations (e.g., restoration, connectivity, seasonal, winter concentration, or other), and to preclude negative impacts to any PHMA habitats. GHMA management for solar energy development applies to SHMA in Wyoming. **Nevada/California:** Avoidance for utility scale solar testing and development. Development could be authorized if the Authorized Officer can document that there would be no negative impacts to PHMA or important seasonal habitats in GHMA.
Utility Scale Wind	**Objective:** N/A **Allocation:** Open with applicable state specific minimization measures from the 2015 and 2019 GRSG Plan Amendments, and compensatory mitigation, to maintain habitat supporting GRSG populations consistent and concurrent with state agency habitat designations (e.g., restoration, connectivity, seasonal, or other), and to preclude negative impacts to any PHMA habitats. **Management Direction:** N/A	**Colorado:** Avoidance for wind development including met towers. Development could be authorized if the Authorized Officer can document that there would be no negative impacts to any PHMA habitats or important seasonal habitats in GHMA. Refer to Colorado Additional Management Direction in **Table 2-7**. **Oregon:** Avoidance for utility scale wind development. Refer to **Table 2-11** for state specific management direction. **Idaho:** Open in GHMA, subject to RDFs, buffers, and mitigation. Refer to **Table 2-8** for state specific management direction. **Montana/Dakotas:** Exclusion w/in 2 miles of leks, UMRBNM, and crucial winter habitat. Avoidance in rest of GHMA. Refer to **Table 2-9** for state specific management direction on unique HMAs. **Utah:** Avoidance in GHMA connectivity areas. Development could be authorized if the Authorized Officer can document that there would be no negative impacts to any PHMA habitats or important seasonal habitats in GHMA connectivity areas. New ROWs in the remainder of GHMA

Proposed RMP Amendment for GHMA Allocations and Management Direction		
Management Category	**Allocation and Management Direction**	**State-Specific Differences**
		(non-connectivity) could be considered if they apply the pertinent management for discretionary activities in GHMA identified in MA-SSS-5 (Utah ARMPA). **Wyoming:** Open with applicable state specific minimization measures from the 2015 and 2019 GRSG Plan Amendments, and compensatory mitigation, to maintain habitat supporting GRSG populations consistent and concurrent with state agency habitat designations (e.g., restoration, connectivity, seasonal, winter concentration, or other), and to preclude negative impacts to any PHMA habitats. GHMA management for wind energy development applies to SHMA in Wyoming. **Nevada/California:** Avoidance for utility scale wind testing and development (including met towers). Development could be authorized if the Authorized Officer can document that there would be no negative impacts to any PHMA habitats or important seasonal habitats in GHMA.
Fluid Minerals (including Geothermal)	**Management Objective, Allocation, and Management Actions**: Same management direction as identified in 2015 and 2019 for all States except as noted in "State-Specific Differences" column. **NSO Exception** 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 GRSG due to site-specific terrain and habitat features, such as topographic features that would reduce the habitat impacts by shielding nearby habitat from disruptive factors. An exception could also be granted if it can be demonstrated by a qualified biologist and confirmed by the BLM, based on site-specific information (using State mitigation tools such as Habitat Equivalency Analysis or Habitat Quantification Tool, or other State mitigation programs), that the impacts anticipated by the proposed activity would be offset through compensatory mitigation developed in coordination with the appropriate State agency that meets principles of GRSG compensatory mitigation identified in the RMP, including providing for no net loss of habitat.	**Colorado:** CSU w/in 1 mile of PHMA to avoid indirect impacts to PHMA, CSU within 1 mile of leks occurring in GHMA to avoid impacts to important seasonal habitats, timing limitations for all of GHMA. Refer to Colorado Additional Management Direction in **Table 2-7**. **Montana/Dakotas:** NSO w/in 0.6 mile of leks and in crucial winter range; CSU (avoid surface occupancy and use in seasonal habitats unless impacts can be addressed) elsewhere. UMRBNM closed. Refer to **Appendix 16**: Montana/Dakotas Oil and Gas Lease Stipulations for full list of stipulations. **Nevada/California:** Open with minor stipulations (CSU for lek buffers and seasonal limitations). **Oregon:** For fluid mineral allocation, refer to Oregon state-specific management direction **Table 2-11**. No modifications to NSO in GHMA. Exception and waiver are the same as rangewide, but applied to active and pending active leks. **Utah:** NSO and seasonal limitations near leks (varies by office) based on pre-2015 management plans.

Proposed RMP Amendment for GHMA Allocations and Management Direction		
Management Category	**Allocation and Management Direction**	**State-Specific Differences**
	NSO Modification The Authorized Officer may grant a modification after a review of available information, and in coordination with the applicable state agency, documents that a portion of the NSO area is nonessential, or it is identified through scientific research or monitoring that the existing area is inadequate or overly protective for maintaining the function or utility of the site for the seasonal habitat, life-history, or behavioral needs of the GRSG, including (but not limited to) reproductive display, daytime loafing/staging activities, and nesting, considering both direct and indirect impacts from a potential modification. **NSO Waiver** This stipulation may be waived for a specific lek if, in coordination with the appropriate State agency, it is determined that the GRSG lek that was active has been classified as inactive as determined by the WAFWA definitions and confirmed by the appropriate State agency. Prior to waiving the stipulations, surveys should confirm that the lek is inactive and not moved to another location in the vicinity. Any changes to this stipulation will be made in accordance with the land use plan and/or the regulatory provisions for such changes. **Seasonal Constraints/Stipulations** **Season Constraints/Stipulations Exception** The Authorized Officer may consider and provide temporary relief from seasonal constraints by granting an exception after documenting the review of available information associated with the site proposed for the exception. This direction applies in PHMA, GHMA, and all other state identified HMAs. While the BLM considers information from all sources, the State wildlife agency can provide information directly associated with bird use, including whether GRSG populations are not using the seasonal habitat during that year's seasonal life cycle period if available. Based on this information and recommendation, and documented variability in climatic conditions (e.g., early/late spring, long/heavy winter), use patterns, or other applicable information the Authorized Officer may consider a one-time exception if development associated with it will not affect GRSG habitat use.	**Wyoming:** NSO w/in 0.25 mile of leks; seasonal limitations within 2 miles of leks; open with standard terms and conditions outside of 2-mile lek buffer. This direction and the NSO stipulation waiver, exception, and modification direction also applies in SHMA.

Proposed RMP Amendment for GHMA Allocations and Management Direction		
Management Category	**Allocation and Management Direction**	**State-Specific Differences**
	Season Constraints/Stipulations Modifications The BLM can and does grant modifications to seasonal restrictions if the BLM, in coordination with the state wildlife agency and other appropriate state authorities on a case-by-case basis, determines that granting the modification would not adversely impact the population being protected. The authorized officer may consider and grant a modification to the dates and areas associated with seasonal timing restrictions based on the criteria described below – after documenting the review of available information associated with the site proposed for the modification, if: The geographic and temporal conditions demonstrate that any modification (shortening/extending seasonal timeframes) is justified on the basis that it serves to better protect or enhance GRSG and its habitat than if the strict application of seasonal timing restrictions are implemented. Under this scenario modifications can occur if one or more of the following conditions can be documented: A proposed authorization is expected to have beneficial or neutral impacts on GRSG and its habitat. Topography or other factors eliminate direct and indirect impacts from visibility and audibility to GRSG and its habitat. There are documented local variations that indicate the seasonal life cycle periods are different than presented. Modifications are needed to address an immediate public health and safety concern in a timely manner (e.g., maintaining a road impacted by flooding). **Season Constraints/Stipulations Waiver** The Authorized Officer may consider and grant a waiver of the stipulation on an existing lease if the area that was mapped as a GRSG habitat management area (regardless of type) when the lease was issued is no longer mapped as such through the appropriate planning process (i.e., plan maintenance or amendment).	
Saleable Minerals/Mineral Materials	**Objective:** N/A **Allocation:** Open. **Management Direction:** Apply State-specific minimization measures identified in the existing 2015 and 2019 GRSG amendments (refer to **Appendix 2**).	**Wyoming:** Direction also applies in SHMA.

Proposed RMP Amendment for GHMA Allocations and Management Direction		
Management Category	**Allocation and Management Direction**	**State-Specific Differences**
Nonenergy Leasable Minerals	**Objective:** N/A **Allocation:** Open. **Management Direction:** Apply State-specific minimization measures identified in the existing GRSG amendments (refer to **Appendix 2**)	**Colorado:** Refer to additional management direction in **Table 2-7**. **Wyoming:** Direction also applies in SHMA.
Coal	**Objective:** N/A **Allocation:** N/A **Management Direction:** **States w/ coal resources (Colorado, Montana/Dakotas, Utah and Wyoming):** Unless a suitability process has already been conducted that considered GRSG HMAs, 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 agency and the determination of essential habitat for maintaining GRSG as per the suitability criteria at 43 CFR Part 3461.5(o)(1) will consider site-specific information associated with lease nomination areas as part of the unsuitability process identified above. **States without coal resources (Idaho, Nevada/California, and Oregon):** No management direction due to the absence of the mineral.	**Wyoming:** Direction also applies in SHMA.
Locatable Minerals	**Objective:** N/A **Allocation:** Open, unless currently withdrawn. **Management Direction:** N/A	**Wyoming:** Direction also applies in SHMA.
Major Rights of Way	**Objective:** N/A **Allocation:** Open with applicable state minimization measures from 2015 and 2019, and compensatory mitigation, to maintain habitat supporting GRSG populations consistent with state agency habitat designations (e.g., restoration, connectivity, seasonal, or other), and to preclude negative impacts to PHMA habitats. **Management Direction:** N/A	**Colorado:** Avoidance and expand criteria to preclude negative impacts to PHMA habitats or important seasonal habitats in GHMA, open in designated corridors to the ROW type for which the corridor was designated. Refer to **Table 2-7** for Colorado specific direction. **Idaho**: Open, subject to RDFs, buffers, and mitigation. Refer to **Table 2-8** for Idaho specific management direction. **Oregon:** Avoidance. **Montana/Dakotas:** Refer to **Table 2-9** for Montana specific direction on major ROW management, including in CHMA and unique HMA types. **Wyoming:** Open with applicable state minimization measures from 2015 and 2019, and compensatory

Proposed RMP Amendment for GHMA Allocations and Management Direction		
Management Category	**Allocation and Management Direction**	**State-Specific Differences**
		mitigation, to maintain habitat supporting GRSG populations consistent with state agency habitat designations (e.g., restoration, connectivity, seasonal, winter concentration, or other), and to preclude negative impacts to PHMA habitats. GHMA management for ROWs applies to SHMA in Wyoming. **Utah:** Avoidance in GHMA connectivity areas that are important for GRSG connectivity between populations. Development could be authorized if the Authorized Officer can document that there would be no negative impacts to any PHMA habitats or important seasonal habitats in GHMA connectivity areas. New ROWs in the remainder of GHMA (non-connectivity) could be considered if they apply the pertinent management for discretionary activities in GHMA identified in MA-SSS-5 (Utah ARMPA). **Nevada:** Avoidance. Direction associated with PHMA applies to GHMA on lands administered by BLM-NV.
Minor Rights-of-Way	**Objective:** N/A **Allocation:** Open with applicable state mitigation requirements from 2015 and 2019 GRSG amendments (refer to **Appendix 2**). **Management Direction:** N/A	**Colorado:** Avoidance. Refer to Colorado Additional Management Direction in **Table 2-7**. **Idaho**: Open, subject to RDFs, buffers, and mitigation. **Montana/Dakotas:** Avoidance w/in 1.2 miles of active leks and w/in crucial winter range, open with mitigation requirements elsewhere. **Oregon:** Refer to **Table 2-11** for additional detail allocations associated with minor ROWs. **Wyoming:** Open with no mitigation requirements. Direction also applies in SHMA.
Livestock Grazing	Same as PHMA except RM-3 does not apply.	**Wyoming:** Direction also applies in SHMA.
Wild Horse and Burro	Same as PHMA.	—
Mitigation	Same as PHMA	**Wyoming:** Direction also applies in SHMA.
Predation	Same as PHMA except Management Action 2 does not apply.	**Nevada/California**: Same as PHMA **Oregon:** Same as PHMA
Disturbance Cap	No GHMA disturbance cap management direction.	—

Proposed RMP Amendment for GHMA Allocations and Management Direction		
Management Category	**Allocation and Management Direction**	**State-Specific Differences**
Adaptive Management	Same as PHMA	**Wyoming:** Direction also applies in SHMA.
Lek Definitions	Same as PHMA	—
Criteria Based Management Direction for Non-Habitat	Same as PHMA	**Wyoming:** Direction also applies in SHMA.

2.5 STATE-SPECIFIC CIRCUMSTANCES

The Proposed RMP Amendment includes State specific management direction to respond to locally relevant habitat variability and circumstances, consistent with the purpose and need. Different resource topics and GRSG conservation strategies addressed by individual states in this amendment effort include fire and fuels, vegetation and invasives, lands and realty actions, project screening, lek buffers, and interagency coordination. Inclusion of a management category for amendment in one state does not necessitate consideration of this category in other states or the consideration of the category rangewide. The management approaches and tools identified in the state-specific Proposed RMP Amendments that follow are limited to those identified for a given state and are only applicable in those states.

Issues or management differences between states are not based on preference, but rather on specific circumstances and are focused on issues, topics, and actions that meet the purpose and need of improving GRSG conservation. Through the alternative development process all states identified at least one state-specific circumstance. In response to the needs identified above and in response to cooperating agency and public comments received on the Draft RMP Amendment and Draft EIS, following are the state-specific circumstances that have been identified in the Proposed RMP Amendment for each state.

Colorado

The Proposed RMP Amendment includes State specific management direction to respond to locally relevant habitat variability and circumstances, consistent with the purpose and need. Most state-specific circumstances in Colorado are a result of different planning approaches in the 2015 and 2019 NWCO GRSG ARMPAs (plans). The BLM will also clarify management decisions that have been unclear since implementation of the 2015 plan.

Colorado has variable topography leading to naturally fragmented habitats, affecting ecology and plant communities, and therefore differences between GRSG population areas. Significant elevational changes may fall within standard lek buffer distances in some Colorado GRSG populations (e.g., Parachute Piceance Roan (PPR) population). Colorado typically does not see large wildfires in sagebrush ecosystems or conversion to agriculture to the same degree as other states.

Prior to the current planning process, the BLM and the State of Colorado adopted refined habitat management area maps. The multi-year (2016-2019), collaborative mapping process refined previously mapped areas to remove non-habitat in habitat management areas or expand areas with documented GRSG use. The re-mapping effort incorporated state-specific, timely research and mapping tools. See **Appendix 3** for a summary of the Colorado habitat management area mapping strategy. The state specific circumstances for the State of Colorado being addressed in this effort include the following: 1) management scale, 2) application and use of lek buffers, 3) consistency across resource uses, and 4) integration of lessons learned during implementation.

Management Scale

Colorado manages populations and sub-populations by Management Zone (MZ) which are biologically driven units delineated by GRSG use, topographic and other natural features, differences in ecological potential, and differences in issues affecting GRSG (Colorado Greater Sage-grouse Steering Committee 2008). The BLM uses the CO MZs to calculate project-scale disturbance and density caps rather than the density and disturbance methodology used by many other states. The MZs are geographically consistent with the areas used by Colorado Parks and Wildlife (CPW) but have different numbering (e.g.- BLM MZ 2 is the same area as CPW MZ 1). For ease of communication, the BLM intends to adjust the MZ numbering during this planning effort to be more consistent with the CPW naming convention.

Lek Buffers

Clarification of lek activity periods

The BLM will clarify the activity period for the leks being included in management allocations and decisions. Both the 2015 and 2019 plans included allocations and management decisions based on the distance from "active" leks using CPW's definition, which is an area used by two or more displaying males in two of the last five years in larger populations and one or more males in any of the last five years in small populations (Colorado Greater Sage-grouse Steering Committee 2008). There are inconsistencies between the CPW definition and the WAFWA definition, which describes an active lek as a lek that has 2 or more males counted during two or more years within the last 10 years (Cook et al. 2022, Connelly et al. 2000a). Because GRSG populations generally follow 9- to 10-year population cycles (Rich 1985, Fedy and Aldridge 2011, Fedy and Doherty 2011), the BLM will use a lek definition that better captures the fluctuation of population dynamics. The BLM will analyze use of the "occupied" lek definition from the 2015 and 2019 plans, which is defined as a lek that has been active during at least one strutting season within the past 10 years. CPW concurs with the approach.

The clarification of lek activity periods results in an increase to the amount of BLM-administered lands within the corresponding buffer distances. According to the Colorado 2022 lek count data from CPW, 276 leks are classified as active using the 5-year activity timeframe. The total number of leks with activity in the last 10 years increases to 445 leks. Using the 2015 and 2019 plan definitions, approximately 571,375 acres of BLM-administered lands were within 1-mile of an active lek (CPW, 5-year timeframe). With the clarification, approximately 811,215 acres are within 1-mile of an occupied lek, representing a 42% increase in BLM-administered lands that are subject to more intensive management decisions for the protection of leks, nesting, and early brood-rearing habitat.

Distance of buffer

In the 2015 plan, fluid mineral leasing was closed within 1-mile of an active lek compared to a 0.6 mile. In coordination with CPW, the BLM increased the previous stipulation area (i.e.- 0.6-mile buffer NSO) to a 1-mile closure to provide protection for leks and nesting and early brood rearing habitat in the closest proximity to leks. The 2019 plan amended the decision from a 1-mile closure to a 1-mile NSO with a different set of waiver, exception, and modification (WEM) criteria than the rest of PHMA (also NSO) but maintained the 1-mile closure around an active lek. The 1-mile standard was subsequently incorporated into the state of Colorado oil & gas regulations (CO Code 34-60-101, 2022). The BLM will analyze the 1-mile lek buffer distance as the minimum threshold in Colorado under Alternatives 1 and 2 (No Action alternatives), and 5.

Allocations/management decisions within 1-mile buffer

The 2019 plan amended the decision from a 1-mile closure to a 1-mile NSO with a different set of WEM criteria than the rest of PHMA (also NSO). However, under the Proposed RMP Amendment, PHMA is open to fluid mineral leasing subject to NSO. WEMs will include additional criteria within 1-mile of occupied leks rather than being limited to active (CPW) leks. This clarification would allow for PHMA to remain NSO with the distinction of more intensive management within 1-mile of a lek requiring the use of one NSO stipulation.

Allocations for GHMA

In the 2015 and 2019 plans, Colorado included a NSO stipulation within 2-miles of active leks in GHMA. Because of the lek status clarification above, the BLM analyzed the change between an NSO around active leks versus occupied leks in Alternative 4. The BLM also analyzed using a Controlled Surface Use (CSU) stipulation within 2-miles of occupied leks in Alternative 5 and a CSU within 1-mile of PHMA in Alternative 6 instead of the NSO to assess the impacts of different stipulation types.

CSU stipulations are applied at the leasing phase and allow the BLM to carefully consider site-specific factors during implementation that provide the appropriate level of protection and restrictions. Common CSU measures include relocating operations by more than 200 meters (656 ft) or deferring the action for more than 60 days to avoid or minimize impacts.

Alternative 4 would increase the acreage of GHMA with NSO stipulations compared to Alternatives 1 and 2. Under Alternative 5, the same amount of acreage under major stipulation (NSO) in Alternative 4 would be under moderate stipulation (CSU). Alternative 5 would allow for more flexibility in development while maintaining the BLM's ability to apply site-specific criteria for GRSG habitat protection. Alternative 6 also analyzes CSU stipulations but would be applied in GHMA within 1 mile of PHMA. This would allow for increased flexibility while allowing the BLM to consider the indirect effects that development in GHMA may have on all PHMA, not just where leks occur.

Consistency Across Resources

The BLM analyzed use of more consistent criteria for management actions such as fluid mineral permitting and ROW authorizations. Many fluid mineral permits include both an Application for Permit to Drill (APD) and a ROW (e.g.- an access road to a well pad begins off-lease and crosses on-lease). Under the 2015 and 2019 plans, the authorization would be subject to two varying sets of siting criteria. By using consistent criteria, the BLM intends to ease plan conformance and coordination across resource uses.

Lessons Learned

The BLM is including clarifications to several management decisions because of lessons learned during implementation of the previous GRSG plans. The BLM will clarify management decisions in the Fluid Mineral and Land and Realty sections. Lessons learned primarily involve administrative clarifications and remedies and are not likely to impact GRSG habitat, other resources, or resource uses.

Table 2-7. Colorado - Additional Management Direction

Management Category	Management Direction
Mitigation	**MD XX**: 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). **MD XX**: 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.
Fluid Minerals	***Unleased Fluid Minerals*** **MD MR-1:** PHMA will be open to fluid mineral leasing subject to No Surface Occupancy (GRSG NSO-1) with waivers, exceptions, or modifications (WEMs) under conditions described in the range-wide section for WEMs. **MD MR-2:** GHMA will be open to fluid mineral leasing subject to Controlled Surface Use (GRSG CSU-1) within 1 mile of PHMA and within 1 mile of occupied leks occurring in GHMA. Waivers, exceptions, and modification could be obtained under conditions described in the range-wide section for WEMs. **GRSG CSU-1:** Apply CSU constraints on surface use, occupancy, placement of permanent tall structures, and surface-disturbing activities in GHMA within 1 mile of PHMA and within 1 mile of occupied leks occurring in GHMA that would decrease habitat availability or functionality of important seasonal habitats including breeding, nesting, or winter concentration; or that create new perching/nesting/food subsidy opportunities for avian predators. Surface use including infrastructure and surface-disturbing activities may require special design, construction, and implementation measures. The actual required measures will be based on the purpose, nature, and extent of the surface occupancy including infrastructure and total surface disturbance, the affected seasonal habitat, and the feasibility of relocating the project. A tall structure is any man-made structure that provides for perching/nesting opportunities for predators (e.g., raptors, ravens) that may naturally be absent, or that decreases the use of an area. A determination as to whether something is considered a tall structure would be made based on local conditions such as existing vegetation or topography. Examples of measures and limitations include: 1. Relocate operations beyond the standard relocation setback defined in CFR 3101.12 to areas outside of habitat, to areas of existing disturbance, or to areas where site-specific topography mitigates project impacts; 2. Defer activities beyond the standard development timeframe deferral defined in CFR 3101.12 to avoid seasonal habitat use periods; 3. Modify project design to discourage avian predator perching; 4. Limit, relocate, or collocate placement of tall structures to reduce impacts of project infrastructure; 5. Limit activity associated with construction, drilling, or completions to certain seasons or times of day; 6. Minimize noise using the best available technology to dampen or direct noise away from breeding or nesting habitat. 7. Modify access routes to avoid important areas or habitats. **MD MR-3:** In PHMA & GHMA, any new leases would include Timing Limitation stipulations (GRSG TL-1) to minimize impacts to GRSG during lekking, nesting, and early brood-rearing. The following stipulation would apply:

Management Category	Management Direction
	GRSG TL-1: No activity associated with construction, drilling, or completions within 4 miles from occupied 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. **MD MR-4:** In the PHMA with Limited Exceptions area, any new leases would include Timing Limitation stipulations (GRSG TL-2) to minimized impacts to GRSG during winter concentration. The following stipulation would apply: **GRSG TL-2:** No activity associated with construction, drilling, or completions during the winter concentration period (December 1 to March 15). The Authorized Officer could grant an exception, in consultation with the State of Colorado, if the environmental record of review shows no significant direct or indirect disturbance, displacement, or mortality of GRSG. No modifications or waivers would be authorized. **MD MR-5:** Disturbance on new leases would be limited to 3% in PHMA by each Colorado population and would be limited to an average of 1 disturbance per 640 acres calculated by Colorado MZ. The following Controlled Surface Use (GRSG CSU-2) would apply: **GRSG CSU-2**: New leases in PHMA are subject to the restrictions of 3% disturbance and an average of 1 disturbance per 640 acres calculated by each Colorado population and proposed project analysis area (Colorado MZ) to allow clustered development. **MD MR-6:** No new leasing in PHMA if disturbance cap exceeds 3% calculated by each Colorado population and proposed project analysis area (Colorado MZ) or 1 disturbance per 640 acres density is exceeded. **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 with the application of reasonable measures that minimize impacts to GRSG and GRSG habitat (e.g., helicopter-portable drilling, wheeled or tracked vehicles on existing roads), or other approved methods conducted and are in accordance with seasonal TLs and other applicable restrictions. 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. ***Leased Fluid Minerals*** **MD MR-8**: Within 1 mile of occupied leks, disturbance, disruptive activities, and occupancy are precluded. 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 an average of 1 disturbance per 640 acres and/or the 3% disturbance cap, use the **criteria*** below to site proposed lease activities to meet GRSG habitat objectives and mitigation standard. **MD MR-9:** In PHMA and GHMA within 4 miles of an occupied 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. **MD MR-10:** Based on site-specific conditions, prohibit construction, drilling, and completion within PHMA and GHMA within 4 miles of an occupied 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.

<table>
<tr><th>Management Category</th><th>Management Direction</th></tr>
<tr><td></td><td>Criteria*:
1. The location of the proposed authorization is determined to be non-habitat, lacks the ecological potential to become habitat, 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.
2. Topography/areas of non-habitat create an effective barrier to adverse impacts (e.g., protected from visual and audible disturbances to GRSG and its habitat).
3. By co-locating the proposed authorization with existing disturbance, impacts would be minimized or similar to impacts associated with the existing infrastructure.
4. 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 authorizing the activity on the parcel in question would have less of an impact on GRSG or its habitat than on the nearby parcel; this criterion 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.

In addition to meeting one of the criteria above, applicable minimization measures including Disturbance Caps, Timing Limitations, Design Features, or other site-specific constraints would be included as Conditions of Approval (COAs) on the authorized activity.
MD MR-11: If the criteria* above do not apply but it can be demonstrated that the direct and indirect impacts of the proposed activity would be offset through compensatory mitigation, the authorized officer may consider permitting the action. The environmental record of review must demonstrate why avoidance is not attainable.
To grant the activity based on compensatory mitigation, the compensation project must be planned, funded, and approved by the operator, BLM, surface owner, in coordination with the State of Colorado prior to construction, surface occupancy, or surface disturbing activities. Applicable minimization measures including Disturbance Caps, Timing Limitations, Design Features, or other site-specific constraints would be included as Conditions of Approval (COAs) on the authorized activity.
MD MR-12: 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.
MD MR-13: In PHMA and GHMA, 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 that would result in full restoration of the lands to the condition prior to disturbance. Base the reclamation costs on the assumption that contractors for the BLM will perform the work.</td></tr>
<tr><td>Solid Minerals</td><td>MD MR-20: Existing nonenergy mineral leases: Apply the following conservation measures as conditions of approval (COAs) where applicable and feasible:
• Preclude new surface occupancy on existing leases within 1 mile of occupied leks (Blickley et al. 2012; Harju et al. 2012).
• If the lease is entirely within 1 mile of an occupied 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.
• Preclude new surface disturbance on existing leases within 2 miles of occupied leks within PHMA. If the lease is entirely within 2 miles of an occupied 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.
• Limit permitted disturbances to 1 disturbance per 640 acres average across the landscape in PHMA. Disturbances may</td></tr>
</table>

Management Category	Management Direction
	not exceed 3% in PHMA in any Colorado population and proposed project analysis area (Colorado MZ). GRSG TL-47-51 – Based on site-specific conditions, prohibit surface occupancy or disturbance within PHMA within 4 miles of an occupied lek during lekking, nesting, and early brood-rearing (March 1 to July 15).
Wind and Solar Energy Development	Manage areas within GHMA as avoidance areas for wind and solar energy testing and development (including met towers). Development could be authorized if the Authorized Officer can document that there would be no adverse impacts to GRSG, any adjacent PHMA, or important seasonal habitats in GHMA based on the **ROW Avoidance Criteria*.**
Lands and Realty	**MD LR-1:** Manage areas within PHMA as avoidance areas for major new major ROWs (linear features such as overhead transmission lines, distribution pipelines, and large non-linear surface disturbing projects (>100 kV transmission and >24" pipeline, refer to glossary) except for designated corridors, which would be open to consideration of new major ROWs in the category of ROW for which the corridor was designated. See range-wide section for Major ROW Avoidance Criteria for PHMA. **MD LR-2:** Manage areas within PHMA as avoidance areas* for minor BLM ROW permits. **MD LR-3:** Manage areas within GHMA as avoidance areas* for major (>100 kV transmission and >24" pipeline, refer to glossary) and minor BLM ROW permits, except for designated corridors which would be open to consideration of new major ROWs in the category of ROW for which the corridor was designated. **MD LR-4:** No new tall structures would be authorized within 1 mile of an occupied lek. Tall structures are defined as any man-made structure that provides for perching/nesting opportunities for predators (e.g., raptors, ravens) that may naturally be absent, or that decreases the use of an area. A determination as to whether something is considered a tall structure would be made based on local conditions such as existing vegetation or topography. Tall structures include but are not limited to: communication towers, meteorological towers, power lines, and transmission lines. Tall structures would only be authorized if it can be demonstrated that the proposed authorization would have no adverse impacts on GRSG or its habitat based on the **ROW Avoidance Criteria*** below. Additionally, if tall structures cannot be buried (i.e.- power lines), require perch deterrents. ***ROW Avoidance Criteria:** ROWs may be issued if it can be demonstrated that the proposed authorization would have no adverse impacts on GRSG or its habitat based on at least one of the following: 1. The location of the proposed authorization is determined to be non-habitat, lacks the ecological potential to become habitat, 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. 2. Topography/areas of non-habitat create an effective barrier to impacts. 3. By co-locating the proposed authorization with existing disturbance, impacts would be minimized or similar to impact associated with the existing infrastructure. 4. 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 authorizing the ROW on the parcel in question would have less of an impact on GRSG or its habitat than on the nearby parcel; this criterion 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. In addition to meeting one of the criteria above, applicable minimization measures including Disturbance Caps, Timing Limitations, Design Features, or other site-specific constraints would be included as Terms & Conditions of the ROW.

Management Category	Management Direction
	MD LR-5: If the **ROW avoidance criteria*** above do not apply but it can be demonstrated that the direct and indirect impacts of the proposed activity would be offset through compensatory mitigation, the authorized officer may consider granting a ROW. The environmental record of review must demonstrate why avoidance is not attainable. To grant a ROW based on compensatory mitigation, the compensation project must be completed prior to construction, surface occupancy, or surface disturbing activities. Applicable minimization measures including Disturbance Caps, Timing Limitations, Design Features, or other site-specific constraints would be included as Terms & Conditions of the ROW. **MD LR-6:** Any new projects within PHMA would be subject to the 3% disturbance cap. If the 3% disturbance cap is exceeded in PHMA in any Colorado MZ, no new ROW would be authorized in PHMA within that Colorado population and proposed project analysis area (Colorado MZ), unless site-specific analysis documents no impact to GRSG. 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. **MD LR-7:** In PHMA and GHMA, prohibit surface occupancy and surface-disturbing activities associated with BLM ROW during lekking, nesting, and early brood-rearing (March 1 to July 15). **MD LR- 8:** If the ROW authorization is the off-lease component of an action that occurs on-lease (e.g.- a road beginning off-lease that crosses on-lease would require both a ROW and subject to the conditions of the APD), ensure that the conditions for each authorization are consistent for mitigation, reclamation, and design features, as appropriate. **MD LR-9:** Construct new roads to the appropriate Gold Book standard and add the surface disturbance to the total disturbance in the PHMA. **MD LR-10**: (PHMA and GHMA) In PHMA and GHMA, for ROW renewals, where existing facilities cannot be removed, buried, or modified, require perch deterrents. **MD LR-11**: (PHMA and GHMA) Reclaim and restore ROWs considering GRSG habitat requirements. **MD LR-12**: (PHMA and GHMA) Designate new ROW corridors in GRSG PHMA or GHMA only where there is a compelling reason to do so and location of the corridor within PHMA or GHMA will not adversely affect GRSG populations due to habitat loss or disruptive activities. **MD LR-13**: (PHMA) Consider the likelihood of development of not-yet-constructed surface-disturbing activities – as defined in the Monitoring Framework (**Appendix 7**)−under valid existing rights prior to authorizing new projects in PHMA. **Land Tenure Adjustment** **MD LR-14:** Retain public ownership of GRSG PHMA. Consider exceptions where: 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, there is mixed ownership, and land exchanges would allow for additional or more contiguous federal ownership patterns within the GRSG PHMA. **MD LR-15**: (PHMA) In isolated federal parcels, only allow tract disposals that are beneficial or neutral to long-term management of GRSG populations.

Management Category	Management Direction
	MD LR-16: (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. **MD LR-17**: (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.

Idaho

The Proposed RMP Amendment includes State specific management direction to respond to locally relevant habitat variability and circumstances, consistent with the purpose and need. State specific management direction for the State of Idaho include 1) management of saleable minerals/mineral materials – specifically consideration of new free use pits in PHMA, 2) application and use of lek buffers (with buffer distances the same as the 2015 Plan; see **Appendix 19** for analysis), and 3) application of renewable energy management to nuclear and hydropower developments in addition to wind and solar.

For consistency with the Proposed RMP Amendment goals and objectives for GRSG, allocations under MD RE-1 would be exclusion in PHMA, avoidance in IHMA, and open in GHMA, as in the 2015 Plan. References to wind and solar development under MD RE-1 were removed for consistency with the rangewide direction for wind/solar development.

The BLM also clarified existing management decisions (MDs) and Special Status Species (SSS) direction to align with the rangewide management direction in the Proposed RMP Amendment. Note that appendices referenced under MD SSS refer to appendices from the 2015 Plan, or, as for Appendix B Buffers, the proposed updates to Appendix B described below under Lek Buffers.

- *Updating terms*. In the Proposed RMP Amendment, the following terms would be replaced under MDs SSS 4, 5, 6, 13, 14, 22, and 30:
  - Trigger with threshold
  - Conservation Area with Neighborhood Lek Cluster for adaptive management
  - Conservation Areas with Fine-scale HAF for disturbance cap
  - Conservation Areas with area for prioritization of restoration and mitigation
  - Key habitat with habitat
  - Remove Biologically Significant Unit (BSU) baseline map
- *Remove obsolete management decisions* (MDs). Currently, Idaho updates key habitat maps annually which are used in disturbance cap calculations. The Proposed RMP Amendment describes a different approach to disturbance cap calculations which will make the following MDs related to key habitat obsolete: MD SSS 8, 41, and 42.
- *Update management decisions to align with the Proposed RMP Amendment*, including new terms and goals and objectives: MD SSS 1, 2, 29, 32, and 44. Under MD SSS 1, references to Conservation Areas were removed and terms related to adaptive management updated. In MD SSS 2, HMA definitions were updated for consistency with the Proposed RMP Amendment and references removed to Conservation Areas. Under MD SSS 29, direction was updated to align with adaptive management thresholds under the Proposed RMP Amendment and co-location language for major ROWs under the Proposed RMP Amendment. For MD SSS 32, text was retained from the 2015 Plan to align with the Proposed RMP Amendment's goals and objectives for GRSG; including Appendix C: RDFs from the 2015 Plan. Under MD SSS 44, language was updated to reflect the interagency Memorandum of Understanding (MOU) that was signed in 2022, which made Appendix K obsolete.

Table 2-8. Idaho - Additional Management Direction

Management Category	Management Direction
Utility Scale Wind	**IHMA –** Avoidance, subject to Anthropogenic Disturbance Development Criteria (MD SSS 30), including RDFs and buffers.
Utility Scale Solar	**IHMA –** Avoidance, subject to Anthropogenic Disturbance Development Criteria (MD SSS 30), including RDFs and buffers.
Fluid Minerals	**IHMA -** Open to leasing subject to no surface occupancy (NSO) – waivers, exceptions, modifications for new leases. Same as described under PHMA direction above (except Anthropogenic Disturbance Development Criteria MD SSS 30 instead of MD SSS 29 for PHMA).
Nonenergy Leasable Minerals	**IHMA** - Open in Known Phosphate Leasing Areas (KPLAs) subject to RDFs and buffers. Outside KPLAs, open subject to disturbance thresholds, RDFs and buffers.
Major Rights-of-Way	**IHMA –** Avoidance, subject to Anthropogenic Disturbance Development Criteria (MD SSS 30), including RDFs and buffers.
Minor Rights-of-Way	**IHMA** – Avoidance, subject to RDFs and buffers.
Livestock Grazing	**IHMA** – Open; same as described under PHMA direction above.
Wild Horse and Burro	**IHMA -** Same as described under PHMA direction above.
Predation	**IHMA -** Same as described under PHMA direction above.
Habitat Objectives	**IHMA –** Same as described under PHMA direction above.
Mitigation	**IHMA -** Same as described under PHMA direction above.
Disturbance Cap	**IHMA –** Same as described under PHMA direction above. The disturbance cap calculation includes both PHMA and IHMA at the Fine Scale Habitat Assessment Framework (HAF).
Adaptive Management	**IHMA –** Same as described under PHMA direction above.
Non-Habitat	**IHMA –** Same as described under PHMA direction above.
Saleable Minerals/Mineral Materials	**MD MR 11:** **PHMA**—PHMA will be closed to new mineral materials development but open for new free use permits and the expansion of existing pits (within ¼ mile of existing improved roads, but not within 3.1-miles of leks, proposed disturbance of less than 40-acre if new free use pit), or if the BLM can verify the area is not habitat and the expansion would not adversely impact any adjoining seasonal habitat. **IHMA**—IHMA will be open to mineral materials development. In order to support maintenance needs for existing local roads and ensure public safety, new and expansion of existing free-use permits would be exempt from Anthropogenic Disturbance Screening and Development Criteria (MD SSS 29 in PHMA; MD SSS 30 in IHMA), but subject to RDFs and buffers. **GHMA**—GHMA will be open to mineral materials development, subject to RDFs and buffers.

Management Category	Management Direction
Renewable Energy – RE-1	**PHMA/IHMA**: PHMA would be exclusion areas and IHMA avoidance areas for nuclear and hydropower energy development. New projects for nuclear and hydropower energy development in PHMA must meet Anthropogenic Disturbance Screening and Development Criteria (MD SSS 29) and in IHMA (MD SSS 30). Infrastructure for nuclear and hydropower energy development in PHMA and IHMA could be considered only if it can be demonstrated that as proposed or conditioned, it would not impair habitat use by GRSG (as determined in coordination with the GRSG Implementation Team) and will meet that the RMP GRSG goal and habitat objective. **GHMA**: Open with minimization measures (e.g. RDFs and buffers) and compensation, to maintain habitat supporting GRSG populations consistent with state agency habitat designations (e.g., restoration, connectivity, seasonal, or other), and to preclude negative impacts to any adjacent PHMA habitats.
Special Status Species	**MD SSS 1**: The geographic basis for evaluating disturbance and density caps are calculated at the fine scale HAF units (**Figure 3.8**). For the adaptive management responses, the geographic scale is based on (**Figure 3.2**). **MD SSS 2:** Designate GRSG Habitat Management Areas: Priority, Important and General Habitat Management Areas. **Priority Habitat Management Areas (PHMA**) have the highest value to maintaining sustainable GRSG populations and include breeding, late brood-rearing, winter concentration areas, and migration or connectivity corridors. PHMA focus is on areas with the highest conservation value to GRSG, based on the presence of larger leks, habitat extent and quality, and important movement and connectivity corridors and winter habitat. **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 but that are not as important as PHMA. **General Habitat Management Areas (GHMA)** encompass habitat that is outside of PHMA or IHMA. GHMA are generally characterized by lower quality disturbed or patchy habitat of low lek connectivity. **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. The following criteria must all be met in the project screening and assessment process: a. The population for Greater Sage-Grouse in the associated neighborhood lek cluster is not currently engaging in any adaptive management thresholds. This applies strictly to new authorizations; renewals and amendments of existing authorizations will not be subject to this criterion when it can be shown that long-term impacts from those renewals or amendments will be substantially the same as the existing development. b. The development with associated design features, avoidance, minimization, or compensatory mitigation actions will not result in a net loss of Greater Sage-Grouse habitat or of the respective PHMA. c. The project, its design features, avoidance and minimization actions, and associated impacts will not result in habitat fragmentation or other impacts causing a population decline in the associated neighborhood lek cluster.

Management Category	Management Direction
	d. The development cannot be reasonably accomplished outside of the PHMA and can be either: developed pursuant to a valid existing authorization or collocated within or adjacent to the footprint of existing infrastructure. For such developments, the AO may waive criteria a. listed above, if all other criteria are met. e. Development will adhere to the RDFs described in **Appendix C** and buffers (**Appendix B**). f. The project will not exceed the disturbance cap (MD SSS 27). g. Large-scale anthropogenic disturbances in PHMA will be reviewed by the GRSG Implementation Team, as described in MD SSS 44. (See the glossary for definition of large-scale anthropogenic disturbances.) **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: a. A specific RDF is not applicable to the site-specific conditions of the project or activity; b. A proposed design feature or BMP is determined to provide equal or better protection for GRSG or its habitat; or 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 44:** In collaboration with the Idaho Governor's Office of Species Conservation, Idaho Department of Fish and Game, Idaho Department of Lands, Idaho Governor's Office of Energy and Mineral Resources, US Fish and Wildlife Service, US Forest Service, and Natural Resource Conservation Services, the BLM will form and maintain an interagency Idaho Greater Sage-grouse Implementation Team, consisting of two teams (a technical and a policy team) through a memorandum of understanding. These teams will be responsible for reviewing proposed infrastructure developments, proposed exceptions and variances, adaptive management thresholds and responses, habitat management area adjustments, and mitigation. The technical team will make recommendations to the policy team comprised of agency decision-makers who provide information for decision-making by the Authorized Officer.
Lek Buffers	**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**) 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 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:

Management Category	Management Direction
	• Linear features (roads)[2] 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 data 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. – 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: o 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** o 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** o 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).

[2] 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).

Management Category	Management Direction
	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. (Refer to **Appendix 19**.)

Montana/Dakotas

The Proposed RMP Amendment includes State specific management direction to respond to locally relevant habitat variability and circumstances, consistent with the purpose and need. GRSG in Montana range across most of the state, with about 1,000 confirmed active sage-grouse leks. GRSG in North and South Dakota have limited distributions and small population sizes. These differences resulted in variable factors being considered for identifying HMAs (in cooperation with state natural resource entities) (see **Appendix 3**, GRSG HMA State-by-State Mapping Strategies). Factors include differences in the amount of the population in GHMA, HMAs to address different seasonal movement strategies, and addressing cross-state populations. These differences also require consideration of different management approaches at a local level (state specific circumstances) in contrast to rangewide approaches (cross-cutting issues) considered in this Proposed RMPA/Final EIS.

GRSG planning efforts completed in 2015 were initiated while plan revisions were ongoing for multiple other plans in the region. The 2015 effort resulted in updated GRSG management in seven plans. However, the Butte Field Office (BFO) and the Upper Missouri River Breaks National Monument (UMRBNM) were not included due to minor amounts of habitat (BFO) and protections provided by inclusion of GRSG as an object and value of the UMRBNM proclamation. Subsequently, the Lewistown Field Office completed a plan revision in 2021, and the North Dakota Field Office is currently undergoing a plan revision. Montana-Dakotas BLM offices were not part of the GRSG plan amendments completed in 2019.

While concepts and approaches are generally consistent between the plans, separate planning efforts resulted both wording and management action inconsistencies. State-specific circumstances address: 1) measures to improve consistency between the nine Field Offices (RMPs) for sage-grouse management; 2) incorporating unique circumstances of peripheral populations and accounting for the higher proportion of sage-grouse leks found in GHMA in Montana; and 3) applying 2021 Plan Evaluation recommendations and lessons learned from implementation of the 2015 plans.

Increasing Consistency between Montana-Dakotas BLM Plans and State Conservation Approaches

The BLM's review of the seven Montana-Dakotas plans included in the 2015 planning effort identified varying management recommendations. While some of these differences are simply minor wording differences, other inconsistencies include the omission or inclusion of actions not included in neighboring plans. These differences also include numerous stipulations for oil and gas leasing in HMAs and occupied GRSG habitat. Among offices, there are varying objectives for GRSG management under the sensitive status species sections or may contain objectives listed as management action in different plans. Furthermore, the BLM identified differences in buffer distances for ROW avoidance around leks, variation in protections for winter range, and several other differences in management among HMAs between offices.

The BLM examined these inconsistencies to determine if they are justified using the following criteria: 1) Biological circumstances between offices that warrant distinction; 2) Wording differences that create inconsistent interpretation and management; 3) Whether specific management objectives and actions were needed within BFO and the UMRBNM, and; 4) Relationships with the state GRSG conservation plans from North Dakota, South Dakota, and Montana.

The action alternatives below strive to provide better consistency among BLM offices and partner natural resource entities. They are intended to provide clear and consistent direction to applicants and partners for cross-office boundary projects and simplify the coordination among field offices. Other potential changes including monitoring, adaptive management, and implementation tracking would be streamlined to increase internal efficiencies and improve coordination with partners.

Addressing Variations in HMAs and Peripheral Populations

In Montana, general habitat, and BLM GHMA, contains a larger proportion of leks relative to these habitat types than many other states (see **Appendix 3**, GRSG HMA State-by-State Mapping Strategies). To meet objectives for GRSG and be more consistent with state management approaches, more restrictive GHMA management is presented for some resources in the alternatives below. The Montana-Dakotas BLM is considering crucial winter range in stipulations and maintains lek-based buffers for ROWs in GHMA (including utility scale renewable energy projects). Peripheral populations present unique challenges to management approaches. The population spanning the Montana and North Dakota Border (Cedar Creek Anticline area) has specific objectives considered to address ongoing development in the area, restoration needs, and cross-state and cross organizational GRSG management in this mixed-ownership area. In Montana, this area is considered as an RHMA in most alternatives to reflect the desire for long-term restoration. In North Dakota, GRSG range is PHMA, but specific objectives and management are considered to address restoration and habitat enhancement, including protecting historical leks (those active in 2010) similar to currently active leks. This is intended to conserve the landscape to provide opportunities for restoration. GRSG in northern Montana and Canada exhibit unique migratory behavior, moving from breeding habitat in silver sage communities to winter south in Wyoming Big Sagebrush dominated communities. To capture these migratory pathways and protect stopover sites the BLM identified connectivity areas, called CHMA, based on the State of Montana connectivity areas (see **Appendix 3**, GRSG HMA State-by-State Mapping Strategies). While the revised GRSG HMAs in the action alternatives and the Pryor Mountain Wild Horse Range overlap by just over 300 acres in the Billings Field Office, GRSG and wild horse use do not overlap due to physical barriers. Therefore, this topic is not addressed in detail.

2015 Plan Evaluations and Lessons Learned

Implementation of the 2015 plans (including 2021 plan evaluations) has identified areas of potential misunderstanding that are included as cross cutting issues in alternatives in this EIS. The BLM Montana-Dakotas also identified opportunities, unique to the region, including cross-boundary coordination with other natural-resource management entities. Additionally, new local and rangewide research provides updated information to consider for GRSG management action adjustments. As a result, the state-specific alternative below incorporates the following new information. The Dillon FO was previously included in a combined Idaho-SW Montana amendment. However, that amendment included management unique to Idaho, but not applicable in Montana including Wild Horse and Burro management, use of the Fire and Invasives Assessment Tool, and incorporation of Key Habitat references. The Montana-Dakotas BLM also considers options to remove the distinction between major and minor rights of way, both for consistency with state management and to address specific impacts of the proposed disturbance or disruption of ROW actions relative to GRSG. Lastly, the revised guidance on conservation buffer distances, project screens, and design features identified in the Proposed RMP Amendment provides a common approach for analyzing different program and project types that result in similar impacts.

Table 2-9. Montana/Dakotas - Additional Management Direction

Management Category	Management Direction
Special Status Species: GRSG	Apply the range wide GRSG goal, Habitat Objectives, etc. In addition, retain existing goals and objectives, but edit or add to ensure the following direction is contained: **Goal (Unique HMAs):** Maintain sagebrush communities while taking strategic opportunities to expand GRSG habitat through habitat treatment and reclamation actions that remove the primary threats found on BLM managed surface acres (e.g., conifer encroachment, infrastructure, etc.) to allow for longer-term GRSG habitat enhancement. **Objective:** Maintain, improve, and restore sagebrush habitats to increase habitat availability and quality for GRSG, sagebrush obligates and other sagebrush dependent species. **Objective**: Manage GRSG through collaborative, coordinated efforts that utilize cooperative planning and 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, nongovernmental organizations, and other interested parties/stakeholders. **All HMAs MA**: Greater sage-grouse management will be consistent with current adopted BLM conservation strategies, will utilize GRSG conservation plans, as revised or updated, from partners such as WAFWA (e.g., Sagebrush conservation strategy; Remington et al. 2021), USFWS (e.g., Greater Sage-grouse (*Centrocercus urophasianus*) Conservation Objectives: Final Report; USFWS 2013), and state wildlife or habitat management agency action, management, or conservation plans (e.g., MT EO 2015, MT SGWG 2005, SD GF&P 2022, ND G&F 2014), and the best available science. **PHMA, LMHMA, SCHMA MA:** Geophysical exploration is allowed in unleased areas provided the work can be accomplished without temporary or new road construction, avoiding surface disturbing or disruptive activities, and the project is in accordance with seasonal timing and other restrictions that may apply**.** **All HMAs MA**: Compensatory mitigation will initially employ a net conservation gain standard. The BLM may create mitigation strategies at the state or other applicable geographies when warranted based on habitat condition or anticipate land uses. These strategies will consider mitigation measures and approaches, sites for mitigation, alternative mitigation standards, and other factors as appropriate (see BLM Handbook H-1794-1 Chapter 4). **All HMAs MA**: Assess and modify as needed water features to reduce the risk of potential impacts from West Nile Virus or other disease outbreaks (see RDF/BMP appendix from each RMP).
Sensitive Status Species: Surface disturbing activities in GRSG habitat	**Objective**: Limit overall surface disturbance and disruption that impacts Greater Sage-grouse habitat through factors such as the reduction, co-location, and siting of activities and uses, and the restoration and enhancement of habitat. Actions in HMAs should be neutral or beneficial to sage-grouse. **Management Action (all HMAs):** For all activities, in undertaking BLM management actions and consistent with valid and existing rights and applicable law in authorizing actions, the BLM will assess impacts to seasonal habitat and important areas for connectivity (i.e., areas needed to provide and maintain functional dispersal and genetic movement) and apply conservation measures (applicable BMPs, design features, and COAs; contained in applicable appendices in existing plans) and the mitigation hierarchy to achieve GRSG objectives. In addition, for GRSG, limitations on surface disturbing and disruptive activities include a 0.6-mile exclusion from leks in PHMA, and for all HMAs timing limitations of December 1 through March 15 in winter range and March 15 - July 15 in breeding and nesting habitats. Timing limitations will be assessed and applied as needed for construction and/or operations and maintenance activities.

<table>
<tr><th>Management Category</th><th>Management Direction</th></tr>
<tr><td></td><td>Management Action (all HMAs): The BLM will take a consistent approach towards evaluating projects among programs falling in HMAs, through utilizing all GRSG management approaches, as applicable for HMA type, such as allocations, disturbance calculations, population and habitat adaptive management thresholds, mitigation practices, habitat objectives, and the variance/exception approaches contained therein. For evaluations of projects in areas with restricted allocations (i.e., exceptions, avoidance, open with RFDs, etc.) approval of the project requires analysis and/or justification that processes and approaches have been met/followed, and that the proposed action satisfies GRSG goals and objectives.</td></tr>
<tr><td>GRSG Unique HMAs: LMHMA and SCHMA Objectives and Management</td><td>Objective 1: Develop and implement an area-wide habitat management plan. The plan will identify opportunities, including short term actions that can reduce disturbance and threats to sage-grouse (conifer encroachment, duplicative roads, infrastructure removal, etc.), habitat treatments (areas to increase sagebrush cover and understory plants), and longer-term actions to put in place as development is completed.
Objective 2: Manage for no net loss of sagebrush habitat, subject to valid existing rights, and maintained connectivity.
Objective 3: Strategically target treatments, as possible with partners across jurisdictions, in disturbed landscapes in a manner which increases or improves the quality and quantity of GRSG habitat.
MA SSS-X (LMHMA in North Dakota): Develop a MOU and/or restoration plan between interested partners such as the Forest Service, State of North Dakota USFWS, NRCS and other conservation partners and adjacent states (Montana, South Dakota) to establish a cooperative approach regarding implementation of sage-grouse conservation measures, proposed management changes, mitigation, site-specific monitoring, adaptive management, and addressing threats to GRSG. The MOU/plan will identify responsibilities, roles and interaction to maximize the party's individual conservation efforts.
MA SSS-Y (LMHMA and SCHMA): Manage as GHMA for adaptive management. Disturbance cap will not apply in Montana (calculations can be used for tracking Objectives), however BLM will still require project proponents to submit projects to the state that fall in core areas, and the BLM will consider state findings and recommendations in decisions.
Allocation summary:
Fluid Minerals (O&G and Geothermal):
LMHMA (MT Only): No NSO in LMHMA, specific CSU applied (Refer to Appendix 16: Montana/Dakotas Oil and Gas Lease Stipulations for full list of stipulations.)
SCHMA and LMHMA (North Dakota) would be the same NSO as PHMA (Refer to Appendix 16: Montana/Dakotas Oil and Gas Lease Stipulations for full list of stipulations.)
Utility Scale Solar and Wind:
Exclusion (same as PHMA)
ROWs (allocations same as PHMA):
Exclusion:
Surface disturbing or disruptive activities within 1km (0.6 miles) of active leks
Crucial winter range
Avoidance
In existing corridors or ROWs
Remainder of HMA</td></tr>
</table>

Management Category	Management Direction
	○ Avoidance criteria differs from PHMA, instead must be consistent with HMA objectives (emphasis on collocation). Nonenergy leasable minerals: • Closed (same as PHMA) Saleable minerals: • Primarily Closed (same as PHMA) Locatable minerals: • Same as PHMA Coal: • Same as PHMA
GRSG Unique HMAs: CHMA Objectives and Management	**Objective 1**: Maintain connectivity (e.g. stopover sites) and manage to facilitate the movement of GRSG, particularly between silver sagebrush and big sagebrush habitats **Objective 2:** Strategically target treatments, as possible with partners across jurisdictions, in disturbed landscapes in a manner which increases or improves the quality and quantity of GRSG habitat. **MA SSS-X (CHMA)**: Manage/consider as GHMA for range wide GRSG monitoring and implementation actions and requirements (e.g., adaptive management, non-habitat, criteria, habitat objectives, etc.). **Allocation summary:** Fluid Minerals (O&G and Geothermal): • Open with CSU (Refer to **Appendix 16**: Montana/Dakotas Oil and Gas Lease Stipulations for full list of stipulations.) Utility Scale Solar and Wind (same as GHMA): • Exclusion ○ Within 3.3 km (2 miles) of active leks • Avoidance ○ Rest of CHMA ROWs (same as GHMA): • Avoidance ○ Within 2 km (1.2 miles) of active leks • Open, subject to GRSG LUP objectives ○ >1.2 miles from active leks Nonenergy leasable minerals (same as GHMA): • Open Saleable minerals (same as GHMA): • Open Locatable minerals (same as GHMA): • Not withdrawn

Management Category	Management Direction
	Coal • Same as GHMA
Vegetation	**Retain existing objectives and management actions, but edit or add to ensure the following direction is contained:** **VEG OBJ-X (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). **VEG OBJ-Y (PHMA)**: 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 conifer removal to benefit GRSG habitat. **VEG MA-A (All HMAs)**: Remove conifers encroaching into sagebrush habitats, in a manner that considers tribal and cultural values, as well as other key resources (e.g., other SSS, including T&E, species, soils, etc.). Prioritize treatments closest to occupied GRSG habitats and near occupied leks, and where encroachment is phase 1 or phase 2. Use of site-specific analysis and tools will help refine the location for specific areas to be treated. **VEG MA-B (All HMAs)**: Restore, convert, or diversify areas with where crested wheatgrass is limiting habitat value. Prioritize treatments within occupied areas and near leks. Use of site-specific analysis and tools will be used to refine the location for specific areas to be treated. **VEG MA-X (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

Rights-of-Way	**PHMA, LMHMA, and SCHMA:**
	• Exclusion:
	  o Surface disturbing or disruptive activities within 1km (0.6 miles) of active leks
	  o Crucial winter range
	• Avoidance
	  o In existing corridors or ROWs
	  o Rest of PHMA, LMHMA, and SCHMA
	GHMA and CHMA:
	• Avoidance
	  o Within 2 km (1.2 miles) of active leks
	  o Crucial winter range
	• Open, subject to GRSG LUP objectives
	  o >1.2 miles from active leks
	• Corridors
	  o Utilizing designated/existing corridors is preferable, especially when meeting the collocation desire for activity/disturbance in GRSG habitat.

Management Category	Management Direction
ROW Avoidance Criteria	Major ROWs are linear features such as overhead transmission lines, distribution pipelines, and large non-linear surface disturbing projects, refer to glossary. If during consideration of a proposed ROW action (project level authorization) the determination of whether it is a major or minor ROW is questioned with supporting rationale, the Authorized Officer (AO), in consultation with the State Office lead(s), will make the final determination. **Major Rights of Way Avoidance Criteria in PHMA:** Authorizations for major ROWs may be granted for projects that are neutral or beneficial to GRSG. Applications and the environmental analysis must clearly demonstrate to the Authorized Officer (AO) and State Sage-grouse lead that the avoidance measure has been met. Projects may reach this measure if at least one of the criteria below and the additional conditions are met. 1) The project is neutral or beneficial to GRSG habitat through application of avoidance and minimization measures (including collocation) described in the mitigation hierarchy (i.e., does not require compensatory mitigation). 2) The ROW can be routed through, or located within, non-habitat, per the Criteria Based Management for Non-Habitat (refer to **Table 2-3**). 3) The ROW must be the minimum necessary to achieve the ROW's purpose and would not otherwise be feasible in an area that is "open" to ROWs (including existing corridors and ROWs). Analysis must also justify placement in areas within lek buffer distances (e.g., Manier et al 2014) and that that no reasonable alternatives exist for collocation or placement of facilities outside the avoidance area. 4) The proposed location on public lands would be undertaken as an alternative to a similar action occurring on a nearby non-public lands parcel (for example, due to landownership patterns), and development on the public parcel in question would eliminate impacts on more important and/or limited GRSG habitat (e.g., wet meadows, brood-rearing habitat, etc.) on the non-public nearby parcel. If one or multiple of the avoidance criteria can be met, the ROW must also meet the following conditions in order to be permitted in PHMA: a. Micro-siting while developing the major ROW is required to limit impacts and maintain connectivity corridors between seasonal habitats. This includes using topography and non-habitat as effective barrier to adverse impacts and collocation with existing, similarly sized, infrastructure. b. Development of the major ROW includes applicable measures and additional required GRSG management (e.g., disturbance cap, mitigation hierarchy, RDFs, etc.) **Rights of Way Avoidance Criteria for Minor ROWs in PHMA, and Major and Minor ROWs in LMHMA, SCHMA, GHMA and CHMA** Authorizations for ROWs may be granted for projects that are neutral or beneficial to GRSG. Applications and the environmental analysis must clearly demonstrate to the Authorized Officer (AO) that the avoidance measure has been met. Projects may reach this measure if at least one of the criteria below are met and development of the ROW includes applicable measures and additional required GRSG management (e.g., disturbance cap, predation, mitigation hierarchy, RDFs, etc.):

Management Category	Management Direction
	1) The project is neutral or beneficial to GRSG habitat through application of avoidance and minimization measures (including collocation) described in the mitigation hierarchy (i.e., does not require compensatory mitigation). 2) The project can be collocated with an existing ROW and the new disturbance results in minimal impacts to those already associated with the existing infrastructure, including indirect disturbance to or disruption of adjacent seasonal habitats. 3) The ROW can be routed through, or located within, non-habitat, per the Criteria Based Management for Non-Habitat (refer to **Table 2-3**). 4) The ROW can be routed through, or located within, unsuitable habitat (as determined by a qualified biologist and confirmed by the BLM using criteria such as the Habitat Assessment Framework and coordinated with State wildlife agencies and other appropriate state authority) and lacks the ecological potential to become suitable habitat. ROWS shall not disrupt connectivity between habitat areas and should be designed to prevent indirect disturbance to or disruption of adjacent seasonal habitats (as disclosed in the environmental analysis). 5) The ROW would not otherwise be feasible in an area that is "open" to ROWs (including existing corridors or ROWs) and in areas outside lek buffer distances (e.g., Manier et al 2014). 6) Environmental analysis demonstrates the proposed location on public lands 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 public parcel in question would be less impactful on GRSG habitat.
Saleable Minerals/Mineral Materials	**PHMA and PHMA LE:** Closed to new large-scale mineral material sales. Open to consideration of small-scale disposal actions (e.g., less than 20 cubic yards), free use permits, and expansion of existing pits (see also Criteria Based Management for Non-Habitat). Projects must be within 1/4 mile of an existing improved road, farther than 0.6 miles from leks, be less than 40 acres of surface disturbance, and meet the below criteria: 1) The proposed project adheres to GRSG seasonal timing restrictions. Exceptions to timing limitations may be considered on a case-by-case basis by the authorized officer and granted based on review and documenting adherence to one of the following criteria: a. The geographic and temporal conditions demonstrate that topography or other factors eliminate impacts to GRGS, or local variations indicate seasonal life cycle periods are different then the defined breeding and winter use periods. b. The project is needed to address an immediate public health and safety concern in a timely manner 2) Analysis documents the project meets the limitations to surface disturbing and disruptive activities (e.g., assessment of lek buffers, noise limitations, reclamation, disturbance caps, etc.)

Management Category	Management Direction
Disturbance	PHMA (MT and SD) and LMHMA (ND only): MT/Dak will utilize two approaches/caps at the project scale, a 3% cap following the range wide approach (refer to **Table 2-3**) and a 5% cap, including fire and agriculture. The 3% fine scale HAF cap will also apply. The following specific modifications apply: 1. For the 3% project scale cap, the BLM may also include additional energy, mining, and infrastructure disturbances (e.g., subdivisions) in the numerator to provide consistency with state approaches (i.e., the Disturbance Density Calculation Tool (DDCT) run by the MT HCP). The 3% cap would not include fire and agriculture. 2. Include at the HAF Fine scale the range wide disturbances (see **Table 2-3**) and the same additional energy, mining, and infrastructure disturbances as at the project scale (e.g., the DDCT measures and additional infrastructure identified with state entities) 3. The BLM will use the 5% project scale cap, with disturbances associated with Montana's Disturbance Density Calculation Tool (DDCT) approaches (e.g., wildfire and agricultural, and infrastructure such as subdivisions and urban) in the numerator. 4. Exception approach for the 5% cap: For project level analyses where the anthropogenic disturbance does not exceed the 3% cap, but the inclusion of fire and ag causes the disturbance to exceed 5%, the BLM may consider an exception, if analysis demonstrate that the proposed activities will not cause declines in sage grouse populations in the applicable PHMA (considering the project analysis area, neighborhood clusters, fine scale HAF, etc. as appropriate). Prior to granting the exception the Authorized Officer must provide an opportunity for input from the state fish and wildlife agency (and others as applicable) and the United States Fish and Wildlife Service (and other federal entities connected to the project), consider the distribution and extent of fire and agriculture surrounding the project, and justify how allowing an exception for the project meets the goals and objectives for GRSG management. In Montana, proposals to utilize an exception from the 5% disturbance cap will consider analysis by the Montana Habitat Conservation Program (with any additional feedback provide by MSGOT review).
Minerals	**Retain existing objectives and management actions, but edit or add to ensure the following direction is contained:** **All HMAs:** Where the federal government owns the mineral estate in GRSG HMAs, and the surface is in nonfederal 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. Where the federal government owns the surface and the mineral estate is in non-federal ownership in GRSG HMAs, 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.

Management Category	Management Direction
Fire and Fuels	**Retain existing objectives and management actions, but edit or add to ensure the following direction is contained:** **All HMAs:** If prescribed fire is used in GRSG habitat, the NEPA analysis for the Burn Plan will address: • why alternative techniques were not selected as a viable options; • how GRSG goals and objectives will be met by its use; • how the COT Report objectives will be addressed and met; • a risk assessment to address how potential threats to GRSG habitat will be minimized 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). 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.
Dillon FO Objectives and Management Direction	Fire and Invasives Tool (FIAT): MDs including SSS MD 5, 6, 37; VEG Objective 2, VEG MD 2, 8, and 9; and MD FIRE 3, 5, 7, 9-13, 20, 21, 32, and 33 are removed or modified to clarify the FIAT does not apply to SW Montana. Key Habitat References: MDs including SSS MD 8, 9, 13, 16-18, 29, 30, 41, and 42 are removed to eliminate key habitat management actions for Dillon (key habitat is an Idaho specific process). Wild Horse and Burro Section is removed to clarify these only apply to WH&B's in Idaho, as there are no WH&B HMAs in Dillon.

Nevada/California

The Proposed RMP Amendment includes State specific management direction to respond to locally relevant habitat variability and circumstances, consistent with the purpose and need. As described in **Appendix 3** (GRSG HMA State-by-State Mapping Strategies) Nevada/California developed their HMAs using a habitat prioritization model based on an intersection of seasonal habitat selection patterns and indices of space use to prioritize areas with varied relevance to GRSG. This model was initially developed by the U.S. Geological Survey (USGS) for 2015 and is periodically updated with additional field data and advances in mapping products. An update of this model provided the base for HMA delineation in the 2019 planning effort. The model was again updated to incorporate GRSG survival metrics, which allow for the identification of population source areas. After using unpublished draft data from USGS that reflected the best available science at the time of Draft RMPA/EIS publication, the BLM has updated HMAs to reflect the Final USGS HMA model published in early 2024 (see detailed summary in **Appendix 3**, GRSG HMA State-by-State Mapping Strategies).

The identification of source areas is unique to the States of Nevada and California, and the alternatives consider this data in both HMA identification and several management actions within this document. The role wildfire and invasive grasses play in the health of GRSG habitat in Nevada and California resulted in considering adjustments to several management actions focused on addressing these threats compared to the 2015 and 2019 decisions. Decisions being considered for amendment for these states are development of nonenergy leasable minerals on lands where mining operations are currently authorized under 43 CFR Subpart 3715, 3802, or 3809, adjustment of allocation exception language considered in 2019, and clarification of application of perch deterrents and lek buffers to newly discovered leks. State-specific circumstances in Nevada and California also include management direction associated with habitat restoration and enhancement, predation, and utility scale solar and wind testing in OHMA.

Table 2-10. Nevada/California - Additional Management Direction

Management Category	Management Direction
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: A. First priority—locate project/activity outside PHMAs and GHMAs while avoiding and/or minimizing direct and indirect impacts to GRSG and/or their habitat; B. Second priority—if the project/activity cannot be placed outside PHMAs and GHMAs, locate and adjust the project/activity to: a. avoid and/or minimize indirect impacts to lekking and source areas (e.g., PHMA+ in Milligan et al. 2024; See **Appendix 3**) by using topography and/or other available methods to negate or reduce auditory and visual intrusions; AND b. locate direct impacts (i.e., surface-disturbing activities) in non-habitat areas first, then in the least suitable habitat for GRSG without creating a barrier to movement or connectivity between GRSG seasonal habitats and populations. C. Third priority—collocate the project/activity next to or in the footprint of existing infrastructure.
MD SSS 5	In PHMA, GHMA, and OHMA, the State Director, in coordination with NDOW, SETT, and/or CDFW, may grant an exception to the allocation decisions if one of the following applies: i. The proposed activity will be authorized to address federal, state, or local government public health and safety concerns, specifically as they relate to preventing an emergency or responding to a catastrophic event such as a flood, wildfire, or earthquake. ii. The proposed activity is determined to be a routine administrative function conducted by federal, state or local governments, including renewal or reauthorization of prior existing uses, valid existing rights and existing infrastructure (i.e., rights-of-way for roads) or expansion of existing county or local government infrastructure that serves a public purpose and will have no adverse direct/indirect impacts on GRSG and its habitat, or is in compliance with BLM mitigation policy, CEQ regulations (40 CFR Part 1508.1(y)) and the State's mitigation policy (NAC 232.400-480). iii. Exceptions to non-disposal or exchange of lands that are identified for retention in Appendix A, Figure 2-12 (in the 2019 NV/CA ARMPA) could be considered if (a) the lands in question are identified for disposal through previous planning efforts or address a Congressional Acts (e.g., the respective Lincoln and White Pine County Conservation, Recreation, and Development Acts) and are in conformance with State law (e.g., NAC 232.400-480), or (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.
MD SSS (new MD)	If an Active or Pending Active lek is identified in an area outside of PHMA or GHMA lek buffer-distances will be applied as described in Appendix B (of the 2019 NV/CA ARMPA) to avoid direct and indirect impacts to lek activity and habitat. Active or Pending Active leks not included in the HMA model will be added when the model is updated.

Management Category	Management Direction
MD VEG (new MD)	Use collaborative planning efforts (e.g., Cooperative Range Improvement Agreement, Local Area Working Groups, Shared Stewardship, etc.) to develop and implement habitat restoration and enhancement projects. Projects of this type will use expertise and ideas from entities such as local landowners, local GRSG working groups, permitted land users, and other federal, state, county, and private organizations. Input from interested partners will be solicited by BLM and considered in development of restoration projects.
Objective FIRE 3	Protect post-fire treatments, source areas (e.g., see **Appendix 3**), or areas that are vulnerable to invasive annual grass conversion, including areas essential for connectivity, in PHMA first, followed by similar areas in GHMAs from subsequent wildfires. Incorporate the best available science in the prioritization of post-fire treatments.
MD FIRE (new MD)	Prioritize actions (pre-suppression, suppression, and rehabilitation) that support the persistence of GRSG source areas (e.g., see **Appendix 3**). Use the best available science (e.g., Milligan et al. 2024, Doherty et al. 2022, Ricca and Coates 2020, Stringham et al. 2016, etc.) to identify habitats essential for maintaining current GRSG populations.
MD FIRE 23	Use prescribed fire designed to reduce wildfire risk or improve GRSG habitat, only when there is no other feasible means to achieve the same or similar result. The NEPA analysis for project implementation will address: • Why alternative techniques were not selected as a viable option • How GRSG goals and objectives will be met by its use • How the COT report objectives, as updated, will be addressed and met • A risk assessment to address how potential threats to GRSG habitat will be minimized. Prescribed fire shall only be considered after the NEPA analysis for the project has addressed the four bullets outlined above. Prescribed fire can be used to meet specific fuels objectives that will protect GRSG habitat in HMAs (e.g., creation of fuel breaks, burning slash piles from conifer reduction treatments, burning high-elevation late brood-rearing habitat (e.g., restore senescent vegetation, etc.), used as a component with other treatment methods to combat annual grasses and restore native plant communities, etc.). Avoid prescribed broadcast burns in known GRSG winter habitat.
MD FIRE 25	Design fuels treatments such as, but not limited to, conifer or annual invasive grass removal through an interdisciplinary team process to expand, enhance, maintain, and protect PHMAs and GHMAs. Fuel reduction techniques, such as mechanical, chemical, and biological (including prescribed and targeted grazing) treatments and prescribed fire (see MD FIRE 23), are acceptable. Use green strips and fuel breaks, where appropriate, to protect treatment areas from subsequent fires.
MD LR 17	Within 4 miles of active and pending leks, 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. Monitor and maintain perch-deterring effectiveness through the life of the structures following guidance from scientifically accepted protocols.
MD MR 25	Manage PHMAs as closed to new nonenergy leasable mineral leasing, unless the new nonenergy leasable mineral lease meets one of the allocation exception criteria outlined in **MD SSS 5** or the new nonenergy leasable mineral has coincident occurrence within existing disturbance and is subject to a non-competitive lease. No additional direct or indirect impacts shall result from extraction of the new nonenergy leasable mineral.
Predation	Reducing predation risk will be achieved using the best available science and in accordance with key elements of the State of Nevada Greater Sage Grouse Conservation Plan (State of Nevada 2019, as amended).

Management Category	Management Direction
MD RE (new MDa)	OHMA is open for utility scale solar testing and development with applicable minimization measures, and compensatory mitigation, to maintain habitat supporting GRSG populations, and to preclude negative impacts to adjacent GHMA and PHMA habitats.
MD RE (new MDb)	OHMA is open for utility scale wind testing and development with applicable minimization measures, and compensatory mitigation, to maintain habitat supporting GRSG populations, and to preclude negative impacts to adjacent GHMA and PHMA habitats.
MD LR (new MD)	In PHMA and GHMA, existing or authorized major ROWs and associated maintenance and re-authorizations would be allowed subject to applicable management.

Oregon

The Proposed RMP Amendment includes State specific management direction to respond to locally relevant habitat variability and circumstances, consistent with the purpose and need. State specific circumstances for the State of Oregon include management of 18 Areas of Critical Environmental Concern/Research Natural Areas (ACEC/RNA) as "Key RNAs" or "Key ACECs", as well as management of saleable minerals/mineral materials in GRSG HMAs. This amendment effort is limited to RMP-level actions needed to provide guidance for subsequent implementation-level actions. The land use allocation will be identified in the ROD, but if public lands are disposed of or devoted to a public purpose which precludes livestock grazing, a site-specific NEPA and a site-specific decision process pursuant to the Taylor Grazing Act and 43 CFR 4100.4-2 is necessary to cancel permits and/or removal of livestock from these areas.

Key ACECs/RNAs

The 2015 Oregon GRSG ARMPA designated the entirety of fifteen (15) existing Areas of Critical Environmental Concern/Research Natural Areas (ACEC/RNAs) as "Key RNAs" and all of three additional ACECs as "Key ACECs" (refer to 2015 ARMPA Special Designations Objective SD 4 which is described in **Appendix 2.13**, Oregon RMPs, **Table 1**). The 2015 Oregon ARMPA also allocated all or portions of thirteen Key RNAs as unavailable to livestock grazing. During the 2019 GRSG RMP amendment process, BLM Oregon proposed and analyzed a reversal of the 2015 decision to make all or portions of the 13 key RNAs (excluding the two ACEC/RNAs allocated as unavailable to livestock grazing under the 1992 Three Rivers and 2003 Lakeview RMPs) available to livestock grazing. However, the 2019 GRSG ARMPA retained the Key RNA designations, along with the applicable Management Objectives and Management Direction (BLM OR 2019 FEIS; Pages 2-8 and 2-9). The BLM is addressing Key RNA management in this RMP Amendment, and the alternatives considered in the Draft EIS and the BLM's Proposed RMP Amendment for Key RNAs are described and analyzed in **Appendix 17**.

In 2022, ODFW informed the BLM that they were going to update core and low density HMA s. The timeline outlined by ODFW for updating and approving Core- and Low-Density areas was inconsistent with the EIS analysis process. Therefore, after coordination with the state, the BLM used ODFW's published methodology and data up through the 2022 field season to estimate likely core habitat and draft PHMA map. The mapping process became the basis for the BLM's proposed PHMA and GHMA designations in the Draft RMPA/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 uses the final ODFW habitat designation for PHMA and GHMA in the action alternatives and the Proposed RMP Amendment in the Proposed RMPA/Final EIS. The HMA acres identified utilizing the ODFW guidance available at the time the Draft EIS was being developed the can be found in Chapter 2, Table 2-3 of the Draft EIS. The Draft EIS can be accessed at the BLM National NEPA Register at https://eplanning.blm.gov/eplanning-ui/project/2016719/510. The HMA acres for Oregon that utilize the updated ODFW final data can be found in Chapter 2, Table 2-14. The range of variance between the acres identified between the Draft EIS and the Final EIS were within the range of alternatives analyzed in the Draft EIS.

Table 2-11. Oregon - Additional Management Direction

Management Category	Management Direction
Disturbance Cap	Same as rangewide with the following additional management direction. For all development threats, including mining, infrastructure, and energy development, implement a human disturbance cap of 3%, not to exceed a 1% increase per decade, within the Oregon priority areas of conservation [PACs]) and proposed project analysis areas, as allowed under current law.
Adaptive Management	A hard threshold is reached if the management area experiences both a soft habitat and soft population threshold.
Livestock Grazing	**Objective RM-1** Specific to GRSG habitat, manage livestock grazing in a manner that 1) meets or makes progress toward meeting the Land Health Standard for special status species, 2) avoids direct adverse impacts from livestock management range improvements in areas with limited GRSG habitat; and 3) applies the guideline that addresses “restoring, maintaining, or enhancing habitats of...special status species to promote their conservation” (43 CFR Part 4180.2(e)(9) or subsequent changes to regulations or policy).
Utility Scale Solar	PHMA buffered by 0.5 miles such that Non-Habitat within the 0.5 mile PHMA buffer would be Avoidance. GHMA is avoidance for utility scale solar testing and development. Testing and development within GHMA may only occur if the following three exception criteria are met: 1. The area is determined to be non-habitat or unsuitable, lacks the ecological potential to become marginal or suitable habitat, and does not provide important connectivity between habitat areas (as determined by a qualified biologist and confirmed by the BLM using criteria such as the Habitat Assessment Framework and coordinated with appropriate state authority) and/or topography or areas of non-habitat create an effective barrier to impacts. 2. The project should be designed to prevent indirect disturbance to or disruption of adjacent seasonal habitats. 3. Infrastructure as proposed or conditioned (including disturbance cap and mitigation requirements) would not impair habitat use by GRSG (as determined in coordination with state wildlife agency) and will meet the RMP GRSG goal and habitat objectives. **OR** 1. If co-location of the proposed authorization with existing disturbance will result in no additional impacts to those already associated with the existing major infrastructure, including indirect disturbance to or disruption of adjacent seasonal habitats. To approve an authorization based on any of the above exception criteria, after coordination with the BLM State Office and appropriate State agency, the Authorized Officer must document that the proposed action satisfies the criteria listed above. If the State agency does not concur with granting the authorization, the Authorized Officer must provide rationale for how the criteria are met considering the information the State provides.

<table>
<tr><th>Management Category</th><th>Management Direction</th></tr>
<tr><td>Utility Scale Wind</td><td>PHMA buffered by 0.5 miles such that Non-Habitat within the 0.5 mile PHMA buffer would be Avoidance.

GHMA is avoidance for utility scale wind testing and development (including met towers). Testing and development within GHMA may only occur if the following three exception criteria are met:
1. The area is determined to be non-habitat or unsuitable, lacks the ecological potential to become marginal or suitable habitat, and does not provide important connectivity between habitat areas (as determined by a qualified biologist and confirmed by the BLM using criteria such as the Habitat Assessment Framework and coordinated with appropriate state authority) and/or topography or areas of non-habitat create an effective barrier to impacts.
2. The project should be designed to prevent indirect disturbance to or disruption of adjacent seasonal habitats.
3. Infrastructure as proposed or conditioned (including disturbance cap and mitigation requirements) would not impair habitat use by GRSG (as determined in coordination with state wildlife agency) and will meet the RMP GRSG goal and habitat objectives.

<u>OR</u>

1. If co-location of the proposed authorization with existing disturbance will result in no additional impacts to those already associated with the existing major infrastructure, including indirect disturbance to or disruption of adjacent seasonal habitats.
To approve an authorization based on any of the above exception criteria, after coordination with the BLM State Office and appropriate State agency, the Authorized Officer must document that the proposed action satisfies the criteria listed above. If the State agency does not concur with granting the authorization, the Authorized Officer must provide rationale for how the criteria are met considering the information the State provides.</td></tr>
<tr><td>Major ROWs</td><td>Development of major ROWs would not be allowed in breeding and nesting habitats and other limiting/high value seasonal habitats.</td></tr>
<tr><td>Minor ROWs</td><td>In GHMA and PHMA, avoidance within breeding, nesting and/or seasonal habitats, otherwise open with minimization and mitigation, if minimization actions are not adequate to offset impacts to GRSG of the minor ROW.</td></tr>
<tr><td>Fluid Minerals</td><td><u>PHMA No Surface Occupancy</u>
Exception 1: The authorized officer may grant an exception to a fluid mineral lease no-surface-occupancy stipulation only where the proposed action is beyond 3.1 miles of active/pending active leks and:
i. Would not have direct, indirect, or cumulative effects on Greater Sage-grouse or its habitat; or
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.

Exceptions based on conservation gain (ii) may only be considered in (a) PHMA of mixed ownership where federal minerals underlie less than 50% 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.</td></tr>
</table>

Management Category	Management Direction
	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 their finding is not unanimous, the Authorized Officer must provide rationale for how the criteria are met considering the information the State and USFWS provides. 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 (e.g., could be part of the APD NEPA process) and all exceptions granted would be tracked in a public place and the exception tracker would be consulted when exceptions are being considered. If the area associated with the proposed development seeking the exception (e.g., well pad, compressor station, etc.) is in an area (neighborhood lek cluster or as appropriate an alternative adaptive management unit as described and allowed in the adaptive management section) that has met one of the adaptive management thresholds (hard or soft) (refer to Adaptive Management section in this table), no exceptions would be considered until the causal factor analysis is completed. If the causal factor analysis concludes that development associated with the type of activity seeking the exception is or could contribute to the threshold being met or not recovering, no exception would be granted. If the analysis is inconclusive on cause, exceptions could be considered. <u>PHMA NSO Waiver</u> NSO within 3.1 miles of active or pending active leks may be waived for a specific lek if, in coordination with the appropriate State agency, it is determined that the GRSG lek that was active or pending active has been classified as unoccupied and confirmed by the appropriate State agency. Prior to waiving the stipulations, surveys should confirm that the lek is inactive and not moved to another location in the vicinity. Any changes to this stipulation will be made in accordance with the land use plan and/or the regulatory provisions for such changes. <u>GHMA Allocation</u> Same as 2015/2019. 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 Oregon 2015 ARMPA **Appendix G**.
Saleable Minerals/Mineral Materials	**MD MR 14**: PHMA and PHMA with limited exceptions 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 Oregon PAC (and is the same footprint as PHMA) and project area disturbance cap. • All applicable required design features are applied and the activity is permissible under screening criteria (see SSS 13 in the 2015 OR GRSG ARMPA), excepting the mitigation requirement. If BLM’s NEPA analysis determines that the use or expansion of an existing, authorized material site (up to the entire footprint of the existing authorized area) could be implemented without significant impacts (i.e., upon completion of an Environmental Assessment, BLM determines that a FONSI is applicable) and the applicable area has not met the disturbance cap, BLM is authorized to implement in conformance with the State of Oregon mitigation policy which requires mitigation when development is considered large scale and impacts over five acres.

Management Category	Management Direction
	Federal Highway Act material sites are a ROW and not subject to mineral sale requirements. See ROW section for management (MD LR 7 in the 2015 OR GRSG ARMPA).
Key Research Natural Areas	**Objective SD 4**: Manage Key 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. **MD LG 1**: All, some, or none of key RNAs will be unavailable to livestock grazing (see **Appendix 17**). Determine whether to remove, modify or construct additional fences, corrals, or water storage facilities (e.g. reservoirs, catchments, ponds). New proposed water-related range improvements (springs, pipelines, troughs, etc.) may be authorized where existing critical water development is no longer accessible as a result of implementing areas within the Key RNAs as unavailable to livestock grazing. Refer to **Appendix 17** for additional information.

Utah

The Proposed RMP Amendment includes State specific management direction to respond to locally relevant habitat variability and circumstances, consistent with the purpose and need. The BLM will address GHMA management in Utah as a state-specific circumstance. HMA management in Utah is a result of different approaches to planning in the 2015 and 2019 Utah GRSG RMP amendments. In the BLM's 2019 GRSG ARMPA, the BLM increased habitat management area alignment with the State of Utah's Sage-Grouse Management Areas (SGMAs) and prioritized the importance of management prescriptions on PHMA. This was to focus protection on seasonal habitats that support over 95% of GRSG populations in Utah and removed GHMA designation and management.

The state-specific circumstances for the State of Utah being addressed in this effort is the result of the 2019 amendment effort. Refer to **Appendix 2** for specific language from the 2015 and 2019 amendments, and **Appendix 3** for additional information on the Utah approaches for identifying habitat management areas.

Table 2-12. Utah - Additional Management Direction

Management Category	Management Direction
General Habitat Management Areas	**MA-SSS-5:** In GHMA, apply the following management to meet a minimum standard of no net loss for discretionary actions that can result in habitat loss and degradation: A- **Existing Management:** Implement GRSG management actions included in the existing RMPs and project specific mitigation measures associated with existing decisions. B- **No Net Loss:** Apply a minimum standard of no net loss consistent with cross-cutting language. Refer to Mitigation section in **Table 2-3**. C- **Buffers**: 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 (Utah 2019 ARMPA). D- **Required Design Features/Best Management Practices:** In GHMA, apply the fluid mineral RDFs that are associated with GHMA identified in Appendix C (Utah 2015 ARMPA) when authorizing/permitting site-specific fluid mineral development activities/projects. The applicability and overall effectiveness of each RDF cannot be fully assessed until the project level, once 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: • 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; • An alternative RDF, state-implemented conservation measure, or plan-level protection is determined to provide equal or better protection for GRSG or its habitat; • A specific RDF will provide no additional protection to GRSG or its habitat. **MA-SSS-6**: Sage-Grouse Management Outside PHMA Outside PHMA, implement GRSG management actions included in the RMPs and project-specific mitigation measures associated with decisions that predated the 2015 amendments. Proposed projects within State of Utah SGMA and USFWS PACs, 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. 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. Outside of PHMA, but within SGMAs and PACs, consider noise and permanent structure stipulations around leks.

Management Category	Management Direction
	Outside PHMA, after analyzing the impacts using the buffer distances identified in Appendix B (Utah 2019 ARMPA) from a lek that is located in PHMA, portions of State of Utah opportunity areas will be managed with the following allocations: • Fluid minerals will be open for leasing with CSU stipulations (noise and tall structures). • Lands ROWs, permits, and leases will be avoided, applying avoidance criteria for noise and tall structures. Avoid siting wind energy development in opportunity areas within the buffer distances identified in Appendix B (Utah 2019 ARMPA) from occupied GRSG leks that are in PHMA, if the lek buffer analysis as identified in Appendix B (Utah 2019 ARMPA) shows that siting wind energy development in opportunities areas will impact lek persistence within PHMA. 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. Outside of PHMA, provide that acres of GRSG seasonal habitat (based on best available maps, then confirmed to be regularly used by GRSG 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 Utah 2015 ROD/ARMPA) are replaced by creating/improving GRSG habitat within PHMA.
The following management actions include a reference to GHMA, usually just pointing to the GHMA polygons or in a prioritization approach (see **Appendix 2**, Utah existing GRSG management): • MA-SSS-1 • MA-FIRE-8 • MA-LG-1 • MA-LG-5 • MA-WHB-2 • Objective MR-1 • MA-MR-20 • MA-MR-24 • MA-LR-8 • MA-LR-9 (GHMA-Connectivity only) • MA-RE-1	Same management direction as described in the 2015 plan but with the inclusion of the changes described in **Table 2-5**. Any conflict in direction would default to the management direction described in **Table 2-5** above.

Management Category	Management Direction
The following management actions include a reference to GHMA, only include a reference to GHMA that references application of MA-SSS-5. • MA-MR-1 • MA-MR-4 • MA-MR-12 • MA-MR-14 • MA-MR-16 • MA-MR-23 • MA-LR-7	Same management direction as described in the 2015 plan but with the amended MA-SSS-5 language described above and the updated GHMA boundaries.
General Habitat Management Area - Connectivity	—
Major ROWS	Addressed in GHMA management direction table above.
Solar	Addressed in GHMA management direction table above.
Wind	Addressed in GHMA management direction table above.
Fluid Minerals (including Geothermal)	Addressed in GHMA management direction table above.

Wyoming

The Proposed RMP Amendment includes State specific management direction to respond to locally relevant habitat variability and circumstances, consistent with the purpose and need. In this planning effort, BLM is addressing Stewardship Habitat Management Areas (SHMA) in Wyoming in addition to PHMA and GHMA. In the Proposed RMP Amendment, the SHMA designation is being applied in northeastern Wyoming where private landowners worked with the State of Wyoming to establish management objectives and approaches. The remainder of this section includes Proposed RMP Amendment actions associated with SHMA.

Table 2-13. Wyoming - Additional Management Direction

Management Category	Management Direction
Habitat Management Areas	Stewardship Habitat Management Areas (SHMAs) are defined as 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.
Major Land Use Allocations	Addressed in rangewide HMA management direction tables above.
Fluid Mineral Leasing/Development	Addressed in rangewide HMA management direction tables above.
Waivers, Exceptions, and Modifications (WEMs)	Addressed in rangewide HMA management direction tables above.
Mitigation	Addressed in rangewide HMA management direction tables above.
Wind	Addressed in rangewide HMA management direction tables above.
Solar	Addressed in rangewide HMA management direction tables above.
Rights-of-Way	Addressed in rangewide HMA management direction tables above.
Adaptive Management	Addressed in rangewide HMA management direction tables above.
Habitat Objectives	Addressed in rangewide HMA management direction tables above.
Disturbance Caps	Addressed in rangewide HMA management direction tables above.
Threats from Predation	Addressed in rangewide HMA management direction tables above.
Livestock Grazing	Addressed in rangewide HMA management direction tables above.
Wild Horse and Burro Management	Addressed in rangewide HMA management direction tables above.
Additional SHMA Management Direction	In partnership with appropriate Federal and State Agencies and landowners and their representatives, encourage the development and implementation of landowner-led conservation benefit agreements in SHMA that focus on ensuring the long-term viability of GRSG populations in the area, and at a minimum identify key habitats and linkages, potential threats to GRSG and its habitat, appropriate conservation measures, and an avoid/minimize/compensate strategy that identifies mitigation opportunities within the boundaries of SHMA. Because the functional movement (i.e., movements that result in genetic connectivity) of GRSG likely occurs among leks, encourage the establishment of conservation benefit agreements that include management measures specific to maintaining active leks in SHMAs. Support research that identifies habitat conditions that promote or limit the movement of GRSG through a landscape to better inform management of SHMAs. Research supported by BLM and partners should be actionable. Encourage the development and implementation of invasive vegetation – including encroaching native species and legacy plantings (e.g., crested wheatgrass) – management strategies in SHMA. Strategies should be inclusive of all private and public land managers and include, but not be limited to: engagement of all pertinent stakeholders, inventory and monitoring requirements, prioritization approaches, treatment and removal options, restoration (to include site-specific management of livestock), responses to fire, and an adaptive management framework.

Management Category	Management Direction
	Work with the appropriate State and Federal agencies to establish fire response in SHMA at the same priority as protection of property. Encourage the development and implementation of fire restoration management strategies in SHMA. Strategies should be inclusive of all private and public land managers and include, but not be limited to: engagement of all pertinent stakeholders, inventory and monitoring requirements, prioritization approaches, native shrub and herbaceous seeding strategies and sources of seed, vegetation regeneration approaches (to include site-specific management of livestock), approaches to controlling invasive annual grasses, and an adaptive management framework. To minimize impact of predators to GRSG, encourage the development of a predator management plan in SHMA. Plans should include, but not be limited to: coordination requirements with appropriate State and Federal agencies if implementation of the plan becomes necessary, assessments of habitat conditions and relationships with predator populations and impacts to GRSG, anthropogenic structure design details to reduce opportunities for corvid and raptor perching and nesting, disposal options for anthropogenic food subsidies, approaches for addressing predation from domestic pets, descriptions of concurrent management actions required to address GRSG survival concerns long-term (for example, habitat enhancement), and monitoring requirements.

2.6 PLAN EVALUATION AND MONITORING

The BLM planning regulations (including 43 CFR Part 1610.4-9) require land use plans establish intervals and standards for monitoring and evaluation, based on the sensitivity of the resource decisions involved.

Evaluation

Evaluation is the process of reviewing the RMP and determining the RMP is being adequately implemented. The BLM Land Use Planning Handbook (H-1601-1; BLM 2005) directs that RMPs should be evaluated at a minimum period of every 5 years. Specifically, RMPs are evaluated to determine if:

- Decisions remain relevant to current issues;
- Decisions are effective in achieving (or making progress toward achieving) desired outcomes;
- Any decisions should be revised;
- Any decisions should be dropped from further consideration; and
- Any areas require new decisions.

Data collected during RMP implementation helps to inform the RMP evaluation.

Monitoring

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) in meeting the purpose and need of the plan or plan amendment. Monitoring strategies for GRSG habitat and populations must be collaborative, as habitat occurs across jurisdictional boundaries. As part of the 2015 GRSG amendment effort, the BLM developed a Monitoring Framework to provide consistent approaches to monitor planning actions across the range (BLM 2015a). In 2021 the BLM published the *Greater Sage-Grouse Plan Implementation Rangewide Monitoring Report for 2015-2020* with the results of implementing the 2015 monitoring framework. As part of this amendment process, the BLM is revisiting the approaches in the monitoring framework, updating it based on lessons learned over the past eight years. The draft updated monitoring framework, which would apply under any alternative selected by the BLM decisionmaker, is in **Appendix 7**. The BLM's monitoring efforts will continue in partnership with federal and state fish and wildlife agencies. The BLM and other partners will use the resulting information to guide implementation of conservation activities.

Monitoring data is used to draw conclusions on whether management actions are being implemented, and if they are helping to meet the stated objectives. Conclusions are then used to recommend whether to continue current management or to identify what changes may need to be made to meet objectives. The BLM would use land use plan evaluations to determine if the decisions in the RMPA, supported by the accompanying NEPA analysis, may need to be amended in light of new information and monitoring data. Its evaluations would follow the protocols established by the BLM Land Use Planning Handbook (H-1601-1) or other appropriate guidance in effect at the time the evaluation is initiated.

2.7 SUMMARY COMPARISON OF ALTERNATIVES

The following **Table 2-14** provides a summary comparison of the management allocations and management direction for the alternatives and the Proposed RMP Amendment. A full description of Alternatives 1-6 can be found in **Appendix 21** and a full description of the Proposed RMP Amendment is provided in **Section 2.4** of this chapter. **Table 2-15** provides a comparative summary of acres by GRSG Habitat Management Area by State by Alternative. **Appendix 3** provides a summary of each state strategy in developing their habitat management areas, as well as the definitions for the GRSG habitat management areas used in each state and **Maps 2.1** through **2.6** show the relationship of the habitat management areas across the west.

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Table 2-14. Summary Comparison of Alternatives

Management Category	Alternative 1	Alternative 2 (No Action)	Alternative 3	Alternative 4	Alternative 5 (Draft EIS Preferred Alternative)	Alternative 6	Proposed RMP Amendment
Goal	For Alternatives 1 and 2, all states have at least one goal or objective that includes the following language and/or concept: • Maintain and enhance populations and distribution of GRSG by protecting and improving sagebrush habitats and ecosystems that sustain GRSG populations. • 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. Maintain and enhance quality/suitable habitat to support the expansion of GRSG populations on federally-administered lands within the planning area.		For Alternatives 3, 4, 5, 6, and the Proposed RMP Amendment: Conserve, enhance, restore, and manage GRSG habitat to support persistent, healthy populations, consistent with Section 102 of the Federal Land Policy and Management Act, as amended, BLM's Special Status Species Management Policy (BLM-M-6840), BLM's Wildlife and Fisheries Management Manual (BLM-M-6500), and in coordination and cooperation with state wildlife agencies and appropriate state authorities. Habitat conservation and management should maintain existing connectivity between GRSG populations.				
Habitat Management Area (HMA) Allocations	Priority Habitat Management Area (PHMA), General HMA (GHMA) Sagebrush Focal Areas: ID, MT, NV, OR, UT, WY: Manage Sagebrush Focal Areas (SFAs) as described in the 2015 amendments or revisions. Boundaries from 2015 RMPAs	PHMA GHMA MT/DK: Manage the same HMAs as Alternative 1. ID, NV, UT, WY removed SFAs and associated management. CA, CO, MT/DK are the same as Alternative 1. OR retained the SFAs but removed the recommendation for withdrawal from	PHMA Updated HMA boundaries based on updated science and data, erring on inclusion based on available data. All areas managed for GRSG would be PHMA. Under Alternative 3, some areas of PHMA would also be managed as ACECs with associated increased management and/or reduced exceptions.	PHMA, GHMA Updated HMA boundaries based on updated science and data.	PHMA, GHMA Updated HMA boundaries based on updated science and data as under Alternative 4 but adopting state government GRSG management area boundaries. Under Alternative 6, some areas of PHMA would also be managed as ACECs with associated increased management and/or reduced exceptions.		PHMA, PHMA with limited exceptions, GHMA HMAs were refined in each State using information from Alternatives 4, 5, and 6.

Management Category	Alternative 1	Alternative 2 (No Action)	Alternative 3	Alternative 4	Alternative 5 (Draft EIS Preferred Alternative)	Alternative 6	Proposed RMP Amendment
	CA, CO, ND, SD: Does not include SFAs.	location and entry under the Mining Law of 1872.					
Fluid Mineral Objective	All states (except Lewistown and Butte RMPs) Priority will be given to leasing and development outside of PHMAs and GHMAs, or within the least impactful areas within PHMA and GHMA if avoidance is not possible.	CO, ID, OR, and MT/DK offices: Same as Alternative 1. UT, NV/CA: removed the objective. WY: Clarified the priority would only apply in processing backlogs.	All states: No leasing objective as all PHMA would be closed to new leasing, and all HMAs would be PHMA.	All states: Manage fluid mineral leasing and development (including geothermal) in GRSG habitat management areas to avoid, minimize, and compensate for adverse impacts to GRSG habitat to the extent practical under the law and BLM jurisdiction.			
Fluid Minerals Allocation	PHMA: open to new leasing, with no surface occupancy (NSO) stipulations w/ Waivers, Exceptions, Modifications. State variation:(WY, CO) GHMA: varies, mainly closed, controlled surface use (CSU) or NSO within certain lek buffers	PHMA: open to new leasing, NSO w/ Waivers, Exceptions, Modifications. State variation:(WY) GHMA: varies, mainly closed, CSU or NSO within certain lek buffers	PHMA: closed to leasing. GHMA: n/a	PHMA: open to new leasing, NSO w/ Waivers, Exceptions, Modifications. State variation: (CO, MT/DK, WY) GHMA: varies by state	PHMA: open to new leasing, NSO w/Waivers, Exceptions, Modifications. State variation: (CO, MT/DK, WY) GHMA: varies by state	PHMA: open to new leasing, NSO w/Waivers, Exceptions, Modifications. State variation: (CO, MT/DK, WY) GHMA: varies by state	PHMA: open to new leasing, NSO w/ Waivers, Exceptions, Modifications. State variation (CO, WY, MT, OR, NV/CA). PHMA with limited exceptions: Open – No Surface Occupancy. No Waivers, Exceptions, Modifications. GHMA: Open, but with state variations (WY, UT, OR, NV/CA, MT/DK, CO)

Management Category	Alternative 1	Alternative 2 (No Action)	Alternative 3	Alternative 4	Alternative 5 (Draft EIS Preferred Alternative)	Alternative 6	Proposed RMP Amendment
Fluid Mineral Management Direction	No similar management direction.	No similar management direction.	In areas already leased in PHMA, the BLM will work with lessees, operators, or other project proponents to avoid, minimize, and compensatorily mitigate for impacts to GRSG and their habitat (e.g., habitat loss, fragmentation, indirect impacts, etc.) from new oil and gas development on existing leases to the extent consistent with surface use rights as part of the environmental review process (e.g., 43 CFR Part 3101.1-2). If possible, place development outside of PHMA (and IHMA);	Leasing is allowed in GRSG habitat management areas open to fluid mineral leasing (including geothermal), subject to the stipulations and RDFs included in the RMP. The BLM will evaluate parcels or those portions of parcels available for leasing associated with nominations (e.g., expressions of interest) and determine areas to continue analyzing for inclusion in a lease sale as part of the lease sale NEPA review or analysis. Where there is an existing evaluation process that considers at a minimum GRSG habitat and development proximity, the BLM will use that evaluation process.	Fluid mineral leasing would be considered in GRSG habitat management areas consistent with the Secretary's discretion under the Mineral Leasing Act (as amended), as well as applicable BLM regulations and policies, and in conformance with RMP goals, objectives, stipulations, and required design features to avoid, minimize, and compensate impacts to GRSG. Management Action to address development in areas already leased would be the same as Alternative 4.		When considering exploration and development on areas leased for fluid mineral resources in PHMAs, including geothermal, application of measures to avoid, minimize, rectify, reduce and/or mitigate potential impacts will be considered through completion of the environmental record of review (43 CFR Part 3162.5 and 36 CFR Part 228.108), including appropriate documentation of compliance with NEPA. The BLM will work with project proponents to promote measurable GRSG conservation objectives such as, but not limited to, consolidation of project related infrastructure to reduce habitat fragmentation and loss and to promote effective conservation and connectivity of

Management Category	Alternative 1	Alternative 2 (No Action)	Alternative 3	Alternative 4	Alternative 5 (Draft EIS Preferred Alternative)	Alternative 6	Proposed RMP Amendment
							seasonal habitats and PHMAs.
Fluid Mineral Waivers, Exceptions, Modifications (WEMs)	The high degree of state variation within and across the alternatives does not allow for an informative high-level summary. Please refer to the full set of management direction for fluid mineral WEMs in Alternatives 1-6 in **Appendix 21**.						The high degree of state variation within the Proposed RMP Amendment does not allow for an accurate or informative high-level summary. Please refer to the full set of management direction for fluid mineral WEMs described above in **Table 2-4** and **Table 2-6**.
Saleable Minerals & Materials	PHMA: closed but open for free use permits and expansion of existing pits. WY open GHMA: open	PHMA: closed but open for free use permits and expansion of existing pits. State variation: (NV/CA) WY open GHMA: open	PHMA: closed GHMA: n/a	PHMA: closed but open for free use permits and expansion of existing pits. State variation: (ID, OR) WY & IHMA: open GHMA: open			PHMA: closed, but open for new free use permits and open for the expansion of existing pits. State variation (ID, MT/DK, OR, WY). PHMA with Limited Exceptions: closed, but open for new free use permits and expansion of existing pits (defined as within 1/4 mile of an existing improved roads and not located within 3.1-miles of a lek) if:

Management Category	Alternative 1	Alternative 2 (No Action)	Alternative 3	Alternative 4	Alternative 5 (Draft EIS Preferred Alternative)	Alternative 6	Proposed RMP Amendment
							1) the proposed disturbance will be less than 40-acres; or 2) the BLM can verify the area is not habitat and the expansion would not adversely impact any adjoining seasonal habitat. State variation (WY, MT/DK, OR) GHMA: open, apply state specific minimization measures.
Nonenergy Leasable Minerals	PHMA: closed but can consider expansion of existing leases. State variation: (WY, ID) GHMA: open	PHMA: closed but can consider expansion of existing leases. State variation: (WY, ID, NV/CA) GHMA: open	PHMA: closed GHMA: n/a	PHMA: closed State variation: (NV/CA, WY) GHMA: open			PHMA: closed to new leases but allow for expansion of existing operations. State variation (CO, NV/CA, WY) PHMA with limited exceptions: closed to new leases including fringe acreage leasing (i.e., no expansion of existing leases). State variation (WY) GHMA: open, apply state-specific minimization measures. State variation (CO, WY)

Management Category	Alternative 1	Alternative 2 (No Action)	Alternative 3	Alternative 4	Alternative 5 (Draft EIS Preferred Alternative)	Alternative 6	Proposed RMP Amendment
Coal	PHMA: (CO, MT/DK, UT, WY only) At the time a new application is submitted, the BLM will determine whether the 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 as per 43 CFR Part 3461.5(o)(1). GHMA: varies by state	PHMA: same as Alt1 State variation: (UT) GHMA: varies by state	PHMA: (CO, MT/DK, UT, WY only) At time a new application is submitted, the BLM will determine whether the area is "unsuitable" for all or certain coal mining methods pursuant to 43 CFR Part 3461.5. Coordination with the appropriate state agency and the determination of essential habitat for maintaining GRSG as per the suitability criteria at 43 CFR Part 3461.5(o)(1) will consider site-specific information as part of the unsuitability process. GHMA: same as PHMA				PHMA (CO, MT/DK, UT, WY) & GHMA: Unless a suitability process has already been conducted 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 agency and the determination of essential habitat for maintaining GRSG as per the suitability criteria at 43 CFR Part 3461.5(o)(1) will consider site-specific information associated with lease nomination. Does not apply in ID, NV/CA, or OR due to absence of the mineral.
Locatable Minerals	Open, unless currently withdrawn. SFAs are recommended for withdrawal in ID, MT/DK, NV/CA, OR, UT, WY.	Open, unless currently withdrawn. State variation: MT/DK: same as Alt. 1.	PHMA is recommended for withdrawal.	Open, unless currently withdrawn.			Open, unless currently withdrawn.

Management Category	Alternative 1	Alternative 2 (No Action)	Alternative 3	Alternative 4	Alternative 5 (Draft EIS Preferred Alternative)	Alternative 6	Proposed RMP Amendment
Major Rights-of-Way	PHMA avoidance State variation: (OR, UT, WY) GHMA varies: • CO, NV/CA, and OR Avoidance • ID, UT & WY open	PHMA: same as Alt1 State variation: (NV/CA) GHMA varies: • CO, NV/CA, and OR Avoidance • ID, UT & WY open	PHMA: Outside of Designated Corridors – Exclusion Within Designated Corridors – Avoidance GHMA n/a	PHMA: avoidance State variation: (MT/DK) GHMA Avoidance State variation: (MT/DK)	PHMA: avoidance State variation: (MT/DK) GHMA Open State variation: (MT/DK)		PHMA: Avoidance with exceptions and conditions. State variation (ID, MT/DK, OR). PHMA with Limited Exceptions: Exclusion with exceptions. GHMA: Open with minimization measures and compensatory mitigation, to maintain habitat supporting GRSG populations consistent with state agency habitat designations (e.g., restoration, connectivity, seasonal, or other), and to preclude negative impacts to adjacent PHMA habitats. State variation (CO, ID, OR, MT/DK, WY, UT, NV).
Minor Rights-of-Way	PHMA/IHMA: Avoidance WY: open GHMA: open	PHMA/IHMA: Same Alt1 State variation: (NV/CA) GHMA: open	PHMA: exclusion outside of designated corridors GHMA: n/a	PHMA/IHMA: Avoidance State variation: (CO, MT/DK) WY: open GHMA:	PHMA/IHMA: Avoidance State variation: (CO, MT/DK) WY: open GHMA:	PHMA/IHMA: Avoidance State variation: (CO, MT/DK) WY: open GHMA:	PHMA: Avoidance with exceptions and conditions. State variation (ID, MT/DK, OR, CO).

Management Category	Alternative 1	Alternative 2 (No Action)	Alternative 3	Alternative 4	Alternative 5 (Draft EIS Preferred Alternative)	Alternative 6	Proposed RMP Amendment
				CO, MT/DK & OR Avoidance ID, NV/CA, UT & WY Open	CO & MT/DK Avoidance ID, NV/CA, OR, UT & WY Open	CO & MT/DK Avoidance ID, NV/CA, OR, UT & WY Open	PHMA with Limited Exceptions: Exclusion with exceptions. GHMA: Open with minimization measures and compensatory mitigation requirements from 2015 and 2019 GRSG amendments. State variation (CO, ID, MT/DK, OR, WY).
Solar (Utility Scale)	PHMA: Exclusion except OR avoidance outside SFAs WY does not address GHMA varies: NV/CA, SD & UT exclusion CO, MT, ND, OR avoidance ID & WY open	Same as Alt 1	PHMA: Exclusion GHMA: n/a	PHMA Exclusion State variation: (ID, MT/DK) GHMA Avoidance State variation: (MT/DK)	PHMA Avoidance State variation: (MT/DK) GHMA Open	PHMA Avoidance State variation: (MT/DK) GHMA Open State variation: (MT/DK)	PHMA: Exclusion with exceptions. State variation: (OR) PHMA with limited exceptions: Exclusion. No exceptions. GHMA: Open with applicable state minimization measures. State variation (CO, OR, ID, MT/DK, NV/CA, WY, UT).
Wind (Utility Scale)	PHMA Exclusion except IHMA & WY avoidance OR avoidance outside SFAs GHMA varies:	Same as Alt 1	PHMA Exclusion GHMA n/a	PHMA Exclusion State variation: (ID, MT/DK) GHMA Avoidance State variation: (MT/DK)	PHMA Avoidance State variation: (MT/DK) GHMA Open	PHMA Avoidance State variation: (MT/DK) GHMA Open State variation: (MT/DK)	PHMA: Exclusion with exceptions. PHMA with Limited Exceptions: Exclusion. No exceptions. GHMA: Open with applicable state

Management Category	Alternative 1	Alternative 2 (No Action)	Alternative 3	Alternative 4	Alternative 5 (Draft EIS Preferred Alternative)	Alternative 6	Proposed RMP Amendment
	CO, MT/DK, NV/CA, & OR avoidance ID, UT & WY open						minimization measures. State variation (CO, OR, ID, MT/DK, WY, NV/CA, UT).
Areas of Critical Environmental Concern (ACECs)	None	None	Identifies 32 potential ACECs[3] ACECs, managed the same as PHMA under Alt. 3 with the following differences: Major Rights of Way are Exclusion Locatable minerals: Operators must submit a plan of operations (refer to 43 CFR Part 3809.11(c)(3)) and obtain BLM approval before beginning any operations (as defined in 43 CFR 3809.5).	None	None	Identifies 32 potential ACECs[3] PHMA management direction for Alternative 5 is applied in ACECs with the following differences: Locatable minerals: Operators must submit a plan of operations and obtain BLM approval before beginning any operations (as defined in 43 CFR 3809.5). Fluid minerals: Open subject to major constraints, NSO. Nonenergy minerals: closed to new leases and expansion associated with existing operations (fringe leases). Saleable: Closed to new operations for all	None

[3] A complete summary of the management direction for ACECs under Alternatives 3 and 6 are provided in Appendix 5, Areas of Critical Environmental Concern for Greater Sage-grouse Habitat.

Management Category	Alternative 1	Alternative 2 (No Action)	Alternative 3	Alternative 4	Alternative 5 (Draft EIS Preferred Alternative)	Alternative 6	Proposed RMP Amendment
						sale types except for free-use pits. Major Rights of Way: Exclusion. Designated corridors Open but would require compensatory mitigation. Wind: Exclusion Solar: Exclusion No disturbance cap exceptions.	
Criteria-Based Management for Non-Habitat within GRSG Habitat Management Areas	All states include language encouraging location of potential projects in areas of non-habitat before considering them in areas with habitat in GRSG habitat management areas.		Outlines a process by which potential non-habitat within designated PHMA or GHMA may be reviewed via a field inspection. (Under Alternative 3 there is only PHMA). Any discrepancies between the mapped GRSG habitat management areas and the site-specific conditions will be disclosed and analyzed as a component of the NEPA process. All management objectives and decisions associated with each management area type will apply unless all specific criteria are documented.				Same as Alts. 4, 5, and 6. State variation: NV/CA
Mitigation	CO, ID, MT/DK, NV/CA, OR, UT: Require and ensure mitigation that achieves a net conservation gain in all HMA types. State variation: (WY, UT, ID, NV, CO, MT/DK, OR)	CO, ID, NV/CA, OR, UT and WY compensatory mitigation would be voluntary unless required by laws other than FLPMA or by the State. State variation: (MT/DK, NV/CA, OR, CO, ID, UT, WY, UT)	In all GRSG habitat management areas and consistent with valid existing rights and applicable law, BLM will apply the mitigation hierarchy when authorizing third-party actions resulting in GRSG habitat loss and degradation (including indirect impacts) to achieve the minimum standard of no net habitat loss. The mitigation hierarchy includes avoidance, minimization, and compensation.				Same as Alt. 5 (Preferred Alt.) with clarifications regarding "no net loss" and applying state mitigation requirements. State variation (CO, MT/DK, OR).
			Apply the mitigation hierarchy to address changes in existing development or new development as the result of valid existing rights. Where avoidance or minimization will not fully offset a project's impacts compensatory mitigation is required and will at minimum	Apply the mitigation hierarchy. Where avoidance or minimization will not fully offset a project's impacts compensatory mitigation is required and will at minimum meet the requirements of the state wildlife agency or other appropriate state	The BLM will apply the mitigation hierarchy. Where avoidance or minimization will not fully offset a project's impacts compensatory mitigation is required and will at minimum meet the requirements of the state wildlife agency or other appropriate state authority, and BLM/DOI mitigation policy. If the state agency does not require mitigation, or state-sponsored mitigation is determined by BLM to be inconsistent with BLM/DOI policy, BLM will require compensatory mitigation to achieve no net habitat loss.		

Management Category	Alternative 1	Alternative 2 (No Action)	Alternative 3	Alternative 4	Alternative 5 (Draft EIS Preferred Alternative)	Alternative 6	Proposed RMP Amendment
			meet the requirements of the state wildlife agency or other appropriate state authority, and BLM/DOI mitigation policy. If the state agency does not require mitigation, BLM will require compensatory mitigation to achieve no net habitat loss.	authority, and BLM/DOI mitigation policy. If the state agency does not require mitigation, or state-sponsored mitigation is determined by BLM to be inconsistent with BLM/DOI policy, BLM will require compensatory mitigation to achieve no net habitat loss. Where habitat and/or population adaptive management thresholds have been met, compensatory mitigation beyond what is required by the States may be considered. BLM shall coordinate closely with the state wildlife management or other appropriate state agency in determining the amount and form of additional mitigation on a case-by-case basis, considering project activity, direct and indirect impacts to GRSG habitats, and			

Management Category	Alternative 1	Alternative 2 (No Action)	Alternative 3	Alternative 4	Alternative 5 (Draft EIS Preferred Alternative)	Alternative 6	Proposed RMP Amendment
				restoration success rates.			
Adaptive Management	Every state has an adaptive management process. All the states include language to the effect of the following: • While there should be no expectation of hitting a hard trigger, if unforeseen circumstances were to occur that trip either a habitat or population hard trigger, more restrictive management would be required. • Hard triggers represent a threshold indicating that immediate action is necessary to stop a severe deviation from GRSG conservation objectives set forth in the BLM plans. • The BLM will also undertake any appropriate plan amendments or revision if necessary.	Same as Alternative 1, though some states applied strategies to improve the process based on lessons learned during implementation between 2015 and 2019. This included the addition of "un-triggers" in some states, to allow management to return to what was in the RMP amendments if conditions improved. The differences between the states persisted, creating challenges for comparing rangewide trends, as well as identifying and addressing concerns in populations that cross state lines.	Habitat Adaptive Management Thresholds: • soft threshold = PHMA/IHMA a neighborhood cluster loses more than 5% of the area capable of supporting sagebrush in a given year (including wildfire) • hard threshold = Habitat in a neighborhood cluster drops below 65% of the area capable of supporting sagebrush OR if a soft habitat threshold is met in 4 consecutive years Population Trend Adaptive Management Thresholds: State wildlife agencies can alert the BLM when thresholds are met or the BLM in review of annual TAWS results determined population trends indicate potential habitat concerns. All thresholds identified by TAWS will be confirmed with the state wildlife agency within 60 days. A hard or soft population trend threshold can be reversed if certain criteria are met. Causal Factor Analysis (CFA) teams assess/determine the causal factor(s) when a threshold is met. Adaptive Management Responses: • Rapid assessment completed within 60 days of a threshold being met • Soft threshold = new permitted activities can be considered during the completion of the CFA as long they do not result in mortality of GRSG or GRSG habitat loss and degradation. • Hard threshold = no new permitted activities until CFA is completed and cause identified • CFA team can alter threshold levels • Some exceptions Habitat threshold due to Wildfire: • Habitat Assessment completed within 60 days • No new authorizations until assessment complete • New projects/permits may be delayed based on the assessment results • Authorizations could be considered if no impacts Inconclusive CFAs: • May consider additional restrictions				Same as Alts 3-6 with edits for clarity. Added multi-factorial causal factor analysis.

Management Category	Alternative 1	Alternative 2 (No Action)	Alternative 3	Alternative 4	Alternative 5 (Draft EIS Preferred Alternative)	Alternative 6	Proposed RMP Amendment
Habitat Objectives	CO, ID, MT/DK, NV/CA, UT, includes general narrative associated with the habitat objective tables that notes the indicators and values from table would be considered when authorizing activities in GRSG habitat. WY and OR note the values would be used during the land health evaluation process to help determine if the standard applicable to GRSG habitat is being met. MT/DK and UT include language that the values may be adjusted based on local factors, data, or updated science. UT includes a qualitative desired condition separate from the quantitative values in the table.	CO, ID, MT/DK, NV/CA, UT, includes general narrative associated with the habitat objective tables that notes the indicators and values from table would be considered when authorizing activities in GRSG habitat. WY and OR these states note the values would be used during the land health evaluation process to help determine if the standard applicable to GRSG habitat is being met. ID, MT/DK, NV/CA, OR, and UT include language that the values may be adjusted based on local factors, data, or updated science. ID and UT include a qualitative desired condition separate from the quantitative values in the table.	All States: The habitat objectives identify the desired outcome for habitat on BLM-administered lands in all GRSG HMAs to support suitable GRSG habitat at multiple scales in order to support connected mosiacs of sagebrush and provide seasonal habitats and dispersal. The scale for assessing habitat suitability are identified and specific tables identifying indicators and benchmarks that various scientific publications throughout the range have identified as guidelines would be retained in the monitoring appendix as a monitoring tool through which suitability is informed.				

Management Category	Alternative 1	Alternative 2 (No Action)	Alternative 3	Alternative 4	Alternative 5 (Draft EIS Preferred Alternative)	Alternative 6	Proposed RMP Amendment
Disturbance Cap	CO, ID, NV/CA, OR, UT, DK: 3% cap does not include fire or agriculture. In ID the cap can be exceeded in utility corridors if benefit to GRSG. Cap applies at both biologically significant unit (BSU)-scale and at proposed project analysis area within PHMA. MT, WY: 5% cap at the project area scale in PHMA. Includes wildfire and agriculture.	CO, ID, NV/CA, OR, UT, DK: 3% cap does not include fire or agriculture. In ID the cap can be exceeded in utility corridors if benefit to GRSG. In UT the cap can be exceeded if will benefit GRSG. The cap is applied at the BSU and project scale except in ID which just applies it at the BSU scale. MT, WY: Same as Alt 1.	All states: 3% cap for new and pre-existing authorizations in the project analysis area and within HAF Fine-Scale boundaries while honoring valid existing rights. Cap would include infrastructure, fire, and agriculture.	All states: 3% cap in the project analysis area in PHMA, applicable only to infrastructure. 3% cap in PHMA in the HAF Fine-Scale boundaries, applicable only to infrastructure. Loss of habitat from wildfire and agriculture would be addressed through the sagebrush availability objective already included by all states, as well as the habitat objectives.	All states: 3% cap in PHMA in the HAF Fine-Scale boundaries. Applicable only to infrastructure. WY and MT: 5% cap at the project analysis area in PHMA. Includes fire and agriculture. All other states: 3% cap at project analysis area in PHMA. Does not include fire or agriculture. Loss of habitat from wildfire and agriculture would be addressed through the sagebrush availability objective already included by all states, as well as the habitat objectives.		Same as Alt. 5 with changes for when an exception could be granted to align with Alternative 4 language (compensatory mitigation must be in place when the exception is granted). Clarifying language throughout.
Predation	All states include some language related to reducing opportunities for avian predators, though the location and exceptions vary substantially between states.	Same as Alternative 1, except UT added language addressing corvid nests discovered during habitat treatments.	Collaborate with appropriate state Agencies and others in their efforts to minimize impacts from predators on GRSG. Where infrastructure in PHMA/IHMA are not avoidable, apply minimization measures and BMPs to minimize threats: • Avoid new infrastructure in undisturbed habitat.	Same as Alternative 3. plus apply minimization measures/BMPs to new authorizations and activities in PHMA and GHMA to minimize threats.	Same as Alternative 4, except no restrictions applied to GHMA and where avoidance of new infrastructure is not feasible in undisturbed habitat, the Authorized Officer could require the project proponent to develop a predator management plan.		Reduce predation from increased numbers of predators resulting from anthropogenic disturbance and habitat loss and function. Apply minimization measures and BMPs to new, existing, and renewal of authorizations and activities to minimize threats from predators shown to pose a threat to GRSG, consistent with applicable law. For authorizations that

Management Category	Alternative 1	Alternative 2 (No Action)	Alternative 3	Alternative 4	Alternative 5 (Draft EIS Preferred Alternative)	Alternative 6	Proposed RMP Amendment
			• Minimize food sources. • Predator Mgmt Plan requirement				require expanded or new or renewal of energy or transmission related energy, mining, and infrastructure as identified in **Table 7-4** in **Appendix 7**, Greater Sage-grouse Monitoring Framework) in PHMA the project proponent is required to submit a predator management plan to minimize influx and support of new predators as a result of the new project. The predator management plan shall be coordinated with state and federal agencies (e.g., USFWS and APHIS) as appropriate. collaborate with appropriate state agencies, other landowners, federal agencies (e.g., USFWS, APHIS, etc.), and Tribal governments, as appropriate and consistent with BLM policy, in their efforts to minimize impacts from predators on GRSG where impacts

Management Category	Alternative 1	Alternative 2 (No Action)	Alternative 3	Alternative 4	Alternative 5 (Draft EIS Preferred Alternative)	Alternative 6	Proposed RMP Amendment
							have been documented (e.g., reduced recruitment of GRSG from predation), including providing needed authorizations to support predator management actions. State variation (ID, OR, NV/CA).
Livestock Grazing	All states: GRSG management areas are available for livestock grazing, except OR, where all or portions Research Natural Areas would be unavailable. Prioritize monitoring and renewal of grazing in SFAs and PHMAs outside of SFAs. Include/adjust permit terms and conditions needed to meet land health standards and GRSG habitat objectives. Require thresholds and responses to address and respond to future conditions in new fully processed permits.	Same as Alt 1, except: UT: all actions addressing were addressed outside the RMP so removed prioritization. WY: clarifications on grazing in riparian areas, management of range improvements, application of land health standards to GRSG, and prioritization (removed SFAs). ID: Clarifications to applying the habitat objectives to land health standards were made. NV: Clarifications to applying the habitat objectives to land	Makes all PHMA unavailable to livestock grazing; requires construction and maintenance of fencing; may include variations based on state-specific policies; allows for targeted grazing to manage fine fuels but at a smaller scale.	GRSG management areas are available for livestock grazing, except in OR, where all or portions of 13 key RNAs would be unavailable. Managing livestock grazing to meet land health standards and avoid direct impacts to GRSG habitats from livestock range improvements. Consider adjustments to active AUMs, timing, intensity, duration, and frequency of grazing to meet or make progress towards meeting land health standards for special status species. Use criteria identified in the Sage-grouse	Similar to Alternative 4 with adjustments in language in the livestock grazing objective and the direction related to threshold and responses. Under Alternative 4, threshold and responses "shall be identified" and under Alternatives 5 and 6, the alternatives "should" be identified. OR would retain or modify allocations based on updated site-specific information, potentially increasing grazing acreage in certain RNAs.		Same objective as Alternative 5. Same management direction as identified under Alternative 4 with clarifying edits.

Management Category	Alternative 1	Alternative 2 (No Action)	Alternative 3	Alternative 4	Alternative 5 (Draft EIS Preferred Alternative)	Alternative 6	Proposed RMP Amendment
	Language related agency considerations if a permittee voluntarily relinquishes a permit or lease.	health standards were made. Prioritization in SFAs was removed. OR: Livestock grazing in the 13 key RNAs was returned to language that pre-dated the 2015 amendments.		Habitat Assessment Framework and other methodology to determine if an area is meeting or making significant progress toward meeting land health standards for BLM special status species. Adjust livestock grazing practices where livestock grazing is a significant causal factor in not meeting land health standards for special status species. In processing grazing permits include an alternative that includes specific thresholds and responses when the special status species standard is not being met due to livestock grazing. Design range improvements to reduce disturbance and effects to GRSG. Identify and address high risk fences. Consider conversion of			

Management Category	Alternative 1	Alternative 2 (No Action)	Alternative 3	Alternative 4	Alternative 5 (Draft EIS Preferred Alternative)	Alternative 6	Proposed RMP Amendment
				the allotment to a reserve comment allotment for the benefit of GRSG habitat when a permittee or lessee voluntarily relinquishes grazing preference and associated grazing authorization.			
Wild Horse and Burro Management	• Manage within established appropriate management levels (AML). • Incorporate GRSG habitat objectives into plans, • Prioritize WH&B activities - such as monitoring, gathers, AML adjustments (due to causal factor) etc. - in SFAs, then PHMA, then GHMA.	Same as Alternative 1, except remove reference to SFAs and remove reference to GHMA in UT.	Wild horses and burros would be removed from PHMA.	Same as Alternative 2, except retain reference to GHMA in Utah.			Where wild horses and burros overlap with GRSG: Manage wild horse and burro populations within established appropriate management levels (AML) and to achieve or make significant progress towards achieving land health standards. State variation (WY).
Definition of Lek	Both the 2015 and 2019 plans included allocations and management decisions based on the distance from "active" leks using the Colorado Parks and Wildlife agency's definition, which is an area used by two or more displaying males in two of the last five years in larger populations and one or more males in any of the last five years in small populations (Colorado Greater Sage-grouse Steering Committee 2008).		Use the Western Association of Fish and Wildlife Agencies (WAFWA) lek definitions (Cook et. al., 2022). (Refer to **Glossary** and **Appendix 4**). Unless otherwise specifically noted, when language in the RMPs uses the term "lek" it applies to the WAFWA definition for "active lek."				Same as Alts. 3-6. State variation: CO, OR, NV/CA, ID, WY

Table 2-15. GRSG Habitat Management Areas (BLM administered surface acres only)

Habitat Management Area[1]	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternatives 5 and 6	Proposed RMP Amendment
Rangewide Habitat Management Area Alignments						
PHMA	32,465,000	32,535,000	64,990,000	35,855,000	33,929,000	34,521,000
PHMA with LE[4]	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*4,213,000*
GHMA	26,383,000	25,878,000	N/A	21,535,000	21,610,000	21,535,000
SFA	10,817,000	2,890,000	N/A	N/A	N/A	N/A
Colorado Habitat Management Area Alignments						
PHMA	748,000	921,000	1,538,000	751,000	751,000	752,000
PHMA with LE	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*5,000*
GHMA	788,000	727,000	N/A	786,000	786,000	786,000
LCMA	97,000	82,000	97,000	97,000	97,000	97,000
Idaho Habitat Management Area Alignments						
PHMA	4,178,000	4,106,000	8,860,000	4,472,000	4,573,000	4,573,000
PHMA w/LE	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*257,000*
IHMA	2,736,000	2,796,000	N/A	2,477,000	2,503,000	2,526,000
GHMA	1,958,000	1,958,000	N/A	1,910,000	1,721,000	1,699,000
SFA	3,855,000	N/A	N/A	N/A	N/A	N/A
Montana/Dakotas Habitat Management Area Alignments						
PHMA	3,275,000	3,275,000	5,255,000	3,301,000	3,301,000	3,233,000
PHMA w/LE	N/A	*N/A*	*N/A*	*N/A*	*N/A*	*639,000*
GHMA	2,384,000	2,384,000	N/A	1,859,000	1,859,000	1,932,000
RHMA	165,000	165,000	N/A	94,000	94,000	N/A
CHMA	N/A	N/A	298,000	298,000	298,000	298,000
LMHMA	N/A	N/A	N/A	N/A	N/A	53,000
SCHMA	N/A	N/A	N/A	N/A	N/A	37,000
SFA	997,000	*997,000*	N/A	N/A	N/A	N/A
Nevada/California Habitat Management Area Alignments						
PHMA	9,266,000	9,268,000	17,403,000	9,645,000	9,496,000	9,660,000
PHMA with LE	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*3,001,000*
GHMA	5,783,000	5,748,000	N/A	2,904,000	2,580,000	2,443,000
OHMA	4,862,000	4,870,000	N/A	4,853,000	4,127,000	4,098,000
SFA	2,798,000	N/A	N/A	N/A	N/A	N/A

[4] PHMA with limited exceptions are areas within PHMA requiring additional protections to support conservation of GRSG habitat. These areas are included in the PHMA total acreage.

Habitat Management Area[1]	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternatives 5 and 6	Proposed RMP Amendment
Oregon Habitat Management Area Alignments						
PHMA	4,589,000	4,557,000	10,546,000	5,572,000	5,572,000	5,572,000
PHMA with LE	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*39,000*
GHMA	5,634,000	5,662,000	N/A	4,975,000	4,824,000	4,824,000
SFA	*2,190,000*	2,190,000	N/A	N/A	N/A	N/A
Utah Habitat Management Area Alignments						
PHMA	2,080,000	2,080,000	3,568,000	2,192,000	1,627,000	2,134,000
GHMA	438,000	0	N/A	1,195,000	646,000	645,000
GCHMA	N/A	N/A	N/A	N/A	N/A	295,000
SFA	233,000	N/A	N/A	N/A	N/A	N/A
Wyoming Habitat Management Area Alignments						
PHMA	8,328,000	8,328,000	17,820,000	9,921,000	8,609,000	8,597,000
PHMA with LE	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*273,000*
GHMA	9,397,000	9,397,000	N/A	7,905,000	9,193,000	9,206,000
SHMA	N/A	N/A	N/A	N/A	15,000	15,000
SFA	1,914,000	N/A	N/A	N/A	N/A	N/A

Source: BLM GIS 2024
[1] PHMA: Priority Habitat Management Area
SFA: Sagebrush Focal Area
PHMA with LE: Priority Habitat Management Area with limited exceptions. These areas are included in the PHMA total acreage.
GHMA: General Habitat Management Area
LMA: Linkage Management Area
IHMA: Important Habitat Management Area
RHMA: Restoration Habitat Management Area
CHMA: Connectivity Habitat Management Area
LMHMA: Little Missouri Habitat Management Area
SCHMA: South Carter Habitat Management Area
OHMA: Other Habitat Management Area
GCHMA: General Habitat Management Area - Connectivity
SHMA: Stewardship Habitat Management Area

Chapter 3. Affected Environment

3.1 Introduction

This chapter describes existing conditions, and trends of resources and land uses in the planning area that may be affected by implementing any of the proposed alternatives described in Chapter 2. The affected environment provides the context for assessing potential impacts as described in Chapter 4, Environmental Consequences for the Proposed RMP Amendment and Appendix 10 which provides the effects analysis for Alternatives 1-6.

Information from broad-scale and fine-scale assessments are used to set the context for identifying BLM resources and resource uses.

Existing conditions describe the location, extent, and current condition of the resource in the planning area (described in **Section 1.4**). For each resource, a general description of existing conditions is provided for the planning area, regardless of land status to provide a regional context. More detailed discussion of the existing conditions at various scales may be provided depending on the resource topic and availability of applicable information.

Acreage figures and other numbers are approximate projections; readers should not infer that they reflect exact measurements. Acreages were calculated using Geographic Information Systems (GIS) technology, and there may be slight variations in total acres between resources. Some information presented here has also been incorporated by reference from the individual state GRSG 2015 and 2019 plans and is cited as such.

3.2 Greater Sage-Grouse

3.2.1 Species Background

Status and Distribution

On March 23, 2010, the USFWS determined that rangewide listing of GRSG was warranted but precluded by higher priority listing actions (75 FR 13910). On November 21, 2012, the USFWS assigned GRSG a listing priority number of 8, indicating that the rangewide threat to GRSG was moderate to low (77 FR 699940). On September 22, 2015, a status review conducted by the USFWS determined that the GRSG remains relatively abundant and well-distributed across the species' 173-million-acre range and does not face the risk of extinction now or in the foreseeable future. The species was withdrawn from the candidate species list on October 2015 (80 FR 59857). GRSG remains a BLM sensitive species as defined by the BLM Special Status Species Policy (BLM Manual 6840 - Special Status Species).

The USFWS's decision not to list the bird followed an unprecedented conservation partnership designed to reduce threats to the GRSG across 90% of the species' breeding habitat. In making that decision, the USFWS stated several relatively large GRSG populations were distributed across the landscape and were supported by undisturbed expanses of habitat. The agency acknowledged some habitat loss associated with energy development, infrastructure, wildfire, and invasive plants will continue. However, regulatory mechanisms provided by federal agencies and three states (Montana, Oregon, and Wyoming), as well as mitigation required by the state of Nevada, reduced threats. They also stated wildfire and invasive species continue to occur in GRSG habitats, especially in the Great Basin, but existing management and commitments for suppression, restoration, and noxious weed treatments were in place and could reduce these impacts.

Since 2015, additional states have added GRSG protection plans, amendments, laws, or executive orders. Federal land use plans, executive orders, or laws for the states of Idaho, Montana, North Dakota, Nevada, Oregon, South Dakota, Utah, and Wyoming build upon the progress made during past planning processes. The plans aim to protect, maintain, and increase GRSG populations and habitats by addressing localized threats, incorporating new science in monitoring and management, and including greater integration of adaptive management into land-use planning.

GRSG are considered a sagebrush ecosystem-obligate species; they rely on sagebrush on a landscape level and on a micro-habitat scale for their survival. Prior to 19th century European settlement, GRSG habitat is estimated to have covered 296,526,080 acres ranging from 4,000 feet to over 9,000 feet in elevation in the Great Basin and Colorado Plateau regions (Schroeder et al. 2004). In 1965, state wildlife agencies began to standardize lek surveys, so they were able to be analyzed with statistical rigor, therefore 1965 provided the most reliable baseline for GRSG population comparisons (Schroeder et al. 2004). Since European settlement of the West began, the amount, distribution, and quality of sagebrush habitats and GRSG populations have declined by approximately 50% (Schroeder et al. 2004; Homer et al. 2015; Doherty et al. 2022a). Populations have been extirpated from Nebraska and British Columbia, and the species is now absent from almost half of its estimated historic distribution (Connelly et al. 2004; Schroeder et al. 2004; Knick and Connelly 2011a; Hanser et al. 2018).

Population abundance has declined significantly over the last six decades, with rangewide declines of approximately 80% since 1965 and nearly 41% since 2004 (Prochazka et al. 2024). Although continued population declines over the entire species range are the overall trend, rates of change vary regionally (Coates et al. 2021b). Declines in GRSG numbers and distribution are attributed primarily to the loss and degradation of sagebrush habitats (Connelly et al. 2000b; Schroeder et al. 2004; Knick and Connelly 2011; Hanser et al. 2018). The recent trends and condition of GRSG populations and habitat are further described below in **Section 3.2.2**, Conditions and Trends within the Planning Area.

Life History and Habitat Characteristics

GRSG persistence is linked to functioning sagebrush ecosystems containing minimal levels of human land use (Knick et al. 2013). Areas of occupation can range in size from 640 to over 64,000 acres to provide all seasonal life requirements (Beever and Aldridge 2011; Connelly et al. 2011a; Connelly et al. 2011b; Leu and Hanser 2011; Stiver et al. 2015). Sagebrush ecosystems are comprised of sagebrush–steppe and Great Basin sagebrush and contain various plant species composition (shrubs, perennial grasses, and forbs), essential for food, cover, and nesting habitat (Connelly et al. 2000b). General habitat characteristics for rangelands supporting GRSG were reported by Braun et al. (1976) and later updated by Connelly et al. (2000b) and others. These include local consideration of sagebrush shrub cover, annual precipitation (e.g., arid, mesic), herbaceous understory and soils (Connelly et al. 2000b). GRSG distribution is strongly correlated with the distribution of sagebrush habitats (Schroeder et al. 2004; Connelly et al. 2011b; Doherty et al. 2016), especially with big sagebrush (e.g., Wyoming big sagebrush, mountain big sagebrush, and basin big sagebrush) (Braun et al. 1976; Connelly et al. 2000b; Connelly et al. 2004; Miller et al. 2011). The behavioral complexity of the species (e.g., migratory or resident population), local variability of ecological sites, and quality and quantity of sagebrush and herbaceous understory influence population structure, which is thought to be highly clustered (Doherty et al. 2016; Coates et al. 2021b). Landscape cover of sagebrush was identified as an important predictor of GRSG habitat, whereas conifer canopy cover and anthropogenic development were correlated with reductions in habitat selection across the GRSG range (Doherty et al. 2016). Additionally, GRSG within fragmented habitats (e.g., agricultural conversion, conifer encroachment) had lower tolerance to disturbances, suggesting effects vary across the range.

As a landscape-scale species, GRSG move between habitats seasonally, requiring large, interconnected wintering, breeding, nesting, and summering areas to sustain a population (Connelly et al. 2011b; Doherty et al. 2016; 2022; Cross et al. 2018; Oyler-McCance et al. 2022). These habitat requirements increase their vulnerability to habitat loss, fragmentation and degradation from development, infrastructure, improper grazing management, and other disturbances (Connelly et al. 2011b; Doherty et al. 2016). GRSG populations have been found to be both non-migratory and migratory in their spatial and temporal distribution. Non-migratory populations often move 5 to 6 miles between seasonal habitats and use home ranges no more than 25,600 acres in size, while annual movements of migratory populations may be 9 to 60 miles and have home ranges that cover hundreds of square miles. Seasonal population movements also vary by the amount of GRSG habitat available and year-to-year conditions. Populations in areas with a large amount of contiguous habitat move longer distances than those in isolated habitats (Dahlgren et al. 2015). There was significant variation in movement distances within and among sites across Wyoming (Fedy et al. 2012).

GRSG have a strong site fidelity to established nesting habitat and other seasonal habitats, suggesting resistance of individuals to adjust to changing habitat conditions (Holloran and Anderson 2005; Doherty et al. 2010; Holloran et al. 2010). Individuals may use currently unsuitable seasonal habitats, reflecting their fidelity to previous conditions in that area (Connelly et al. 2004; Knick and Connelly 2011; Dahlgren et al. 2015, 2016; Fremgen et al. 2016; Caudill et al. 2016).

During the spring breeding season males congregate at leks, traditional strutting grounds, to perform courtship displays to attract females. GRSG leks are generally found in areas with low, sparse vegetation with higher amounts of bare ground, surrounded by adjacent sagebrush habitat (Scott 1942; Patterson 1952, Klebenow 1985; Bradbury et al. 1989). Leks also include old fire scars, sparse hillsides, roads or pipeline scars. Lekking sites remain fairly consistent year-to-year and there is evidence that some leks have been in use for up to 130 years.

Productive nesting areas are typically characterized by sagebrush with an understory of native grasses and forbs, with horizontal and vertical structural diversity that provides an insect prey base, herbaceous forage, and cover for the hen while incubating eggs (Gregg et al. 1994; Connelly et al. 2000b; Connelly et al. 2004; Connelly et al. 2011a). These areas also provide GRSG chicks with insects and forbs, essential nutritional components for chick survival and development (Klebenow and Gray 1968; Johnson and Boyce 1990; Connelly et al. 2004). Some recent studies have shown mixed support for relationship between grass height and GRSG nest survival (Smith et al. 2018). After correcting for plant phenology (i.e., the timing of vegetation surveys), successful nests had high horizontal cover and total shrub cover during nesting and late brood rearing (Gibson et al. 2016). Taller perennial grasses (>12.1 centimeters) were associated with successful nests in xeric but not mesic sites because grasses were less available in xeric sites (Coates et al. 2017). In areas where grass heights are reduced by livestock grazing, such as parts of the Great Basin, GRSG may select the best available habitat, even if it does not provide optimal conditions for long-term survival and reproduction. Habitat conditions for GRSG also vary widely across their range, depending on regional environmental factors, such as moisture availability, grazing pressure, and site potential. Thus, the relationship between grass height and nest success must be considered within the broader context of site potential, habitat availability, and management practices, such as the need to limit grazing impacts to meet habitat objectives for GRSG conservation. Shrub canopy and grass cover provide concealment for GRSG chicks (Barnett and Crawford 1994; Gregg et al. 1994; Connelly et al. 2004).

Summer use areas include sagebrush habitats as well as riparian areas and wet meadows that provide an abundance of forbs and insects for both hens and chicks (Schroeder et al. 1999). GRSG gradually move from sagebrush uplands to more mesic areas (moist areas, such as streambeds or wet meadows) during the late brood-rearing period in response to summer desiccation of herbaceous vegetation in the sagebrush uplands (Connelly et al. 2000b; Knick and Connelly 2011; Donnelly et al. 2016). Late brood-rearing habitats are often associated with sagebrush, and selection is based on shrub cover as well as the availability of forbs, correlated to a shift in the diet of chicks as they mature (Connelly et al. 1988 and references therein; Connelly et al. 2011a; Coates et al. 2017).

In the fall, GRSG transition to winter habitats. The timing of this transition depends largely on the weather. GRSG generally remain in summer habitat until plant phenology or frost eliminates the succulent vegetation. Currently, they move to their winter habitat and transition their diet to mostly sagebrush (Knick and Connelly 2011). These movements may include migrations of less than 37 miles (60 km), with the longest known migration occurring is approximately 75 miles (120 km) (Smith 2012). GRSG select winter-use sites based on sagebrush availability above the snow, which is influenced by snow depth, topographic factors (e.g., slope, aspect, elevation), environmental factors (e.g., wind speed, snow hardness), and vegetation characteristics (e.g., canopy cover, shrub height) (Smith et al. 2016).

Threats

Proximate reasons for population declines differ across the GRSG distribution, but ultimate underlying causes are loss, fragmentation, and/or degradation of suitable sagebrush habitat, as well as the effects of predation and drought. In many areas of the West, predation and drought have a very high impact on GRSG population size and distribution compared to other factors. The quality and quantity of sagebrush habitat has declined over the last 50 years to the extent that expanses of unfragmented sagebrush are rare across the landscape (Connelly et al. 2000b; Miller and Eddleman 2001; Aldridge and Brigham 2003; Pedersen et al. 2003; Connelly et al. 2004; Schroeder et al. 2004; Leu and Hanser 2011; Homer et al. 2015). Habitat loss is attributed to large-scale conversions to cultivated croplands or pastures, increasing wildfire frequencies facilitating annual nonnative grass and noxious weed dominance at lower elevations, conifer encroachment, improper livestock grazing management, herbicide use and chaining to reduce sagebrush, crested wheatgrass seedings, mineral and energy development, wild horse grazing, and recreational activities related to urban growth and increased human populations (Manier et al. 2013; USFWS 2013). Currently, sagebrush communities and GRSG continue to be at risk from multiple stressors acting across multiple scales (Manier et al. 2013; Hanser et al. 2018; Connelly et al. 2011b; Doherty et al. 2022a).

Parts of the planning area have experienced severe habitat degradation from undesirable annual invasive species, including cheatgrass (*Bromus tectorum*), medusahead wildrye (*Taeniatherum caput-medusae*), and ventenata (*Ventenata dubia*). Invasive plants, including cheatgrass, alter plant community structure and composition, productivity, nutrient cycling, and hydrology and may competitively exclude native plant populations. The presence of invasive annual grasses can also change wildfire cycles, creating a positive feedback loop between wildfire frequency and invasive annual grass persistence, precluding reestablishment of sagebrush and reduce or eliminate vegetation that GRSG use for food and cover (Manier et al. 2013; Hanser et al. 2018). Warming trends may further exacerbate this cycle, preventing natural recovery in those areas and requiring active management approaches (Hanser et al. 2018; Pyke 2011). While wildfire is a primary factor facilitating annual grass invasion, annual grasses are also able to invade landscapes that have not been burned for decades (Smith et al. 2023).

The expansion of native juniper (*Juniperus* spp.) and pinyon (*Pinus* spp.) woodlands (pinyon-juniper) can also contribute to GRSG habitat loss. Pinyon-juniper expansion and infill occurs from low to high elevations, especially in Nevada's Basin and Range GRSG habitats (Miller et al. 2011). Pinyon-juniper expansion intensifies avian predation threats by providing perch sites and nesting substrate for raptors and corvids (Prochazka et al. 2017), as well as changing vegetative understories. Studies have shown that GRSG incur population-level impacts as low as 4% of conifer encroachment (Baruch-Mordo et al. 2013). In addition, Douglas-fir (*Pseudotsuga menziesii*) expansion into GRSG habitat has occurred in Montana (USGS 2011).

Predation is a common cause of mortality for GRSG (Connelly et al. 2011b; USFWS 2013; Conover and Roberts 2017), but it is not considered a threat to the persistence of the species in areas where habitat is not limited and of good quality (USFWS 2010a). However, predation may limit population growth in fragmented habitats or areas where predator populations have supplemental food sources, such as landfills (Coates 2007), or where electrical transmission or other human-made structures facilitate nesting and perching by avian predators such as ravens (Howe 2012; Hagen 2011).

In particular, increased common raven (*Corvus corax*) populations as a result of anthropogenic subsidies (Boarman et al. 2006, USFWS 2023) have caused elevated predation rates on GRSG, which may have contributed to the declining GRSG populations in some areas in recent decades (Conover and Roberts 2017; Coates et al. 2016). In one study the majority (64%) of projected GRSG breeding concentration areas across the Great Basin and adjoining ecoregions had raven densities associated with below average GRSG nest survival, suggesting predation as a result of elevated raven numbers is a more widespread and greater threat than wildfire (Coates et al. 2020). Anthropogenic factors that contribute to greater raven occurrence include livestock presence, increased road density, presence of transmission lines, agricultural activity, and presence of roadside rest areas (O'Neil et al. 2018; Coates et al. 2016). While ravens are a significant concern, other predators also impact GRSG populations. These include, among others, other corvids, golden eagles (*Aquila chrysaetos*), great horned owls (*Bufo virginianus*), coyotes (*Canis latrans*), badgers, bobcats, red foxes, and hawks, all of which contribute to predation pressure on GRSG.

While populations of golden eagles, great horned owls, and coyotes have remained relatively stable over the past century and are not believed to have significantly contributed to GRSG population declines (Conover and Roberts 2017), the situation with common ravens is different. Populations of golden eagles, great horned owls, and coyotes have not increased during the last century, so they likely have not contributed to GRSG population declines (Conover and Roberts 2017).

Raven populations in the West have increased due to anthropogenic influences such as habitat changes and food availability (Conover and Roberts 2017; Boarman et al. 2006; USFWS 2023). This rise in raven numbers has led to an elevated predation rate on GRSG, which may contribute to the decline of GRSG populations, particularly in areas where sagebrush habitat is already degraded (Conover and Roberts 2017; Coates et al. 2016; USFWS 2023).

Sagebrush habitats that remain intact typically support high nest success and adult survival rates (Hagen 2011). However, highly fragmented sagebrush landscapes reduce protective cover and can support abnormally large predator populations, including ravens. Recent studies indicate that high raven populations have become a significant factor even in relatively intact landscapes. The challenge of managing raven populations is compounded by limited control measures, further complicating efforts to manage raven populations and mitigate their impact on GRSG.

In addition to ravens, the introduction of red foxes (*Vulpes vulpes*) into central Wyoming, primarily from fox farms that became unprofitable, has further exacerbated predation on GRSG (Baxter et al. 2000). While GRSG survival rates may be higher in areas with intact habitats, egg and chick survival remains a critical issue across all habitats due to predation.

It is important to recognize the natural cycles of predator-prey interactions. Predator populations fluctuate in response to prey availability, and GRSG populations are subject to these natural cycles. Understanding these dynamics is crucial for developing effective management strategies.

Interactions Between Climate Change, Wildfire, and Invasive Species

Over the past century, changing trends in temperature, precipitation, and atmospheric CO_2 have altered vegetation community composition and species distributions across the western U.S. (Polley et al. 2013; Lucht et al. 2006; USGCRP 2018), resulting in changes to the composition and availability of sagebrush (Schlaepfer et al. 2015; Still and Richardson 2014). Research predicting sagebrush responses to changing climate has helped identify areas where climate change poses the greatest threat to GRSG habitat. Projections suggest geographically divergent responses of big sagebrush to climate change with changes in biomass ranging from −20% to +27% (Palmquist et al. 2021; see **Map 3.10** in **Appendix 1**). Decreases in sagebrush cover were projected across much of its range, although some increases were projected in Wyoming, the Northern Great Basin, and eastern Montana (Rigge et al. 2021c; see **Map 3.11** in **Appendix 1**). Warmer, drier sites are likely more susceptible to sagebrush reductions compared with cooler, wetter sites (Rigge et al. 2021c; Adler et al. 2018; Flerchinger et al. 2019; Palmquist et al. 2021). GRSG may have the ability to move to areas that are currently cooler and wetter, as long as the new regions are suitable and available for sagebrush expansion (BLM 2013a; Knick et al. 2013).

Within the planning area, California, Colorado, Eastern Montana, Eastern Oregon, Nevada, Southern Idaho, Utah, and Wyoming have experienced particularly severe and prolonged drought (NOAA 2022; Belmecheri et al. 2015; Griffin and Anchukaitis 2014), which, based on climate models, are expected to become more intense rangewide (BLM 2020a; NOAA 2022; see **Section 3.13.1**, Air Resources, *Climate Change and Greenhouse Gases*). In August 2021, nearly the entire planning area experience severe or greater drought with similar conditions in 2022 (NOAA 2022). This drought has caused changes to vegetation conditions, including lower sagebrush canopy cover, reduced perennial grass and forb production, and changes to food resource availability (See **Section 3.3**, Vegetation). Such changes could trigger mismatches in timing between resource availability and GRSG life-history needs. Because GRSG population abundance is positively related to mesic availability (Donnelly et al. 2016, 2018), weather-driven productivity has been identified as a key factor influencing GRSG survival (Blomberg et al. 2013; Guttery et al. 2013; Donnelly et al. 2018). A diversity of mesic resources (e.g., rangelands, riparian, and wet meadows) may help sustain GRSG populations over time, but regional drought sensitivity may influence demographic performance differently across the species range (Donnelly et al. 2018).

Sagebrush habitats with low resistance and resilience to invasion by exotic annual grasses are also more likely to be negatively affected by climate changes (Adler et al. 2018). Climate change may worsen the spread of invasive species, such as cheatgrass, medusahead, and ventenata, by increasing the severity of droughts, reducing precipitation, or altering wildfire cycles (BLM 2013a; USGCRP 2018). Climate change models indicate less precipitation may occur from July through August in lower elevation sites; this may favor cheatgrass, which becomes dormant in summer, over native perennials, which depend on summer moisture for growth. Elevated temperatures due to climate change may increase the competitive ability of cheatgrass at higher elevations, expanding its range into sites where it currently is not widespread. Climate change may increase the spread of woody plants such as juniper at higher elevations due to increased precipitation in winter and spring and warmer temperatures, which may increase wildfire risk (BLM 2013a).

Disease Relative to Climate Change

GRSG are highly susceptible to mortality from West Nile virus (*Flavivirus* spp.), the zoonotic disease transmitted by mosquitoes and other anthropods (Clark et al. 2006; Naugle et al. 2004; Clark et al. 2006). Climate change is expected to increase the risk of exposure to West Nile virus because warmer temperatures associated with climate change can lengthen the mosquito breeding season, biting rates, and the incubation of the disease within a mosquito. Climate change may also likely alter GRSG ecology and physiology, as well as the mosquitoes that play a role in disease transmission and maintenance. During periods of drought, which are expected to be more frequent and possibly more intense under climate change, GRSG may also move toward water earlier in the year and, subsequently, come into contact with mosquitoes for longer periods during the transmission season (Naugle et al. 2004). The combined impacts of predicted climate change on sagebrush habitat and West Nile virus transmission are likely to reduce suitable GRSG habitat in the northern Great Plains and northern Rockies (Schrag et al. 2011).

Renewable Energy Development

There has been increasing interest in renewable energy development and many areas that are promising for wind, solar, and geothermal energy development overlap with GRSG habitat (Hanser et al. 2018). There is concern that renewable energy development may have similar negative effects on GRSG habitats and populations as non-renewable energy development (NWCC 2017; Hanser et al. 2018). For example, disturbance associated with existing energy infrastructure and human activity has been linked to reproductive costs incurred by GRSG exposed to diverse energy development. Female GRSG avoided areas where discrete disturbance was high during nesting and brood-rearing, and survival of nests and broods were highest in areas that had the least amount of disturbance. This indicates the importance of minimizing disturbance to maintain viable GRSG populations (Kirol et al. 2020).

Impacts from renewable energy development generally include direct habitat loss and fragmentation due to facilities, access roads, and transmission lines as well as disturbance and habitat avoidance from noise and increased human presence. Solar facilities in particular require a large land area and high water consumption (Hanser et al. 2018). Geothermal power is expanding, and while little is known regarding impacts of geothermal energy on wildlife populations, recent research suggests GRSG are adversely affected. GRSG experienced decreased nest and adult survival near geothermal infrastructure (Coates et al. 2023). Ravens also increased in density around geothermal plants, potentially increasing predation risk to GRSG (Coates et al. 2023).

Research has suggested that the sensitivity of GRSG to wind energy development varies with the life history stage and distance from disturbance (NWCC 2017). Brood site selection and summer habitat selection were both negatively affected by surface disturbance, such as cleared ground related to roads and turbine pads. Females raised broods in habitats with lower densities of turbines and access roads out to 1.2 km from the facility. At a wind facility in Wyoming, lek counts declined more severely near wind infrastructure after a 3- or 5-year time lag and the relative probability of GRSG selecting brood-rearing and summer habitats was negatively correlated with the percentage of surface disturbance associated with the facility infrastructure (LeBeau et al. 2017a, 2017b). Effects of wind infrastructure on lek attendance were weakly evident within 1.5 km from a turbine. However, survival rates were higher on the wind facility site relative to the undisturbed site, possibly due to lower numbers of avian predators (LeBeau et al. 2017b). Further research is needed to increase the understanding of the relationship between wind energy development and GRSG populations.

Wild Horses and Burros

The Wild Free-Roaming Horses and Burros Act of 1971 was created to manage population levels of herds to facilitate and protect "a thriving natural ecological balance" (Coates et al. 2021a). The BLM was tasked to establish appropriate management levels (AMLs) for each herd management area to balance the multiple use and sustained yield mandate (Coates et al. 2021a; BLM 2010). Over the past decade, the population of wild horse and burro populations on public land has greatly increased. When they are found at densities greater than the AML, wild horses can reduce GRSG population trends (Coates et al. 2021a) and demographic rates (Beck et al. 2024). In Nevada, the current population estimate is 46,974 wild horses, which exceeds the BLM's AML upper limit of 11,987 by 367% (Munoz et al. 2021). The estimated population of wild burros in Nevada as of March 1, 2024, on BLM lands is 4,685 (BLM 2024a). The BLM does not manage wild horse and burro grazing like it does for livestock grazing.

Recent research suggests wild horses can directly and indirectly disrupt native wildlife populations within sagebrush ecosystems (Munoz et al. 2021). Wild horse presence causes fragmented and reduced shrub cover, increase soil compaction and erosion, and may contribute to the spread of invasive grasses (Coates et al. 2021a; Munoz et al. 2021; Henning et al. 2021). Wild burros can have grazing and trampling impacts that are similar to wild horses (Carothers et al. 1976; Douglas and Hurst 1993; Hanley and Brady 1977) and can substantially affect riparian habitats (e.g., Tiller 1997) and native wildlife (e.g., Seegmiller and Ohmart 1981). Where wild burros and GRSG co-occur, year-round use by burros in low elevation habitats may lead to a high degree of overlap between burros and GRSG (Beever and Aldridge 2011; Griffin et al. 2019). Wild horses may be a particular threat during the lekking season. Research suggests that male GRSG respond differently when native (pronghorn and mule deer) and non-native (wild horses and cattle) ungulates are on established leks (Munoz et al. 2021). GRSG continue to display at leks when native ungulates are present, but they are not usually detected when non-native ungulates are present (Munoz et al. 2021).

3.2.2 Conditions and Trends within the Planning Area

Population, Abundance, and Trends

Lek count data have been widely used to monitor GRSG population trends and are considered a reasonable index to relative abundance (Reese and Bowyer 2007; Doherty et al. 2010, 2016). Because demographic properties, such as rates of population change, are affected by environmental and intrinsic factors that operate on different spatial and temporal scales (Gurevitch et al. 2016), clustering leks into hierarchical levels can help detect changes in abundance that are more likely driven by demographic rates. Pronounced clustering has been documented in GRSG populations Doherty et al. 2016). This suggests the species is vulnerable to those landscape-level risks that occur in high-density areas because they could negatively affect large proportions of the populations (Doherty et al. 2016).

New research incorporated lek count variation and habitat selection into population estimates to more accurately reflect abundance and changes across different spatial and temporal scales (Baumgardt et al. 2017; Fremgen et al. 2016; Fremgen et al. 2017; McCaffery et al. 2016; Monroe et al. 2016). Coates et al. (2021a) clustered GRSG leks to develop a multi-scale hierarchical population structure that can be used to assess population trends. Estimated trends show 37.0%, 65.2%, and 80.7% declines in abundance rangewide during short (17 years), medium (33 years), and long (53 years) temporal scales, respectively (see **Map 3.1** in **Appendix 1**). However, trends varied spatially, and some areas exhibited evidence of increasing trends in recent decades. In general, population clusters at the periphery of the species range showed higher probabilities of extirpation relative to interior clusters (see **Map 3.2** in **Appendix 1**).

The use of statistical models applied to time series lek count data have also improved the understanding of GRSG population fluctuation. There is substantial variation in how GRSG populations fluctuate across space and through time. Populations in core range (Great Basin and Wyoming Basin) exhibited the most consistent fluctuation but with smaller differences between population highs and lows (Row and Fedy 2017). Trends for marginal populations did not follow expected fluctuations, and large-scale spatial synchrony among populations weakened as fluctuations weakened. Length between fluctuation for most populations also decreased with time.

Genetic Structure and Connectivity

Genetic variation and the dispersal of individuals are necessary to maintain GRSG resilience to current and future environmental and demographic stochasticity and anthropogenic effects. Several studies have used genetic network models to delineate subpopulations, which theoretically represent the core of each distinct genetic group and identify areas of increased importance to GRSG genetic connectivity (Cross et al. 2023; Cross et al. 2018; Oyler-McCance et al. 2022; see **Map 3.3** in **Appendix 1**). Areas outside of subpopulation centers are likely important for maintaining overall connectivity by allowing different genetic groups to converge (Cross et al. 2018; Oyler-McCance et al. 2022). However, subpopulation centers that help maintain genetic diversity, as well as other "hubs" important for connectivity (Cross et al. 2018; Oyler-McCance et al. 2022) were identified as high priority for targeted conservation efforts. Areas outside subpopulation centers are also priorities for conservation to protect areas where different genetic groups converge to maintain overall connectivity. Translocations have been recommended to reestablish and sustain genetic diversity in declining GRSG populations. Low genetic diversity has been shown to be coupled with declining population trends, suggesting relatively high conservation concern.

Gene flow is greater, and genetic differentiation less in areas of contiguous habitat in eastern Montana, most of Wyoming, much of Oregon, Nevada, and parts of Idaho. In contrast, areas of fragmented habitat such as in Utah exhibited the greatest genetic differentiation and lowest effective migration (Oyler-McCance et al. 2022). Migration rates were lower than expected and functional connectivity was constrained in central Wyoming east of the Continental Divide (Row et al. 2018; Oyler-McCance et al. 2022; see **Map 3.5** in **Appendix 1**).

Empirical evidence on the mechanisms governing the exchange of genetic information among populations shows that affinity to breeding leks can inherently restrict gene flow and provide a mechanism for maintaining localized genetic structure (Cross et al. 2016, 2017; Jahner et al. 2016). Additionally, landscape and habitat features, such as terrain ruggedness, may cause dispersing GRSG to avoid certain areas and affect connectivity between populations (Row et al. 2018). However, increased habitat suitability, especially during nesting and winter periods, decreased anthropogenic effects on the landscapes, and increased landscape connectivity can facilitate higher rates of gene flow that are important for population persistence (Cross et al. 2017; Jahner et al. 2016; Knick et al. 2013; Row et al. 2015, 2016). Research suggests minimum thresholds for sagebrush land cover across the landscape for GRSG persistence. One study showed 90% of active leks occurred on landscapes that were at least 40% dominated by sagebrush, while others have shown 25% to 30% sagebrush within 18- and 30-km scales (Aldridge et al. 2008; Wisdom et al. 2011). The rangewide map of habitat and genetic connectivity indicates areas that are important to genetic exchange and population persistence (see **Map 3.4** in **Appendix 1**).

Habitat Conditions and Trends

The distribution of GRSG is closely aligned with the distribution of sagebrush-dominated landscapes (Schroeder et al. 2004), and occupancy is associated with measures of sagebrush abundance and distribution.

Sagebrush area (percentage of 18-km radius composed of sagebrush cover types) was the single best discriminator between occupied and extirpated ranges among 22 variables evaluated by Wisdom et al. (2011). Across the planning area, sagebrush vegetation communities still occur on approximately 109,131,000 acres (**Table 3-2**, Vegetation Communities within GRSG HMAs by State in **Appendix 9**).

Existing Habitat Management Areas

Currently, the BLM delineates GRSG habitat into management areas to help prioritize habitat and conservation activities while providing management flexibility. GRSG habitat management areas (HMAs) were identified during previous land use plan amendments based on considerations of GRSG occupancy, landscape, habitat and land use/adaptive management opportunities as described below. HMAs have been revised in some instances through plan maintenance actions.

Priority Habitat Management Areas (PHMAs) are considered those areas with the highest value for maintaining sustainable GRSG populations. Management within PHMAs is the most restrictive, designed to promote GRSG conservation. Sagebrush Focal Areas (SFAs), as defined in the 2015 plans are "Areas identified by the USFWS that represent recognized "strongholds" for GRSG that have been noted and referenced by the conservation community as having the highest densities of GRSG and other criteria important for the persistence of GRSG." Remaining suitable habitat are designated as General Habitat Management Areas (GHMAs), which are either occupied seasonally or provide year-round habitat where some special management would apply. The GHMA designation is the least restrictive due to generally lower occupancy of GRSG and more marginal habitat conditions.

The 2015 Resource Management Plan (RMP) Amendments for several states include additional habitat management area categories. These are described further in Appendix 3 and the corresponding management for these other HMA categories is discussed in the previous RMPAs.

All states except Montana and the Dakotas adjusted their HMA boundaries in the 2019 RMP amendments. Idaho, Nevada/California, Wyoming and Utah also removed SFAs through the 2019 efforts.

Habitat Assessment Framework

The Habitat Assessment Framework (HAF, Stiver et al. 2015) provides a multiple-scale, GRSG habitat assessment tool that can be easily integrated into the BLM landscape monitoring approach. The HAF established indicators to determine the status of sage-grouse habitat needs at multiple scales and for seasonal habitats. The results of these assessments provide necessary information to evaluate whether the BLM managed lands are meeting the sage-grouse land health habitat standard.

GRSG occupy large geographic extents and experience a high degree of spatial heterogeneity in biotic and abiotic variables across their range (Doherty et al. 2016; Coates et al. 2021b). The general condition and trend of habitats on BLM-administered lands varies by geographic area within the region and is a result of various threats that are currently occurring or have occurred historically. The HAF was established to account for this variation and describes habitat suitability at different spatial scales (Stiver et al. 2015). The orders of habitat selection are hierarchical, in which each higher order is dependent on the previous order (Johnson 1980; Stiver et al. 2015):

- First-order (broad-scale): The physical or geographical range of a species (Johnson 1980). GRSG range is defined by populations of GRSG associated with sagebrush landscapes (Connelly et al. 2003).
- Second-order (mid-scale): Population areas; dispersal between subpopulations. These may include as many as 39 discrete populations (USFWS 2013).

- Third-order (fine-scale): Home range of isolated populations, subpopulations, or an individual, which is determined in part by the quality and the comparison of resources within and between seasonal habitats. Relevant ecological processes are those that may affect movements between seasonal habitats within a home range.
- Fourth-order (site-scale): The use of a particular nesting, feeding, or roosting site within one particular seasonal habitat. Ecological processes consider seasonal habitat needs related to the life requisites of shelter, food, and breeding.

Space is a significant life requisite for GRSG at all scales – pathways for movement within and between populations are critical for maintaining population viability, while access to well-connected sagebrush patches that provide dispersal and movement among subpopulations is essential for GRSG population viability and long-term persistence. At the fine scale, habitat availability, security, and connectivity within home ranges are important for securing seasonal movements to shelter and food needs. Shelter and food availability at the site-scale directly affects individual fitness, survival, and reproductive potential (Stiver et al. 2015).

The GRSG mid-scale HAF areas are shown in **Map 3.6** in **Appendix 1**, and the fine-scale HAF areas are shown in **Map 3.7** in **Appendix 1**.

Sagebrush Ecological Integrity

Advances in research have built upon the emerging understanding of the importance of multiscale habitat selection (Johnson 1980) and how landscape context affects GRSG habitat selection, survival, and population persistence (Aldridge and Boyce 2007; Aldridge et al. 2008; Doherty et al. 2008; Connelly et al. 2011b; Wisdom et al. 2011; Knick et al. 2013; Doherty et al. 2016; Coates et al. 2021a). This work has identified the need for large intact sagebrush landscapes with minimal disturbance that provide all seasonal components required to meet GRSG life history needs. Geographical patterns in sagebrush ecological integrity were positively linked to GRSG population performance (Doherty et al. 2022a). Therefore, conservation actions in those areas identified as having high sagebrush ecological integrity may be most beneficial.

Probability of Breeding Habitat and Lek Persistence

Breeding habitat is highly condensed within GRSG occupied range and comprises 26% of the current range (see **Map 3.8** in **Appendix 1**). General habitat variables and climatic gradient variables were more important than disturbance variables in predicting occupied breeding habitat across the species' range. However, human disturbance resulted in the sharpest probability distribution declines once identified thresholds were crossed (Doherty et al. 2016). GRSG response to sagebrush varies across the range with strong selection for landscape-level sagebrush and a strong avoidance of tree cover. Thresholds of disturbance factors (i.e., tillage, conifer, human disturbance index) also varied across the range (Doherty et al. 2016).

Rangewide lek persistence was modeled as a function of environmental covariates, including sagebrush cover, pinyon-juniper cover, topography, precipitation, point and line disturbance densities, and landscape configuration metrics (Wann et al. 2023). Five of these covariates showed significant regionally varying responses: sagebrush clumpiness (a measure of habitat aggregation), pinyon-juniper cover, point disturbance of anthropogenic features such as energy infrastructure and communication towers, elevation, and a topographic index associated with mesic habitats. The highest quality habitat (capturing 50% of active leks) was estimated as covering 25.5% of the occupied range, while the combined lowest through highest quality habitats (capturing 95% of active leks) covered 65.0% (see **Map 3.9** in **Appendix 1**). These results suggest that habitat management planning should consider regional environmental differences in addition to broader-scale habitat requirements (Wann et al. 2023).

3.3 VEGETATION

Vegetation provides many ecosystem services, including, but not limited to, stabilizing soils, preventing erosion, absorbing carbon dioxide, releasing oxygen, increasing species diversity, and providing habitat and food for animals and products for human use. Many land management policies are directed toward maintenance of healthy vegetation communities (Fattet et al. 2011; Yapp et al. 2010; Lawler et al. 2014).

Landscape Monitoring Framework (LMF) and field office collected Assessment, Inventory, and Monitoring (AIM) data provide estimates for consistent contextual information about habitat conditions (Herren et al. 2021). AIM data represent one of the largest available datasets to inform resource management decisions on BLM lands. The LMF is a component of the AIM strategy and is used to assess and monitor renewable resources on BLM-administered rangelands in 13 western states (Arizona, California, Colorado, Idaho, Montana, Nevada, New Mexico, North Dakota, Oregon, South Dakota, Utah, Washington, and Wyoming). LMF and AIM would be used to evaluate whether quantitative habitat objectives are met within seasonal habitats within HMAs.

GRSG rely on sagebrush ecosystems for all aspects of their life cycle. Typically, a range of sagebrush community composition within the landscape (including variations in sub-species composition, co-dominant vegetation, shrub cover, herbaceous cover, and stand age), along with the use of riparian and wet meadow areas, is needed to meet seasonal requirements for food, cover, nesting, and wintering habitats. Since GRSG require large landscapes, the ecology, management, and conservation of large, intact sagebrush ecosystems goes hand-in-hand with managing for the dynamics and behaviors of the populations themselves (Connelly et al. 2004; Crawford et al. 2004). Intact sagebrush does not imply uniform coverage of sagebrush across the ecosystem, but a mosaic of shrub, grassland, and riparian cover across the landscape that allows for migration of GRSG between seasonal habitats (Connelly et al. 2011b). In addition, riparian and wetland areas provide important seasonal habitat, water, and forage for GRSG. See section 3.2.1 *Life History and Habitat Characteristics* for an in-depth discussion of GRSG habitat characteristics and requirements.

Historically, sagebrush-dominated vegetation was one of the most widespread habitat types in the US, but its expanse has been fragmented, lost, or altered by invasive plant species and anthropogenic disturbance (NTT 2011). Current protection of GRSG habitat involves restrictions and limitations on activities that contribute to the spread of invasive plant species, wildfire, and habitat fragmentation, reducing other surface disturbances, and management of vegetation to promote healthy sagebrush and understory vegetation to support GRSG. Some habitat loss associated with energy development, infrastructure, wildfire, and invasive plants will likely continue into the future.

There are two main sagebrush dominant vegetation communities: sagebrush steppe and sagebrush shrublands (Kuchler 1970). The sagebrush steppe resembles a semiarid grassland and is characterized by a mosaic of perennial bunchgrasses and forbs with sagebrush shrubs. Sagebrush shrubland resembles more of an arid, desert ecosystem with fewer grasses and forbs and sagebrush dominates (Arizona 2023). The open density, erosive soils, and low herbaceous cover of the sagebrush shrubland type contribute to the vulnerability of this sagebrush type to plant invasions (Barbour and Billings 2000).

Within both the sagebrush steppe and sagebrush shrubland types there are several different community types. The dominant vegetation community types are calculated and presented in acres by state within HMAs (**Table 3-2 [Appendix 9]**), **Map 3.12 [Appendix 1]**).

Table 3-2 (**Appendix 9**) and **Map 3.12** (**Appendix 1**) presents LANDFIRE Existing Vegetation Type (EVT) acres, which captures a number of different sagebrush, sagebrush-associated, and non-sagebrush communities. Several representative vegetation community types within each of those three categories are discussed below, but LANDFIRE EVT includes more communities included in the numbers above.

3.3.1 Representative Sagebrush Vegetation Communities

Wyoming Big Sagebrush/Grassland

The Wyoming big sagebrush (*Artemisia tridentata* spp. *wyomingensis*)/grassland occurs in shallow-to-moderately deep soil at lower elevations, giving way to basin big sagebrush (*Artemisia tridentata* spp. *tridentata*) in deeper soils and to mountain big sagebrush (*Artemisia tridentata* spp. *vaseyana*) above 6,500 feet in elevation and within the 9- to 16-inch annual precipitation zones (Knight 1994). Shrub height varies from as little as six inches on shallow sites to around 30 inches in deeper soils. Canopy cover is usually under 30% which is generally lower than observed in either basin or mountain big sagebrush.

Wyoming big sagebrush often appears as the dominant plant in mosaic communities intermixed with Gardner saltbush (*Atriplex gardneri*) and open grasslands. In shallow, rocky-to-gravelly soils, Wyoming big sagebrush may co-dominate with black sagebrush (*Artemisia nova*), green rabbitbrush (*Chrysothamnus viscidiflorus*), and sometimes winterfat (*Krascheninnikovia lanata*). Grass and forb species vary depending on soil texture, aspect, and slope (Knight 1994). Common grass and grass-like species include bluebunch wheatgrass (*Pseudoroegneria spicata*) and thickspike wheatgrass (*Elymus lanceolatus*), Sandberg bluegrass (*Poa secunda sandbergii*), mutton bluegrass (*Poa fendleriana*), Indian ricegrass (*Achnatherum hymenoides*), needle-and-thread (*Hesperostipa comata*), threadleaf sedge (*Carex filifolia*), and bottlebrush squirrel tail (*Elymus elymoides*). Common forbs include phlox (*Phlox spp.),* Hooker sandwort (*Arenaria hookeri*), onion (*Allium* spp.), goldenweed (*Pyrrocoma* spp.), sego lily (*Calochortus nuttallii*), buckwheat (*Eriogonum* spp.) penstemon (*Penstemon* spp.), Indian paintbrush (*Castilleja* spp.), globemallow (*Sphaeralcea* spp.), and prickly-pear cactus (*Opuntia* spp.).

Basin Big Sagebrush Shrubland

Basin big sagebrush shrubland is found in moderately deep-to-deep soils of all soil textures, in zones of ten to 16 inches of annual precipitation (Beetle 1960). It occurs as pockets within Wyoming big sagebrush and Gardner saltbush communities, as the dominant plant type along valley bottoms and canyons, and along ephemeral washes. This subspecies of big sagebrush may reach 12 feet in height, with canopy cover reaching 70%.

Basin big sagebrush mixes with serviceberry *(Amelanchier spp.),* green and rubber rabbitbrush (*Ericameria nauseosa*), snowberry (*Symphoricarpos* spp.), bitterbrush (*Purshia tridentata*), silver sagebrush (*Artemisia cana*), and mountain mahogany (*Cercocarpus* spp.), depending on the soil depth, annual precipitation, and elevation. Grasses occurring in these communities include basin wildrye (*Leymus cinereus*), green needlegrass (*Nassella viridula*), Idaho fescue (*Festuca idahoensis*), thickspike wheatgrass, Kentucky bluegrass (*Poa pratensis*) and mutton bluegrass, and bottlebrush squirrel tail. Common forbs include bluebell (*Mertensia* spp.), groundsel (*Senecio vulgaris*), onion, violet (*Viola* spp.), buttercup (*Ranunculus spp.*), sagebrush false dandelion (*Nothocalais troximoides*), buckwheat, penstemon, Indian paintbrush, lupine (*Lupinus* spp.), locoweed (*Oxytropis* spp.), *Agoseris* spp., and prickly-pear cactus (Decker et al. 2020).

Basin big sagebrush can provide important cover and habitat for wildlife species. In some areas it also provides critical winter habitat for GRSG when snow covers most other shrubs. Basin big sagebrush increases in density and cover as the dominant plant species, and to even a greater degree when associated with poor livestock management and/or interruptions in the wildfire cycle. The natural wildfire recurrence interval in the sagebrush type is approximately 30 to 75 years.

Mountain Big Sagebrush/Grassland

Mountain big sagebrush is located in shallow or moderately deep soils at elevations above 6,500 feet, in 9- to 20-inch annual precipitation zones (Innes and Zouhar 2018). This is one of the largest homogeneous communities of this sagebrush type in the United States. Mountain big sagebrush also occurs as smaller plant communities at the lower mountain elevations, intermixed with aspen (*Populus* spp.) and conifer woodlands. Shrub height will vary from eight to 60 inches, with canopy cover reaching 50% to 60%.

Mountain big sagebrush is usually the dominant shrub in foothill and mountain sage communities, with bitterbrush, serviceberry, snowberry, and mountain mahogany providing subdominant brush diversity. Grasses include Idaho fescue, king spike fescue (*Leucopoa kingii*), needlegrass (*Achnatherum* spp.), muttongrass, and Kentucky and big bluegrass; elk sedge (*Carex geyeri*), and Ross' sedge (*C. rossii*). Common forbs found in these areas include Indian paintbrush, phlox, balsamroot (*Balsamorhiza* spp.), locoweed, lupine, larkspur (*Delphinium* spp.), penstemon, hawksbeard (*Crepis* spp.), and Oregon grape (*Mahonia aquifolium*) (MTNHP 2024).

Mountain big sagebrush is limited as a food source for GRSG during the winter when these habitats become unavailable because of snow.

Silver Sagebrush/Grasslands

Silver sagebrush/grasslands have two subtypes with very different habitats. The most common is found in deep sandy soils and consists of silver sage as the dominant species. It is associated with basin big sagebrush, green rabbitbrush, serviceberry, chokecherry (*Prunus* spp.), and wood rose (*Rosa woodsii*). Herbaceous species include needle-and-thread, Indian ricegrass, poverty oatgrass (*Danthonia spicata*), sand dropseed (*Sporobolus cryptandrus*), scurfpea (*Pediomelum* spp.), and prickly-pear cactus.

A second type of silver sagebrush is located in riparian habitat along streams above the wet sedge and willow riparian zone. This second riparian terrace is also habitat for basin wildrye, Kentucky bluegrass, streambank wheatgrass (*Elymus lanceolatus psammophilus*), redtop (*Agrostis gigantea*), Baltic rush (*Juncus balticus*), clover (*Trifolium* spp.), checkermallow (*Sidalcea malviflora*), malva (*Malva sylvestris*), and, occasionally, cottonwood (*Populus* spp.) and willow (*Salix* spp.).

Low Sages—Alkali, Birdsfoot, Black, and Wyoming Three-Tip Sagebrush/Grassland

Alkali sagebrush (*Artemisia arbuscula longiloba*) is found growing in clay soils and can withstand soils of higher alkalinity than can other sagebrush species (Beetle and Johnson 1982; Knight 1994). It reaches six to 12 inches in height and occurs in relatively pure communities because of the high clay content and high cation exchange capacity in the soils in areas below 7,500 feet in elevation. Understory grasses include bluebunch wheatgrass, western wheatgrass (*Pascopyrum smithii*), mutton bluegrass, bottlebrush squirreltail, and Indian ricegrass. Forbs noted at this site include wild buckwheat (*Eriogonum ovalifolium*), biscuit root (*Lomatium* spp.), and wild onion.

Birdsfoot sagebrush (*Artemisia pedatifida*) is found in alkaline soils, where pH ranges from 8.5 to 11, and below 7,500 feet. It is a mat species, reaching only three to six inches in height. At lower pH levels, birdsfoot sage mixes with Gardner saltbush, and it appears with a mixture of grasses and forbs on windswept ridges and hills. At higher pH levels, birdsfoot sagebrush occurs as a monoculture.

Black sagebrush occurs on gravelly-to-rocky soils that have a "shallow effective" rooting depth (less than 15 inches) and various textures from sandy loams to clay loams. As a result, plant heights may vary between four and 12 inches. On the plains north of the Ferris and Seminoe Mountains, it is the principal shrub present, but it will often be intermixed with Wyoming big sagebrush. Above 7,400 feet, it gives way to Wyoming three-tip sagebrush. It also has been observed as an understory shrub in true mountain mahogany stands. On sandy sites, it is commonly found with needle-and-thread, threadleaf sedge, Junegrass (*Koeleria macrantha*), sandwort, and buckwheat, whereas on loamy soils it will occur with wheatgrasses, bluegrasses, Indian ricegrass, phlox, onion, paintbrush, and penstemon.

Wyoming three-tip sagebrush (*Artemisia tripartita*) occurs above 7,000 feet in the foothills and at the higher elevations of the mountain ranges. It normally grows between four inches and 15 inches tall in moderately deep, well-drained soils (Beetle and Johnson 1982). It is often found intermixed with mountain big sagebrush and black sagebrush. Understory grasses and forbs include Idaho fescue, king spike fescue, Columbia needlegrass, elk sedge, Ross' sedge, Indian paintbrush, prairie clover (*Dalea* spp.), larkspur, balsamroot, phlox, and buckwheat. Wyoming three-tip sagebrush-dominated areas are often used as forage for wildlife.

3.3.2 Representative Sagebrush-Associated Vegetation Communities

Sagebrush-Associated Vegetation Communities are typically grasses and forbs species in shrub-dominated overstories and grass/forb-dominated understories that vary with geographic location, topography, soil, elevation, and climate throughout sagebrush ecosystems. Sagebrush steppe and shrublands vegetation follow a gradient of temperatures and moistures that may have perennial herbaceous species dominate or be co-dominant with sagebrush, depending on the last wildfire, insect outbreak, or climatic changes. (Arizona 2023).

Inter-Mountain Basins Mixed Salt Desert Scrub

Inter-mountain basins mixed salt desert scrub contains soils that are shallow to moderately deep, poorly developed, and often alkaline or saline. Salt desert shrubland is perhaps the most arid vegetation type in the intermountain West (Knight 1994). Gardner saltbush (*Atriplex gardneri*) dominates the salt desert shrub community type and in some instances occurs as up to 90% of the vegetation cover. Gardner saltbush normally grows no higher than 12 inches and may grow along the ground, forming a mat. These areas are characterized by accumulations of salt in poorly developed soils. Soils of these areas usually have a pH of 7.8 to 9, which restricts the uptake of water by all but the most salt-tolerant plants (halophytes). Soil textures can be sandy loam, sandy clay loam, or loam and clay. Salt desert shrublands occur at elevations between 5,000 and 7,600 feet within the lowest precipitation areas in the planning area (Arizona 2023). These areas are typically flat or rolling hills.

Rocky Mountain Gambel Oak-Mixed Montane Shrubland

The Rocky Mountain Gambel oak-mixed montane shrubland occurs in mountains, plateaus and foothills of the southern Rocky Mountains and Colorado Plateau, including the Uinta and Wasatch ranges and the Mogollon Rim. These shrublands are most commonly found along dry foothills, lower mountain slopes, and at the edge of the western Great Plains from approximately 6600 to 9500 ft in elevation and are often situated above pinyon-juniper woodlands (NatureServe 2022). Vegetation types in this system may occur as sparse to dense shrublands composed of moderate to tall shrubs. In many situations of this system, the canopy is dominated by the broad-leaved deciduous shrub Gambel oak (*Quercus gambelii*), which occasionally reaches small tree size. Climate is semi-arid and characterized by mostly hot-dry summers with mild to cold winters and annual precipitation of 10 to 25 inches (Natureserve 2022).

Northwestern Great Plains Mixed Grass Prairie

Mixed-grass prairie is characterized by needle-and-thread (*Hesperostipa comata*), western wheatgrass (*Pascopyrum smithii*), blue grama (*Bouteloua gracilis*), Sandberg bluegrass (*Poa secunda*), threadleaf sedge (*Carex filifolia*), needleleaf sedge (*Carex duriuscula*), prairie junegrass (*Koeleria macrantha*), Indian ricegrass (*Achnatherum hymenoides*), prickly-pear cactus (*Opuntia* spp.), globemallow (*Sphaeralcea* spp.), fringed sagebrush (*Artemisia frigida*), sand dropseed (*Sporobolus cryptandrus*), threeawn (*Aristida purpurea*), little bluestem (*Schizachyrium scoparium*), and various species of milkvetch (*Astragalus* spp.) and locoweed (*Oxytropis* spp.). Summers in this area are cool, reducing evapotranspiration. Frequent thunderstorms in July and August maintain this grassland.

3.3.3 Nonsagebrush Vegetation Communities

Nonsagebrush communities are typically grasses and forbs species in pinyon-juniper dominated overstories and grass/forb-dominated understories that vary with geographic location, topography, soil, elevation, and climate throughout sagebrush ecosystems.

Pinyon-Juniper

Pinyon-juniper woodlands occupy dry woodland sites and grow on foothills, low mountains, mesas, and plateaus, depending on precipitation and soil conditions. These areas typically include portions of black sagebrush and Wyoming big sagebrush communities occupying the cooler and moister end of their range. It also includes cool and moist mountain big sagebrush and low sagebrush (*Artemisia arbuscula*) communities with moderately deep soils (Miller et al. 2013).

Plant species present in these areas vary widely. Typically, juniper dominates at lower elevations, and pinyon dominates at higher elevations. Pinyon-juniper woodlands are similar to semiarid communities where water and soil retention or losses are governed by structure, amount and cover of vegetation, inherent soil and topographic attributes, and climate. These semiarid woodlands occupy precipitation zones between 8 and 20 inches, elevations of less than 1,000 to over 8,000 feet, and a wide variety of soils and parent materials (Miller et al. 2019). In general, pinyon-juniper communities do not provide suitable habitat for GRSG, and further, mature trees displace shrubs, grasses, and forbs through direct competition for resources that are important components of GRSG habitat (Manier et al. 2013).

Pinyon-juniper woodlands naturally spread into sagebrush and perennial grass communities and have expanded across the landscape over the last 120 years (Miller et al. 2008; Rowland et al. 2008). Expansion has been greatest in cooler and/or moister portions of the landscape (Miller et al. 2013, Johnson and Miller 2006; Weisberg et al. 2007). Expansion largely coincides with soil temperature and moisture regimes that are cool to warm and moist, to cool and moist. Three phases of juniper succession are identified by Miller (2005). In Phase I, juvenile trees are present on site, with an occasional mature, seed-producing tree present, but shrub and herbaceous vegetation still maintain dominance of ecological processes (hydraulic, nutrient, and energy cycles). As juniper saplings develop in Phase I, GRSG use declines rapidly. In Phase II, trees are established on site and contribute an equal influence on ecological processes along with shrub and herbaceous species. Trees are increased in size and density in this phase. In Phase III trees have established dominance on the site and are the primary plant group influencing ecological processes. The expansion of pinyon-juniper communities has been attributed to the reduced role of wildfire, introduction of livestock grazing, increases in global carbon dioxide concentrations, climate change, and natural recovery from past disturbance (USFWS 2010a).

Map 3.13[1] (**Appendix 1)** shows PHMA and GHMA acreage found within the percentage of the project area that is covered by conifer species in the states of California, Colorado, Idaho, Montana, Nevada, Oregon, Utah, and Wyoming.

Riparian and Wetlands
Riparian vegetation includes plants requiring higher amounts of available water than those found in adjacent upland areas and are generally associated with water courses and wet meadow areas (Decker et al. 2020). Riparian areas, wetlands, and wet meadows provide valuable GRSG late summer brood rearing habitat because these areas provide succulent forbs and insects later in the summer when most forbs in upland habitats have dried out and are senescent (Connelly et al. 2011b). These communities make up a small percentage of the vegetation in relation to other types but are important in providing seasonal habitats.

Invasive Annual Grasses
All invasive plant species adversely affect GRSG habitat quality by competing with and displacing native species (Dardis et al. 2016). Invasive annual grasses are the most problematic due to the expense and low success rate in restoration and the dramatic shortening of wildfire frequencies where these grasses dominate. Invasive plants were present on nearly 70% of GRSG habitat in 2018 (Herren et al. 2021).

Cheatgrass and medusahead are the two most aggressive non-native invasive species found in the planning area and comprise about 15% of vegetation on average (Herren et al. 2021). These species are prolific seed producers and can out-compete native plants for valuable resources such as water and nutrients. These grasses germinate in the fall and early spring and are adapted to thrive in low moisture conditions (Tilley 2023). Throughout the west, the number and size of infestations have increased in size and density over the last 20 years.

Cheatgrass is usually matured and cured by early to mid-June, while most native herbaceous species cure in late July and early August. In areas where cheatgrass has replaced native species, earlier and more frequent wildfire can occur, causing further damage to native plant species. With an increased wildfire frequency, conversion to annual grasslands is likely and an increase in other invasive species such as Russian-thistle (*Salsola* spp.) and rush skeletonweed (*Condrilla juncea*), can replace native plants in previously sagebrush dominated ecosystems.

The invasive annual grass ventenata, including North Africa grass (*Ventenata dubia*), is an emerging concern that is spreading quickly through the planning area. Ventenata differs from cheatgrass in that it prefers wetter conditions (Scheinost et al. 2008). Ventenata is beginning to replace perennial grasses and forbs along roadsides and in hay, pasture, rangeland, and fields in the western U.S. It has minimal forage value for wildlife and may cause the soil to be more prone to erosion. Over time, infestations of ventenata will cause a decline of productivity and land value (Scheinost et al. 2008).

3.3.4 Climate
As described in **Section 3.2.1**, Species Background, *Threats*, changing trends in temperature, precipitation, and atmospheric CO_2 over the past century have resulted in changes in the composition and availability of sagebrush. Climate change scenarios for the sagebrush region predict a decline in sagebrush communities across most of its range, although some increases were projected in Wyoming, the Northern Great Basin, and eastern Montana (Rigge et al. 2021c). Changing environmental conditions may also favor invasive species (e.g., cheatgrass) expansions and result in increased wildfire sizes and frequencies. In addition, climate change

[1] The Falkowski et al. 2017 data used to create **Map 3.13** does not cover the entire planning area.

may exacerbate the expansion of woody vegetation (e.g., pinyon (*Pinus* spp.) and juniper (*Juniperus* spp.)) into sagebrush communities (Shriver et al. 2022).

3.4 WILDLAND FIRE ECOLOGY AND MANAGEMENT

Wildfires played an important role historically in creating a mosaic of areas of herbaceous species and mature sagebrush. However, human influences have changed wildfire return intervals, altering their historical ranges of variability. Human factors include wildfire ignitions, wildfire suppression, grazing management, and invasive annual grass expansion, which alters the fuel composition. Sagebrush ecosystems have among the most altered wildfire regimes due to these factors (Shinneman et al. 2018).

3.4.1 Role of Wildfire in Sagebrush Vegetation Communities

Wildfire is an important component and functional natural disturbance of all sagebrush-dominated plant communities. Depending on the nature of the site, the wildfire return interval can be between 33 and 130 years (Innes 2019). Historic wildfire seasons in sagebrush communities usually occur between July and September, with the most extreme wildfire conditions being in August (Bunting et al. 1994). Wildfire can be particularly damaging to sagebrush ecosystems. Big sagebrush does not resprout after a wildfire but is replenished by wind-dispersed seed from adjacent unburned stands or seeds in the soil. Depending on the species and the size of a burn, sagebrush can reestablish itself within five years of a burn, but a return to a full pre-burn community cover can take 15 to 30 years or longer (Manier et al. 2013).

Following wildfire, mountain big sagebrush reestablishes as the dominant species more quickly than do other sagebrush types, often resuming dense canopy cover after approximately 40 years. Immediately after wildfire, perennial grasses, forbs, and sprouting shrub species dominate for up to 20 years (Innes and Zouhar 2018). The natural wildfire recurrence interval in this sagebrush type is approximately 25 to 75 years. Reduced wildfire frequency in mountain big sagebrush types has allowed for the encroachment of conifer species such as lodgepole pine (*Pinus contorta*) and Douglas-fir (*Pseudotsuga menziesii*).

In contrast to big sagebrush, silver sagebrush readily resprouts following wildfire, which facilitates post-fire recovery and potential use of prescribed fire as a management tool under favorable spring moisture conditions (White and Currie 1983; Howard 2002). However, any disturbance in the silver sagebrush community may result in less desirable species increasing in prevalence due to the transition of soil types or low-moisture regime. Black sagebrush sites rarely burn, probably because of the low production and shrub cover these sites support. Wyoming three-tip sagebrush (*Artemisia tripartita*) does burn, but because of a lack of fuel continuity, large, resource-damaging wildfires are rare.

3.4.2 Invasive Annual Grasses

Increasing exotic annual grasses, primarily cheatgrass, are resulting in sagebrush loss and degradation (USFWS 2010a). Cheatgrass can more easily invade and create its own feedback loop in areas that are dry with understory vegetation cover that is not substantial or that are experiencing surface disturbance, such as road construction. Cheatgrass facilitates short wildfire return intervals by outcompeting native herbaceous vegetation with early germination, early moisture and nutrient uptake, prolific seed production, and early senescence (Hulbert 1955; Mack and Pyke 1983; Pellant 1996). By providing a dry, fine fuel source during the peak of wildfire season, cheatgrass increases the likelihood of wildfire and thus increases the likelihood of further cheatgrass spread (Pellant 1990; Pellant 1996). By reducing the spread of cheatgrass and restoring native vegetation communities, the frequency and intensity of wildfires would be reduced. Without wildfire, cheatgrass dominance can exclude sagebrush seedlings from establishing. With wildfire, areas can be converted to annual grasslands.

Wyoming big sagebrush communities are one of the most susceptible to cheatgrass invasion (Bunting et al. 1987; Miller and Eddleman 2000; Schlatterer 1972) and tend to be most susceptible to wildfire compared to the other big sagebrush subspecies (Tisdale 1994). Cheatgrass introduction to the big sagebrush ecosystem has increased wildfire frequency about 12 to 22 times (Whisenant 1990). Recent research found that invasive annual grasses are also capable of substantial spreading in the absence of wildfire (Smith et al. 2023).

Another invasive annual grass, ventenata, tends to dry out earlier than associated perennial grasses and remains highly flammable throughout the wildfire season. Ventenata invasion can increase fine fuel loads and continuity by establishing in typically bare interspaces between shrubs and perennial grasses, increasing the risk of wildfire spread in areas that historically had discontinuous fuels. Models suggest that ventenata invasion can increase wildfire severity, annual area burned, wildfire intensity, and burn probability. Similar to cheatgrass, a grass wildfire cycle may establish in some communities invaded by ventenata, such as sagebrush steppe (Innes 2022).

3.4.3 Climate

Changing climatic conditions have resulted in higher temperatures and more severe droughts, which have led to longer wildfire seasons and larger, more frequent wildfires in the western U.S. (Jolly et al. 2015; Dennison et al. 2014). More wildfires facilitate the spread of invasive annuals, which results in a positive feedback cycle between wildfire and grasses (D'Antonio and Vitousek 1992). Further, potential climatic shifts may enhance the spread of invasive annuals such as cheatgrass into resistant ecosystems (Bradley et al. 2016). The combined interactions of invasive plant species, uncharacteristic wildfire events, and climate change will likely continue to change sagebrush communities (USGCRP 2018).

3.4.4 Resistance and Resilience

The condition of sagebrush vegetation within HMAs can be assessed on the concepts of resistance and resilience (Chambers et al. 2014a, 2014b). Resistance relates to a vegetation community's ability to retain its structure, processes, and function when exposed to stresses, disturbances, or invasive species. Resilience relates to a vegetation community's capacity to regain its structure, processes, and functioning after disturbance, such as wildfire (Chambers et al. 2014a, 2014b). At sites in higher elevations with higher precipitation levels and soil moisture content, sagebrush steppe vegetation is more resistant to cheatgrass invasions and wildfires and more resilient to disturbances (Chambers et al. 2014b). Sagebrush shrublands occur at lower elevations and are more arid, resembling deserts with open shrub density, erosive soils, and low herbaceous cover, contributing to the vulnerability for annual plant invasions.

Vegetation types were analyzed by state to determine the acres of HMAs consisting of sagebrush steppe and sagebrush shrubland and their levels of resistance to disturbances. These levels of resistance to disturbances range from high and medium-high, medium, medium-low, and low, with additional acreage for areas not analyzed in the HMA. Not all acres within HMAs were analyzed by Chambers et al. (2023) and they are noted in a column as such.

3.4.5 Wildfire Occurrence and Risk

Susceptibility to wildfire occurrence, which results from fuel loading, vegetation characteristics, or as a natural condition of the environment (for example, drought). The introduction of invasive grasses such as cheatgrass and the expansion of pinyon-juniper into sagebrush systems have resulted in changes in the frequency, size, and severity of wildfires in some communities. Low-elevation Wyoming sagebrush communities in sagebrush shrublands have been especially susceptible to such changes due to their low resistance to disturbances. Acres burned in areas with low resistance and resilience may not recover after larger wildfires and could be dominated by invasive annuals, resulting in a loss of habitat functions for GRSG. **Figure 3.1** (**Appendix 9**) and **Map 3.14** (**Appendix 1**) show the acres of mapped occupied GRSG habitat between PHMA and GHMA that have burned since 2012 (regardless of land ownership) and between 2012 to 2021 throughout the states of Wyoming, Montana, North Dakota, South Dakota, Idaho, California, Nevada, Colorado, Oregon, and Utah.

The data for **Figure 3.2** (**Appendix 9**) were sourced from the National Interagency Fire Center (NIFC) 2023 GIS data regarding acres burned in HMA boundaries. In **Figure 3.2** (**Appendix 9**) acres burned were analyzed by year of total acres burned in PHMA and GHMA boundaries between all states. In both PHMAs and GHMAs, 2012 experienced the most significant impact with 1,500,500 acres burned for PHMA and 949,900 acres for GHMA. In 2013, there was a sharp drop in acres burned with 90,400 acres in PHMA and 304,900 acres in GHMA impacted by wildfire.

3.5 Fish and Wildlife

A wide variety of fish and wildlife occur within the planning area. Species distributions are influenced by vegetation, cover, elevation, soil, and other factors. Some species have similar habitat requirements as GRSG while others overlap in distribution but require different habitats. A high-level summary of the types of species that may occur in the planning area is presented below but should not be considered a complete list.

3.5.1 Ungulates

Primary ungulate species found in the planning area include elk (*Cervus canadensis*), mule deer (*Odocoileus hemionus*), white-tailed deer (*Odocoileus virginianus*), and pronghorn (*Antilocapra americana*). Moose (*Alces alces*), bighorn sheep (*Ovis canadensis*), and bison (*Bison bison*), also occur in lower numbers throughout the planning area. These ungulate species are supported by the diversity of habitat and availability of essential resources throughout the planning area. For most ungulate species in the planning area, habitat management challenges include habitat degradation (particularly browse forage), habitat fragmentation, and loss, invasive annual grasses, impairment of migratory and other seasonal movements by incompatible fences (e.g., excessive wire heights, spacings, wire type, net wire, etc.), incompatible land use practices (land conversion, industrial activities, and intensive recreational activities), incompatible stock management (domestic sheep grazing in or near bighorn sheep habitat that can spread disease to bighorn sheep), and impacts from human disturbance during sensitive periods and barriers to animal movement.

The BLM's Instruction Memorandum 2023-005, Habitat Connectivity on Public Lands, ensure habitat connectivity, permeability and resilience is restored, maintained, improved, and/or conserved on public lands, particularly for ungulate animals. The BLM is working with state and Tribal wildlife managers as well as other stakeholders to assess data regarding connectivity, permeability, and resilience and, based on that assessment, to identify where to focus management that best supports priority species.

3.5.2 Small Mammals

Terrestrial small mammals, such as ground squirrels, cottontail rabbits, bats, and mice, are common throughout much of the sagebrush range in the planning area. Sagebrush range in good condition supports an abundant understory of protein rich bunchgrasses and forbs providing habitat for by small mammals. Examples of species are associated with sagebrush vegetation communities include black-tailed jackrabbits (*Lepus californicus*), white-tailed jackrabbits (*L. townsendii*), desert cottontails (*Sylvilagus audubonii*), mountain cottontails (*S. nuttallii*), deer mice (*Peromyscus* spp.), sagebrush voles (*Lemmiscus curtatus*), Merriam's shrew (*Sorex merriami*), and kangaroo rats (*Dipodomys* spp.) (McAdoo et al. 2003). Bats include the little brown myotis (*Myotis lucifugus*), fringed myotis (*M. thysanodes*), long-eared myotis (*M. evotis*), pallid bat (*Antrozous* *pallidus*), spotted bat (*Euderma maculatum*), and Towsend's big-eared bat (*Corynorhinus townsendii*). Many of these bat species use aquatic and riparian habitats for foraging opportunities (McAdoo et al. 2003).

Some small mammals that rely on pinyon-juniper woodlands within the sagebrush planning area include mountain cottontail, cliff chipmunks (*Tamisas dorsalis*), rock squirrels (*Spermophilus variegatus*), brush mice (*Peromyscus boylii*), pinyon mice (*P. truei*), rock mice (*P. difficilis*), deer mice, white-throated woodrats (*Neotoma albigula*), desert woodrats (*N. lepeda*) and Mexican woodrats (*N. mexicana*) (Findley et al. 1975, in Gottfried et al. 1995). Bat species commonly found in pinyon-juniper habitats include eight species of myotis, big brown bats (*Eptesicus fuscus*), spotted bats, western pipistrelles canyon bats (*Pipistrellus hesperus*), and pallid bats (Findley et al. 1975, in Gottfried et al. 1995). Native mammalian predators in the project area include red fox (*Vulpes vulpes*), striped skunk (*Mephitis mephitis*), racoons (*Procyon lotor*), American badger (*Taxidea taxus*), coyote (*Canis latrans*), bobcat (*Lynx rufus*), and long-tailed weasel (*M. frenata*) (Conover and Roberts 2017; Hagen 2011).

3.5.3 Migratory Birds

Migratory birds cross international borders to meet seasonal habitat requirements and are protected under the Migratory Bird Treaty Act. Examples include passerine songbirds, flycatchers, vireos, swallows, thrushes, warblers, and hummingbirds. In addition to GRSG, sagebrush-obligate migratory birds include the sagebrush sparrow (*Artemisiospiza nevadensis*), and sage thrasher (*Oreoscoptes montanus*). Other migratory birds associated with sagebrush habitats include Brewer's sparrow (*Spizella breweri*), loggerhead shrikes (*Lanius ludovicianus*), and Cassin's sparrows (*Aimophila cassinii*). Pinyon-juniper expansion into sagebrush alters range structure negatively impacting migratory birds reliant on sagebrush (e.g., GRSG, sagebrush sparrow). However, several species of migratory birds depend on pinyon-juniper habitats, including the pinyon jay (*Gymnorhinus cyanochephalus*) which is being reviewed by the USFWS for potential listing under the Endangered Species Act.

Common raven (*Corvus corax*) populations have nearly doubled in the past 50 years (USFWS 2023) and they are extremely adaptable to human-altered environments and disturbance (Howe et al. 2014). Ravens are known to predate GRSG nests and chicks and in some areas, they have been documented to influence lek behavior at a similar magnitude as golden eagles, and other predators (Kobilinsky 2021). Raven densities are higher in areas associated with livestock production (Coates et al. 2016) and will readily use anthropogenic structures for nesting (Howe et al. 2014), particularly in areas like sagebrush habitats where features such as power poles were historically uncommon. The continued expansion human-related structures in sagebrush will likely drive increases in common ravens (USFWS 2023).

Raptors

Raptors are important indicators of overall ecosystem health because they are keystone species at the top of the food web. Raptors are found throughout the planning area and include bald eagles (*Haliaeetus leucocephalus*), golden eagles (*Aquila chrysaetos*), peregrine falcons (*Falco peregrinus*), prairie falcons (*F. mexicanus*), red-tailed hawks (*Buteo jamaicensis*), Swainson's hawks (*B. swainsoni*), rough legged hawks (*B. lagopus*), ferruginous hawks (*B. regalis*), Cooper's hawks (*Accipiter cooperii*), sharp-shinned hawks (*A. striatus*), American kestrels (*F. sparverius*), northern harriers (*Circus cyaneus*), great-horned owls (*Bubo virginianus*), and burrowing owls (*Athene cunicularia*). Nests of all raptors are protected under the Migratory Bird Treaty Act (16 U.S.C. 703–712). Bald and golden eagles are also protected under the Bald and Golden Eagle Protection Act of 1940, as amended (16 U.S.C. 668-668d).

Waterfowl and Shorebirds

The numerous streams, rivers, reservoirs, ponds, associated riparian areas, and wetlands vegetation provide habitat for a wide variety of waterfowl and shorebirds. Canada geese (*Branta canadensis*), mallards (*Anas platyrhynchos*), northern pintail (*Anas acuta*), gadwall (*Anas strepera*), green-winged teal (*Anas crecca carolinensis*), American wigeon (*Anas americana*), and other waterfowl species winter along many of the major rivers within the planning area. Waterfowl production also occurs throughout the planning area. Important foraging areas include primarily lakes and ponds found on public or private lands in agricultural areas and within the river corridors.

Wading birds such as great blue heron (*Ardea herodias*), cattle egret (*Bubulcus ibis*), snowy egret (*Egretta thula),* and white-faced ibis (*Plegadis chihi*) are found throughout the planning area. Great blue heron foraging and breeding areas are primarily along rivers, streams, and ponds throughout the planning area. Killdeer (*Charadrius vociferus*), American avocet (*Recurvirostra americana*), willet (*Tringa semipalmata*), and Wilson's phalarope (*Phalaropus tricolor*) are also commonly found within the planning area.

3.5.4 Upland Game Birds

Upland game birds are common within the planning area, but few share the same sagebrush habitats with GRSG. For example, dusky grouse (*Dendragapus obscuru*) are widely distributed throughout higher elevation woodlands, and wild turkeys (*Meleagris gallopavo* can be found in riparian areas, mixed mountain shrub, and pinyon-juniper woodlands. California quail (*Callipepla californica*) occur in foothill woodlands, chaparral, and sagebrush along the western side of the planning area. Sharp-tailed grouse (*Tympanuchus phasianellus*) while native to GRSG habitat occur primarily in grasslands and shrub-dominated slopes. Small flocks of the non-native chukar (*Alectoris chukar*) can also be found in the western portion of the planning area.

3.5.5 Reptiles and Amphibians

Reptiles in the planning area mostly occur in lower elevations and in dryer habitats, such as semi-desert shrub, sagebrush, greasewood, and pinyon-juniper. The sagebrush lizard (*Sceloporus graciosus*) and short-horned lizard (*Phrynosoma hernandesi*) are two of the most common species associated with sagebrush habitats. Other species found in the planning area include Great basin gopher snake (*Pituophis catenifer*), western terrestrial garter snake (*Thamnophis elegans*), collared lizard (*Crotaphytus collaris*), and the side blotched lizard (*Uta stansburiana*). Predatory snakes, such as gopher snakes, are unable consume GRSG eggs but have been observed constricting and consuming a 19-day juvenile GRSG chick (McIntire et al. 2020).

Amphibians, specifically frogs and toads, are important indicators of ecosystem health because they are highly sensitive to environmental changes. Widespread population declines in the western United States are be attributed to disease, pollution, exposure to toxins from energy development, habitat loss and degradation, and the effects from climate change. Examples of amphibians that may occur in GRSG habitat include Columbia spotted frogs (*Rana luteiventris*) and Great Basin spadefoot (*Spea intermontana*).

3.5.6 Invertebrates

Insects provide important food sources for many species of wildlife, including adult and juvenile GRSG. Although there are thousands of species of insects in sagebrush, and riparian and wetland habitats, species in the Scarabaeidae and Tenebrionidae (beetle) families, Formicidae (ants) family, Tettigoniidae family (including Mormon crickets), and Orthoptera (grasshopper) family are a high protein food source of many wildlife species, including GRSG (Klebenow and Gray 1968; Peterson 1970; Johnson and Boyce 1990; Pyle 1993; Fischer 1994; Drut et al. 1994).

Invertebrates are the primary pollinators of forbs, thus helping to proliferate important components of the GRSG diet. GRSG brood-rearing and chick survival are highly dependent on diverse and abundant forbs and insects necessary for early GRSG development. Insect diversity can be attributed to large, diverse, and relatively undisturbed areas of sagebrush habitat.

3.5.7 Fish

The condition of aquatic habitats and fisheries is related to hydrologic conditions of the upland and riparian areas associated with, or contributing to, a specific stream or water body, and to stream channel characteristics. Riparian vegetation reduces solar radiation by providing shade and thereby moderates water temperatures, adds structure to the banks to reduce erosion, provides overhead cover for fish, and provides organic material, a food source for macroinvertebrates. Intact vegetated floodplains dissipate stream energy, store water for later release, and provide rearing areas for juvenile fish. Water quality (especially factors such as temperature, sediment, and dissolved oxygen) also greatly affects fisheries and aquatic habitat.

Higher elevation waters support cold water fishes, consisting primarily of brook trout (*Salvelinus fontinalis),* rainbow trout (*Oncorhynchus mykiss*)*,* brown trout (*Salmo trutta*), and cutthroat trout (*Oncorhynchus clarkii* spp.). Lower elevation waters support primarily cool water and warm water fishes including such species as nonnative northern pike (*Esox lucius*), yellow perch (*Perca flavescens*), smallmouth bass (*Micropterus dolomieu*), largemouth bass (*Micropterus salmoides*), black crappie (*Pomoxis nigromaculatus*), bluegill (*Lepomis macrochirus*), common carp (*Cyprinus carpio*), and walleye (*Sander vitreus*).

Native warm water fish within the planning area include but are not limited to black bullhead (*Ameiurus melas*), channel catfish (*Ictalurus punctatus*), green sunfish (*Lepomis cyanellus*), Johnny darter (*Etheostoma nigrum*), long-nose dace (*Rhinichthys cataractae*), bluehead sucker (*Catostomus discobolus*), flannelmouth sucker (*Catostomus latipinnis*), roundtail chub (*Gila robusta*), razorback sucker (*Xyrauchen texanus*), creek chub (*Semotilus atromaculatus*), Colorado pikeminnow (*Ptychocheilus lucius*), plains killifish (*Fundulus zebrinus*), bonytail chub (*Gila elegans*), and humpback chub (*Gila cypha*).

3.5.8 Pollinators

Pollinators in the planning area include invertebrates and some bird and bat species. Because of the large diversity of species may serve as pollinators, habitat use by these species is also diverse and are generally described above. A diversity of pollinators is a direct indicator of plant diversity and overall ecosystem health. Declines in native and managed pollinator populations have been linked to habitat loss, fragmentation, invasive species, disease, and pesticides (Xerces Society 2021). North American bumble bee species are generally threatened by habitat loss, pesticides, and climate change. Some species are additionally threatened by pathogens and parasites they may acquire from managed bees.

3.6 Special Status Species

Special status species include both animals and plants requiring specific management due to their listing status under the Endangered Species Act (ESA) and population and habitat concerns. BLM management policy is described in the BLM 6840 Manual, Special Status Species Management. Categories of special status species are the following:

- Species listed as threatened and endangered under the ESA and designated critical habitats
- Species proposed for listing under the ESA and proposed critical habitats
- Candidate species for listing under the ESA
- BLM sensitive species

The BLM will consult with the USFWS in accordance with Section 7 of the ESA for any listed or proposed species or designated or proposed critical habitat that may be affected by the RMPA. A summary of consultation is included in **Chapter 4**.

3.6.1 Federally Listed Species

Threatened and Endangered Species

Species are listed as either threatened or endangered under the ESA. Some listed species have critical habitat designated as essential to species conservation or requiring special management consideration or protection. Under the ESA, all federal agencies must participate in the conservation and recovery of listed threatened and endangered species (USFWS and NMFS 1998). The ESA also states that federal agencies shall ensure any action they authorize, fund, or carry out is not likely to jeopardize the continued existence of a listed species or result in the destruction or adverse modification of designated critical habitat.

The mission of the USFWS is to work with other federal, state, and local agencies to conserve, protect, and enhance fish, wildlife, and plant species and their habitats. USFWS manages threatened and endangered species and designated critical habitat, in cooperation with other federal agencies to support recovery. The BLM cooperates with USFWS identify and properly manage recovery habitats.

ESA-listed species that have been documented to occur in the planning area are included in **Appendix 11**, Special Status Species.

Proposed and Candidate Species

Proposed species are plant and animal taxa proposed in the Federal Register to be listed under the ESA. These are species that USFWS has sufficient data on biological vulnerability or threats to support a potential to list but issuance of a proposed rule is precluded by higher priority listing actions. Proposed and candidate species that have been documented to occur in the planning area are in **Appendix 11**, Special Status Species.

BLM Sensitive Species

The BLM's objectives for special status species are to conserve and recover ESA-listed species and the ecosystems on which they depend so that ESA protections are no longer necessary, and to initiate proactive conservation measures that reduce or eliminate threats to minimize the need for listing these species under the ESA. The BLM 6840 manual directs the BLM to "work cooperatively with other agencies, organizations, governments, and interested parties for the conservation of sensitive species and their habitats to meet agreed on species and habitat management goals." The 6840 Manual also requires managers to determine to the extent practicable, the distribution, abundance, population condition, current threats, and habitat needs for sensitive species, and evaluate the significance of actions in conserving those species.

All federal candidate species, proposed species, and delisted species in the 5 years following delisting will be conserved as Bureau sensitive species. State lists of BLM sensitive species for states in the planning area are available in **Appendix 11**.

Current Conditions

The BLM continues to implement actions that further the conservation, protection, and recovery of ESA-listed threatened and endangered species. Consultation with USFWS under the ESA is a key part of these activities. Habitat for proposed, candidate, and BLM sensitive plant and animal species continue to be managed in such a manner that actions authorized, funded, or carried out by the BLM reduce the likelihood for special status species to become listed under the ESA.

The BLM maintains some spatial data on special status species but mostly relies on state agencies for data stewardship and data are also available from NatureServe for wide ranging species that cross jurisdictional boundaries. State natural heritage programs provide location and natural history information on special status plants, animals, and natural communities. These data help drive conservation decisions, aid in the environmental review of projects and land use changes and provide baseline data helpful in recovering listed species.

In managing special status species, the BLM also considers the role of wildlife corridors in connecting habitats. Biological corridors within and adjacent to the analysis area are reviewed to understand their contribution to broader ecosystem connectivity. This understanding helps minimize habitat fragmentation and supports broader conservation goals for special status species.

Species Accounts

Activities within the decision area will primarily affect sagebrush habitat. Areas of conifer encroachment targeted for sagebrush restoration to benefit GRSG may also be affected. Therefore, special status species dependent on sagebrush habitat or strongly associated with pinyon-juniper woodlands may be directly or indirectly affected by proposed management actions to protect and enhance GRSG habitat. An expanded discussion of several key special status species follows. For other special status species accounts, please see **Appendix 11**.

Mammals

<u>Black-footed ferret</u>

In 1967, the black-footed ferret (*Mustela nigripes*) was listed as endangered in early legislation prior to the ESA; the ferret was officially listed as endangered under the ESA in 1973 (USFWS 2013d). The black-footed ferret is intimately tied to prairie dogs (*Cynomys* spp.) and is only found in association with prairie dog colonies. Historically, the black-footed ferret range overlapped with prairie dog habitat throughout the North American Great Plains, mountain basins, and grasslands. Declines in occupied prairie dog habitat in the early twentieth century coincided with the rapid decline of the ferret (USFWS 2013d). Black-footed ferrets currently occur in both captive and wild populations. Captive ferrets have been reintroduced at 29 sites in the western United States, Canada, and Mexico, including at multiple locations in the planning area (see Table 3 in USFWS 2019). Four primary stressors to black-footed ferrets are disease, drought, declining genetic fitness including increased inbreeding and a reduction in genetic diversity, and prairie dog poisoning and shooting (USFWS 2019). The main disease concern for wild and captive populations is non-native sylvatic plague. The white-tailed prairie dog (*C. leucurus*) is the primary diet for black-footed ferrets in the planning area (USFWS 2017). White-tailed prairie dogs generally inhabit dry landscapes with shrub land vegetation, such as the high desert scrub community of Utah and sagebrush steppe of western Wyoming. Sagebrush management that negatively impacts white-tailed prairie dogs could affect black-footed ferrets.

<u>Pygmy rabbit</u>

On January 25, 2024, the USFWS announced they will conduct a status review of the pygmy rabbit (*Brachylagus idahoensis*) in consideration of listing under the ESA. This BLM sensitive species is patchily distributed throughout sagebrush habitat and alluvial fans in the planning area where plants occur in tall dense clumps (Smith et al. 2019). The only native rabbit species in North America to excavate their own burrows, pygmy rabbits require deep, crumbly, loamy-type soils are required for burrow excavation although they may occasionally use burrows excavated by other species and, therefore, may occur in areas that support shallower, more compact soils (Janson 1946; Weiss and Verts 1984; USFWS 2010c).

Big sagebrush is the primary food and may comprise up to 99% of food in winter and 51% in summer. Grasses and forbs make up the remaining diet during the summer (Shipley et al. 2009, Schmalz et al. 2014). Pygmy rabbits likely select for percent cover and composition of grasses and forbs at different habitat scales (i.e., patch vs. burrow). Cover and height of woody vegetation appear to be critical habitat features (Green and Flinders 1980), and Larrucea and Brussard (2008) found pygmy rabbits occupied clusters of sagebrush that were taller than the sagebrush shrubs in the surrounding area (i.e., sagebrush islands that range from 4.7 to 46.0 inches in height).

Pygmy rabbits avoid edge habitats and open areas such as Rights of Way (ROWs), roads, and other areas cleared of sagebrush (Crowell et al. 2016, Carr et al. 2013, Edgel et al. 2018.) The size of pygmy rabbit home ranges fluctuates seasonally with smaller home ranges during winter and larger home ranges during spring and summer. Annual home ranges in southeastern Oregon and northwestern Nevada differed between the sexes and ranged from 1.2 to 25.8 acres for males and 0.27 to 18.7 acres for females. Juvenile dispersal in Nevada and Oregon was greater than 0.3 mile, with a maximum long-distance movement of 5.3 miles recorded for a juvenile female (Weiss and Verts 1984).

Utah prairie dog

The Utah prairie dog (*Cynomys parvidens*) was listed as an endangered species under the ESA in 1973 and reclassified to threatened status in 1984 (49 FR 22330–22334). Historically, the Utah prairie dog was found in portions of Beaver, Garfield, Iron, Juab, Millard, Piute, Sanpete, Sevier, Washington, and Wayne Counties in Utah (USFWS 2012b). Current dog distribution is now limited to the southwestern quarter of Utah (USFWS 2012b). Significant concentrations of Utah prairie dogs occur in three areas that are identified as recovery units in the Recovery Plan (USFWS 2012b), including the Awapa Plateau, Paunsaugunt, and West Desert recovery units. There are nearly 60,000 acres of Utah prairie dog habitat among the three Recovery Units, and over 48% of these acres are BLM-administered or National Forest System lands.

The Utah prairie dog inhabits elevations from 6,200 feet on valley floors up to 9,180 feet (USFWS 2012b) in mountain mesa habitats. Preferred habitats include grasslands and semiarid shrub-steppe. Open habitats are important for foraging and avoiding predators. Livestock grazing practices that reduce shrub height and density or vegetation treatments that remove encroaching conifers may enhance prairie dog habitat.

Since 1976, the Utah Division of Wildlife Resources has performed annual (spring) counts of Utah prairie dogs designed to monitor population trends over time. Based on the spring counts, rangewide population trends for the Utah prairie dog are stable to increasing since the time of listing, though populations vary annually and the numbers across the range have decreased in recent years. The rangewide count in 2020 (6,217 dogs) is approximately 54% of the count in 2016 (11,478 dogs; USFWS 2021). Population numbers have declined from historic highs primarily due to habitat loss and fragmentation, sylvatic plague, drought, poisoning, and other factors.

Migratory Birds and Raptors

Brewer's sparrow

Brewer's sparrow is a BLM sensitive species strongly associated with sagebrush over most of its range, in areas with scattered shrubs and short grass, though it can also be found in mountain mahogany, rabbitbrush, bunchgrass grasslands with shrubs, bitterbrush, and openings in pinyon-juniper (Knopf et al. 1990; Sedgwick 1987). Brewer's sparrow places nests in sagebrush, and may also use other shrubs, from a few inches to about three feet from the ground, though higher nests in taller sagebrush have been documented (Rich 1980). In migration and winter, Brewer's sparrow uses low, arid vegetation, desert scrub, sagebrush, and creosote bush (NatureServe 2023d). Brewer's sparrow is vulnerable to loss and fragmentation of sagebrush habitats, and even though it is typically one of the most abundant songbirds in sagebrush habitats, it is declining across its range (NatureServe 2023d).

Ferruginous hawk

The ferruginous hawk, a BLM sensitive species, occurs in grassland and shrublands year-round throughout the planning area. Ferruginous hawks often nest on the ground, lone trees, topographic high points, or cliffs. Ferruginous hawks occur in areas with abundant prey, typically small mammals such as rabbits, prairie dogs, and ground squirrels. Ferruginous hawk density and productivity are closely associated with cycles of prey abundance (NatureServe 2023e). Ferruginous hawks are easily disturbed during the breeding season; nest abandonment from disturbance is most likely during early nesting stage (Tesky 1994).

Golden eagle

The golden eagle is a BLM sensitive species and is protected under the Bald and Golden Eagle Protection Act, which prohibits unpermitted "taking" of bald or golden eagles, including their parts, nests, or eggs. Golden eagles generally inhabit open and semi-open country such as prairies, sagebrush, savannah or sparse woodland, and barren areas, and in areas with sufficient mammalian prey base and suitable nesting sites. Nests are most often on rock ledges of cliffs but sometimes in large trees, on steep hillsides, on electrical transmission towers, or on the ground. While a pair may have multiple alternate nests, they may use the same nest in consecutive years (NatureServe 2023f). Diet consists primarily of small mammals (e.g., rabbits, marmots, ground squirrels) but sometimes also includes large insects, snakes, sage-grouse, other bird species, juvenile ungulates, and carrion.

Golden eagle declines in the early 1900s were due to eradication campaigns, frequently encouraged by the use of bounties (eagle was believed to be a major predator on livestock). Golden eagles are also susceptible to powerline electrocution given their large wingspan. Other threats include ingestion of poison intended for coyotes; ingestion of toxic water from mining activities; occasional shootings; habitat loss to agriculture, suburban land uses, and energy development and loss of potential food resources as a result of habitat degradation. Human disturbance or activity may cause nest abandonment, render a nest site less productive, or prevent a suitable nest site from being utilized, but direct disturbance of nests appears to be infrequent (GBBO 2010).

Pinyon Jay

Pinyon jay, a BLM sensitive species, is a resident of the foothills and lower mountain slopes of western and southwestern U.S. and Mexico in pinyon juniper woodland habitats (AOU 1983). The pinyon jay status is currently being reviewed by the USFWS for potential listing under the Endangered Species Act. Pinyon jays do not migrate but may forage long distances to find food during years with a low pinyon pine seed crop. Flocks may also migrate altitudinally – up or down in elevation – to find food (NatureServe 2023g). Pinyon jay flocks have complex social organization. Flocks are made of multiple breeding pairs and offspring. While flocks tend to have established home ranges, they move in search of food as described above.

Pinyon jays prefer a mixed-age mosaic of woodland interspersed with sagebrush shrubland. Although they roost and nest within relatively dense groves of older trees, they typically locate their nests within 1.2 miles of the habitat edge (GBBO 2010). Pinyon jays' nest when and where enough food is available – which predominately includes seeds from pinyon pines. Studies have indicated that large expanses of homogenous, closed-canopy pinyon-juniper woodland, which have become more common over the past century, are largely unsuitable for the birds (GBBO 2010, 2012).

This species has undergone significant declines over the last 50 years and faces ongoing threats from habitat alteration due to climate change and wildfire suppression (NatureServe 2023g). Pinyon-juniper habitats in the southwest have been impacted by climate change, including widespread pinyon mortality and probable reduction in pinyon seed crops, the primary food source for pinyon jays (Gaylord et al. 2013). Further loss and distributional shifts of pinyon juniper woodland habitats in response to climate change are likely (Gaylord et al. 2013, Meddens et al. 2015). Habitat has also been altered through thinning of pinyon-juniper for fuels reduction, and perceived wildlife management benefits, including habitat improvements for GRSG. Breeding Bird Survey data show a decline of 2.1% per year from 1966-2021 (Ziolkowski et al. 2023).

<u>Sagebrush Sparrow</u>

Sagebrush sparrow habitat is dry brushy foothills, chaparral, and sagebrush and in winter deserts (Audubon 2023). In the northern and eastern part of the range, sagebrush sparrows mainly inhabit stands of big sagebrush, whereas farther southwest, they mainly use saltbush and other low shrubs of arid flats. Nests are either on the ground or in shrubs. In the Great Basin, the species usually nests in living sagebrush, where cover is sparse, but shrubs are clumped (Petersen and Best 1985). Placement may be related to density of vegetative cover over the nest, as sagebrush sparrows will nest higher in a taller shrub (Rich 1980). The species migrates to, and winters in, arid plains with sparse bushes, grasslands, and open situations with scattered brush, mesquite, and riparian scrub, preferring to feed near woody cover (Audubon 2023; Meents et al. 1982; Repasky and Schluter 1994).

Sagebrush sparrows are negatively affected by factors that fragment sagebrush habitat or alter its basic structure, including wildfire, cheatgrass invasion, heavy livestock use, nest predation, expansion of pinyon-juniper woodland into shrubland, heavy off-highway vehicle (OHV) use (GBBO 2010), urban and suburban development, and road and power line ROWs.

<u>Sage Thrasher</u>

Sage thrasher is a BLM sensitive species. In the northern Great Basin, the sage thrasher breeds, and forages in tall sagebrush/bunchgrass, juniper/sagebrush/bunchgrass, mountain mahogany/shrub, and aspen/sagebrush/bunchgrass communities. The species is positively correlated with shrub cover, shrub height, bare ground, and horizontal patchiness and negatively correlated with spiny hopsage (*Grayia spinosa*), budsage (A*rtemisia spinescens*), and grass cover (Rotenberry and Wiens 1980; Wiens and Rotenberry 1981). The species usually nests within 3 feet of the ground in the forks of shrubs (almost always sagebrush) and sometimes nests on the ground (Reynolds 1981; Rich 1980). In winter, the sage thrasher uses arid and semiarid scrub, brush, and thickets. The species feeds on a wide variety of insects, including grasshoppers, beetles, weevils, ants, and bees, as well as fruits and berries. Loss, degradation, or fragmentation of high-quality sagebrush shrubland suitable for sage thrasher is attributed to wildfire, invasive plants, expansion of pinyon-juniper woodland into sagebrush, heavy livestock grazing, and heavy OHV use (GBBO 2010).

Fish

<u>Lahontan Cutthroat Trout (LCT)</u>

LCT (*Oncorhynchus clarkii henshawi*) is an inland subspecies of cutthroat trout (Salmonidae). The species may be either riverine or lacustrine and is endemic to the Lahontan Basin of northeast California, southeast Oregon, and northern Nevada. As with all cutthroat trout, LCT is an obligate riverine spawner. This species spawns in riffles over gravel substrate when water temperatures are between 41 and 60°F. Intermittent tributaries are sometimes used as spawning sites during high-water years. Fry may develop in the tributary stream until flushed into the mainstream during high runoff.

The decline of LCT has been primarily attributed to the loss and degradation of habitat. Agricultural and municipal uses of water from streams and lakes have reduced or altered the stream discharge in this species' range. Grazing has altered the physical characteristics of stream channels and increased the sediment loads in many LCT habitats. Mining, urban development, logging, road construction, and dam building have also been associated with changes in stream channel morphology and water quality (USFWS 1995). LCT competes with nonnative trout species that were historically stocked for recreational fishing opportunities. Updated recovery goals include removing threats from nonnative trout, ensuring ecological functions in habitats, including carrying out restoration and management changes where needed, and maintaining existing isolated populations (LCTCC 2019).

Bull Trout

Bull trout (*Salvelinus confluentus*) occur in the Columbia River and Snake River basins in Washington, Oregon, Montana, Idaho, and Nevada. Other populations outside the planning area include Puget Sound and Olympic Peninsula watersheds in Washington, Saint Mary basin in Montana, and Klamath River basin of south-central Oregon. Historical habitat loss and fragmentation (including from climate change), interaction with nonnative species, and fish passage issues are widely regarded as the most significant primary threat factors affecting bull trout (USFWS 2015a).

Of all the native salmonids in the Pacific Northwest of the United States, bull trout generally have the most specific habitat requirements, including cold water temperatures (often less than 54 degrees Fahrenheit), clean water quality conditions, complex stream habitat including deep pools, overhanging banks and large woody debris, and connectivity between spawning and rearing areas and downstream foraging, migration, and overwintering habitats (USFWS 2015a).

Invertebrates

Monarch butterfly

The monarch butterfly (*Danaus plexippus*) was identified as a candidate species for listing under the ESA in 2020 (USFWS 2020). Based on past annual censuses, the western North American population has been declining over the last 23 years, despite an increasing number of sites being counted. Primary drivers affecting North American migratory populations are loss or degradation of breeding, migratory, and overwintering habitat, continued exposure to insecticides, and effects of climate change. Milkweed availability is essential to monarch reproduction and survival and reductions in milkweed due to habitat loss and conversion are also a key driver in monarch declines (USFWS 2020).

During the breeding season, monarch butterflies lay their eggs primarily on milkweed host plants (*Asclepias* spp.). In western North America, nectar and milkweed resources are often associated with riparian corridors, and milkweed may function as the principal nectar source for monarch butterflies in more arid regions. Additionally, monarchs rely on mostly native forb species within GRSG habitat that are also GRSG preferred forbs (Dumroese et al. 2015).

Most adult butterflies live approximately 2 to 5 weeks, but overwintering adults enter reproductive diapause (suspended reproduction) and live 6 to 9 months. In the fall, monarch butterflies west of the Rocky Mountains fly south and west to overwintering groves along the California coast into northern Baja California (USFWS 2020). During breeding and migration, adult monarch butterflies require a diversity of blooming nectar resources, which they feed on throughout their migration routes and breeding grounds.

3.7 WILD HORSES AND BURROS

The Wild Free-Roaming Horses and Burros Act of 1971, as amended by FLPMA and the Public Rangeland Improvement Act of 1978, directs the protection and management of wild horse and burro populations on BLM-administered lands. Responsibility for wild horse and burro management is governed by 43 CFR Part 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 horse and burro, 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 where wild horses or burros were found when the 1971 Wild Free-Roaming Horses and Burros Act was passed are known as herd areas. Approximately 26.9 million BLM-administered acres (32.6 million acres among all landowners) have been determined suitable for long-term management of wild horses and burros and are known as herd management areas. Wild horse and burro populations within wild horse and burro herd management areas are managed with the goal of maintaining sustainable ecological conditions and multiple-use relationships on federal lands. Both herd areas and wild horse and burro herd management areas can include private or state lands, but the BLM has management authority only over public lands.

The BLM periodically evaluates each HA to determine if 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 specifies an allowable range in horse numbers for each wild horse and burro herd management areas based upon 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.

The estimated population size of wild horses and burros within each wild horse and burro herd management areas is based on helicopter, fixed-wing, or by ground-based inventories, which occur every 2 to 3 years. These population inventories provide information pertaining to population numbers, foaling rates, distribution, and herd health. When the AML is exceeded, populations of wild horses and burros are examined to determine if population control methods are required. Historically, it has been a challenge for the BLM to maintain AML in all herd management areas.

Wild horses and burros are a long-lived species with annual survival rates estimated between 80% and 97% (Wolfe 1980; Eberhardt et al. 1982; Garrott and Taylor 1990). In addition, wild horses can increase their numbers by 18% to 25% annually, resulting in the doubling of wild horse populations about every 4 years (Wolfe et al. 1989; Garrott et al. 1991). Wild horse and burro numbers appear to be limited principally by water availability and winter forage, as predation and disease have not substantially regulated wild horse and burro population levels. This has resulted in the BLM shifting program emphasis beyond just establishing an AML and conducting wild horse and burro gathers to including a variety of management actions that further facilitate the achievement and maintenance of viable and stable wild horse and burro populations and a "thriving natural ecological balance" (Public Law 92-195). Methods of herd population control include periodic gathers and removal to short-term holding and adoption or long-term holding, as well as methods of population growth suppression, including treatment with fertility control drugs where approved. Gathering or other population growth suppression activities are based on inventory data, herd health, rangeland health, climatic conditions, and occurrence of catastrophic events such as wildfire and drought.

3.7.1 Current Conditions

In the planning area, there are approximately 15 million acres of wild horse and burro herd management areas. The BLM administers 168 wild horse and burro herd management areas within California, Colorado, Idaho, Montana, Nevada, Oregon, Utah, and Wyoming. Current herd area, herd management areas, and estimated population of wild horse and burro within the project area by state are listed in **Table 3-3** (**Appendix 9**). Wild horse and burro populations within the planning area continue to grow, often exceeding AMLs and this trend is expected to continue. Due to a lack of predators, and limited management authority, wild horse and burro populations will continue to increase in size. As a result, the agency will continue to remove animals from the range each year and will continue to administer various methods of fertility control.

Currently, the AMLs are being exceeded by an average of 3.6 times greater than the "high" AML value across the planning area (**Table 3-3** [**Appendix 9**]). Wild horse and burro populations have increased since 2012 and are 2.78 times over AML. The total number of herd management area acres which overlap with GRSG HMAs is displayed in **Table 3-4** (**Appendix 9**). Wild horses and burros can be found outside of WHB herd management areas as they are not fenced, and horses and burros may leave in search of water and forage and enter onto non-herd management area BLM-administered or other lands. Wild horses and burros can be causal factors for failing to meet applicable Land Health standards.

Climate change may affect the availability of wild horse and burro forage or water resources as well as rangeland health; AMLs for herds were established based on past conditions, including vegetation and water resources. Should available forage or water resources be reduced due to a change in climate, current AMLs may no longer be appropriate, rangeland conditions may be impacted, and herd health impacted due to a lack of resources.

3.8 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 issued by field offices to qualified applicants, who are assigned grazing preference. Forage use is identified in allotments, which are areas of land designated and managed for livestock grazing. The amount and length of use is described in the terms and conditions of the grazing authorization, which is usually a permit or lease, normally issued for 10 years. More prescriptive management and flexibility may be used to achieve resource and operational goals and objectives through Allotment Management Plans (AMP) or their functional equivalents. When grazing permits/leases expire, they may be renewed based on continued availability of the grazing area, grazing preference, and satisfactory record of performance.

3.8.1 Current Conditions

The species (kind) and age (class) of livestock that graze across the planning area varies across field offices but are primarily cow-calf pairs or yearling cattle. Some allotments graze other kinds of livestock, including sheep, goats, bison, and horses. Livestock grazing allotments across the planning area range in size, with some less than 1,000 acres, and others exceeding 100,000. Allotments may be completely fenced but are often located along geographic features such as canyons, streams, and rivers that can restrict the movement of livestock in lieu of fencing.

The BLM grazing administration regulations were revised in 1995 to include Fundamentals of Rangeland Health and Standards and Guidelines for Grazing Administration (43 CFR Part 4180). Standards provide for the conformance with the Fundamentals of Land Health at 43 CFR Part 4180.1 BLM State Directors are responsible for developing or modifying Standards and Guidelines specific to areas under their jurisdiction. This is done in consultation with affected Resource Advisory Councils and in coordination with applicable Indian Tribes, other state/federal land management agencies, and the public. Standards (of Land Health) are expressions of levels of physical and biological condition or degree of function required for healthy lands and sustainable uses and define minimum resource conditions that must be achieved and maintained. Guidelines are a practice, method or technique determined to be appropriate to ensure that standards can be met or that significant progress can be made toward meeting the standard. Guidelines are tools such as grazing systems, vegetative treatments, or improvement projects that help managers and permittees achieve standards.

In BLM policy, Standards (i.e. Land Health Standards) are applicable to all ecosystems and management actions. They are expressed as goals in the Land Use Plan. Public lands are managed to achieve or make significant progress toward achieving Land Health Standards developed for an area unless specified otherwise in the Land Use Plan. Practices and activities subject to standards and guidelines by regulation include the development of grazing-related portions of activity plans, establishment of terms and conditions of permits, leases and other grazing authorizations, and range improvement activities such as vegetation manipulation, fence construction and development of water.

Livestock grazing can be causal factors for failing to meet applicable Land Health standards. In accordance with 43 CFR Part 4180, the BLM must take appropriate action as soon as practicable but not later than the start of the next grazing year upon determining that 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. Appropriate action means implementing management that will result in significant progress toward fulfillment of the standards and toward conformance with the guidelines.

The number of allotments with at least 15% PHMA in Alternative 1 by Land Health Standard Category is shown in **Table 3-5** (**Appendix 9**). Across the planning area, grazing management has been improved by a variety of actions. One example is changing the terms and condition s in grazing permits/leases to improve riparian areas and wetlands through utilization, herding requirements, and strategic placement of salt and supplemental feed. Furthermore, improvements through additional water developments and pasture fencing, along with following compliance inspections to ensure assigned range improvement maintenance is completed for grazing authorizations.

Climate change may impact the availability of forage or water resources, which are crucial for both livestock and rangeland health. Grazing allotments were established based on past conditions, including vegetation and water resources. However, should available forage or water resources be reduced due to a changing climate, current grazing levels may no longer be sustainable. Reduced forage availability could lead to decreased rangeland health, negatively affecting livestock productivity. This would necessitate reevaluation of grazing permits or leases to ensure that land health standards are met under changing environmental conditions. In addition, improper livestock grazing practices have been identified as contributing factors in the decline of GRSG habitat, particularly in areas where overgrazing reduces the vegetation cover needed for GRSG nesting and brood-rearing. Additionally, the reduction in available forage due to improper grazing or changing climate conditions can further exacerbate habitat degradation for GRSG.

3.9 LANDS AND REALTY (INCLUDING RENEWABLE ENERGY)

The lands and realty program consists of (1) land use authorizations, including ROWs; (2) land tenure adjustments, including disposals and acquisitions of lands; (3) Official Surveys of Federal Interest Lands, Management of Land Boundary (MLB) Plans, Standards for Boundary Evidence (SBE), Public Lands Survey System Data Set (PLSSDS), Surface Management Agency (SMA), and Land Status Records System; and (4) withdrawals. Changes to land tenure and the cadastral survey will not be affected by the proposed actions in the alternatives and will not be discussed further. The lands and realty program also processes renewable energy applications related to wind, solar, and geothermal energy. Geothermal energy is managed as a fluid leasable mineral (see **Section 3.10.1**, Fluid Minerals [Including Geothermal]). Utility-scale wind and solar resource facilities are permitted with ROW authorizations through the lands and realty program. The management actions identified in the alternatives could affect ROWs and renewable energy applications related to wind, solar, and geothermal energy.

3.9.1 Conditions within the Planning Area

Land use authorizations include granting ROWs, permits, leases, and temporary use permits (TUPs). A ROW is most often authorized by a grant or lease under 43 CFR Part 2800 and 2880 and are appropriate for facilities constructed for long-term use, generally 30 years. Short-term ROWs are typically used during construction, maintenance, and other seasonal or short duration uses involving minimal improvement and investment. Additional land use authorizations are issued as leases, permits, and easements under 43 CFR Part 2920. Leases are usually long-term authorizations that use public lands for a fixed term involving considerable capital investments. TUPs are authorized under the Mineral Leasing Act (see 43 CFR Part 2881.5(a)) and short-term ROWs may be issued under FLMPA. TUPs can be reauthorized at the discretion of the authorized officer. Easements are authorizations for a non-exclusive interest in lands that specifies the right to the holder the obligation of the BLM to use and manage the lands in a manner consistent with the terms of the easement. A lease grants less than the interest given by an easement and provides for more direct control by the authorized officer. ROW grants are used for wind and solar development and testing.

Granting ROWs

ROW grants are used for oil and gas pipelines, electric transmission and distribution lines, roads, wind and solar development, communication sites such as telephone and fiber optic, and non-linear features such as carbon capture and storage sites. Generally, ROWs are granted for the term of a project. A ROW authorizes the holder to construct, operate, maintain, and/or terminate a new or existing facility over, under, upon, or through BLM-administered lands. The majority of ROWs are authorized under Title V of the FLPMA (90 Stat. 2743; 43 U.S.C. 1715, 1761-1771) and the Mineral Leasing Act (Section 28 of the Mineral Leasing Act of 1920, as amended, 43 U.S.C. 185). The BLM will authorize ROW applications at the discretion of the authorized officer in a responsible, efficient, and economically feasible manner.

Acres of disturbance associated with existing transmission lines, railroads, and roads on BLM-administered lands within the planning area are listed in **Table 3-6** (**Appendix 9**) and **Map 3.15** (**Appendix 1**) shows disturbance associated with transmission lines, railroads, and roads. Of the approximately 679,300 acres of transmission lines on BLM-administered lands in the planning area, approximately 33% are within mapped occupied habitat (**Table 3-6** [**Appendix 9**]).

ROW Avoidance and Exclusion Areas

Areas identified as unsuitable for surface disturbance or occupancy are generally identified as avoidance or exclusion areas for ROWs. Restrictions and mitigation measures could be modified on a case-by-case basis for avoidance areas, depending on impacts on resources, while exclusion areas are prohibited from ROW development with limited exceptions.

Communication Sites

The BLM typically issues communication site ROWs or leases for communication facilities. Communication towers, transmission lines, and other vertical structures that provide additional perching opportunities for ravens and other birds of prey can result in habitat fragmentation, habitat avoidance, and increased vehicle traffic during maintenance operations (USFWS 2013a).

Roads and Railroads

Roads and railroads can fragment GRSG habitat (Knick and Rotenberry 1995). Within the BLM-administered lands in the planning area there are 46,600 acres of railroad and 2,197,200 acres of road ROWs, of these 24% and 42% respectively are located in occupied habitat (**Table 3-6** [**Appendix 9**]).

Solar Energy

Acres of solar facilities and ROWs in the planning area are presented in **Table 3-7** (**Appendix 9**). For ROW applications to support non-utility-scale solar facilities (i.e., less than 5 MWs), the BLM will consider requests on a case-by-case basis and may require a land use plan amendment to analyze an otherwise nonconforming proposal.

Wind Energy

Based on 2023 U.S. Energy Information Agency data, sites with an average annual wind speed greater than 5.8 meters per second are candidates for utility-scale generation (EIA 2023a). Acres of wind turbines and wind ROWs in the planning area are listed in **Table 3-8** (**Appendix 9**). Acres of wind potential in mapped occupied habitat within the planning area are listed in **Table 3-9** (**Appendix 9**). See **Map 3.16** (**Appendix 1**) for an overview of existing wind potential within the planning area.

3.9.2 Trends within the Planning Area

Land Use Authorizations

Land use authorization requests are customer driven. Within the planning area most authorizations processed are primarily for roads, electric distribution lines, and communication sites. Renewable energy land use authorization requests including wind and solar development have increased and are expected to continue to increase due to the growing demand for renewable energy.

3.10 Mineral Resources

3.10.1 Fluid Minerals (Including Geothermal)

Fluid leasable minerals include oil, gas, coalbed natural gas, and geothermal resources. Oil and gas are most often found in the porous spaces of sedimentary rocks (e.g., sandstone and limestone), having migrated there from source rocks (e.g., marine shales) rich in organic material. Coalbed natural gas is methane gas that can be extracted from coal seams. Since most coalbed natural gas is associated with coals at shallow depth, exploration, well drilling, completion, and production costs are considerably lower than for conventional deep gas production. Geothermal resources are a source of energy that uses the natural heat of the Earth's interior, carried to the surface by steam or hot water.

Leasable minerals are governed by the Mineral Leasing Act of 1920, as amended, which authorized specific minerals to be disposed of through a leasing system. Geothermal is also governed by the Geothermal Steam Act of 1970, as amended. The rights to explore for and produce fluid minerals on public land may only be acquired through leasing. Leases are issued through a competitive process and are offered through a bid in areas nominated by interested parties. The BLM issues competitive leases for oil and gas exploration and development on lands owned or controlled by the federal government. Currently, the BLM holds quarterly competitive sales but not in every state. Leases are issued for a term of ten years and expire unless they are extended, suspended, or held by production. If the lessee establishes hydrocarbon production, leases are held as long as oil or gas is produced.

During the leasing process, the BLM may apply lease stipulations to leases in order to protect other resource values or land uses (e.g., cultural resources, boundary line markers and corners and wildlife) by establishing authority for timing delays or the denial of operations in the terms of the standard lease contract. There are four types of additional stipulations defined as follows:

- No Surface Occupancy (NSO). On lands covered by the NSO stipulation, use or occupancy of the land surface for fluid mineral exploration or development is prohibited to protect identified resource values. Fluid minerals could be leased, but the leaseholder/operator would have to use off-site methods, such as directional drilling to access the mineral resource.
- Controlled Surface Use (CSU). Under the CSU stipulations, use and occupancy is allowed (unless restricted by another stipulation) but identified resource values require special operational constraints that may modify the lease rights. While less restrictive than an NSO, a CSU stipulation allows the BLM or surface managing agency to require special operational constraints, to shift the surface-disturbing activity, or to require additional protective measures (e.g., special construction techniques for preventing erosion in sensitive soils) to protect the specified resource or value.
- Timing Limitations (TLs). A TL stipulation prohibits surface use during specified periods to protect identified resource values. This stipulation does not apply to the operation and maintenance of production facilities unless the findings of analysis demonstrate the continued need and that less stringent, project-specific mitigation measures would be insufficient.
- Protection of Survey Corner and Boundary Line Markers. Under the boundary marker protection stipulation, the responsible party will identify and protect evidence of federal interest land boundary markers.

Most but not all stipulations attached to leases at the time of sale have a provision, specified in the individual Land Use Plans, for granting exceptions, modifications, or waivers. An exception is a case-by-case exemption from a lease stipulation. The stipulation continues to apply to all other sites in the leasehold to which the restrictive criterion applies. A modification is a fundamental change to the provisions of a lease stipulation, either temporarily or for the term of the lease. A modification may, therefore, include an exemption from or alteration to a stipulated requirement. Depending on the specific modification, the stipulation may or may not apply to all other sites in the leasehold to which the restrictive criteria applied. A waiver is a permanent exemption from a lease stipulation. The stipulation no longer applies anywhere in the leasehold.

The issuance of a lease does not, in and of itself, authorize any surface-disturbing activities. If a lessee wishes to conduct exploratory drilling, an application for permit to drill (APD) must be submitted to the BLM for approval. These protections are accomplished through the attachment of Conditions of Approval (COAs) to each project in conjunction with the National Environmental Policy Act (NEPA) process and during review. For geothermal resources, some exploratory drilling can be done under a Notice of Intent and does not require an APD.

The federal fluid mineral regulations do not allow the BLM to attach new stipulations to a lease after its issuance, without the consent of the lessee. Similarly, the BLM may not apply COAs and other post-leasing restrictions that result in a de facto application of a new lease stipulation.

Existing Conditions in the Planning Area

Oil and Gas

Major oil and gas producing basins in the planning area are located primarily in Colorado, Utah, Wyoming, Montana, and the Dakotas. The most prolific oil and gas producing basins include the Powder River, Greater Green River, Unita-Piceance, North Park, and Williston, and are described further below.

The Powder River Basin, with an area of 43.5 thousand square miles, covers northeastern Wyoming and southeastern Montana (EIA 2023b). The Powder River Basin is a deep, northerly trending, asymmetric, mildly deformed trough, approximately 250 miles long and 100 miles wide. The thickness of the sedimentary section exceeds 17,000 feet along the basin axis (Lawrence 2010). The Eastern Powder River Basin in northeast Wyoming is one of the most prolific oil producing basins in the Rocky Mountain region. Coalbed natural gas is one of the largest contributors to total natural gas production in Wyoming, and coals of the Powder River Basin are the largest source of coalbed natural gas (WOGCC 2023).

The Greater Green River Basin, with an area of 25.9 thousand square miles and the largest oil shale deposits, covers areas in southwest Wyoming, northwest Colorado, and northeast Utah (EIA 2023b). Oil and gas exploration of the Overthrust Belt dates back to the 1890s. This area has been the focus of intense exploration, including seismic and drilling programs, since the mid-1970s (BLM 2003).

Uinta-Piceance Basin, which encompasses an area of 29.2 thousand square miles, extends from eastern Utah into northwestern Colorado and currently has production in conventional gas, tight sands, shale gas and oil (EIA 2023b). The Piceance Basin within the greater Unita-Piceance Basin is an elongated structural depression trending northwest - southeast located in western Colorado. The basin is more than 100 miles long and has an average width of over 60 miles, encompassing an area of approximately 8.6 thousand square miles (EIA 2023b). The Piceance Basin contains six of the top one hundred natural gas reserves in the US one of the top one hundred oil reserves (Colorado Geological Survey – online).

The North Park Basin occupies approximately 1.3 thousand square miles in north-central Colorado (EIA 2023b) and includes oil and natural gas resources primarily in the form of coalbed natural gas, carbon dioxide, and recent interest in the oil and gas potential of the Niobrara shale formation.

The Williston Basin, with an area of 69.8 thousand square miles extending from northwest South Dakota to western North Dakota and eastern Montana (EIA 2023b), has a long history of oil and gas production. Conventional oil production from the Williston Basin became significant during the 1970s, peaking in the mid-1980s, and then declining in the 1990s. Technological advances in horizontal drilling and hydraulic fracturing in the early 2000s have allowed development of unconventional zones (methane-bearing coal zones, oil or gas bearing shale zones, gas hydrates or "tight gas" in low porosity or low permeability traditional zones), that were once considered as uneconomic. As a result, oil and gas production in the region increased beginning in early 2000 and peaking in 2008. While production has slowed, interest and potential continue to exist in the region.

In addition to the above regions, Railroad Valley and Pine Valley in Nevada have areas of high and moderate potential for petroleum. Railroad Valley is an elongated valley trending north to south, approximately 80 miles long and up to 20 miles wide. The Grant Canyon No. 3 Well in Railroad Valley was one of the most prolific onshore oil wells in the continental United States, flowing up to 4,300 barrels of oil per day (Nevada Bureau of Mines and Geology, undated). Pine Valley is an elongated valley, trending north to south, approximately 30 miles long and 15 miles wide, in Eureka County. Production of oil in Pine Valley has been declining over recent years. Oil and gas operators have not indicated an interest in drilling new wells there.

Swings in the natural gas market are the likely driver in the industry's interest for oil and gas leases and the resulting requests for leasing and for filing of APDs. As demand rises, more interest in oil and gas development is expected (BLM 2009). In areas with moderate to high potential in several areas in the planning area, drilling is expected to increase.

Geothermal

Geothermal resources are a source of energy that uses the natural heat of the Earth's interior, carried to the surface by steam or hot water. Most of the geothermal power plants in the US are in western states, where there are large areas with medium to high potential for geothermal resources. More than 90% of the US geothermal power generation is from California and Nevada, with additional contributions from plants in Idaho, New Mexico, Oregon, and Utah (as well as Alaska and Hawaii; National Renewable Energy Lab [NREL] 2021).

In Nevada, geothermal resources are substantial in portions of the planning area. Based on US Geological Survey (USGS) data, there is particularly high potential in northeastern Nevada (Williams et al. 2008). Nevada currently has 26 operating geothermal power plants in 17 locations (State of Nevada Commission on Mineral Resources 2023). Between 2015 and 2019, geothermal project development growth in Nevada surpassed all other states with 5 new geothermal plants (NREL 2021). Nevada's geothermal electricity generation is the second highest in the US, after California. In 2021, geothermal power plants in Nevada collectively produced 825 megawatts of electricity (State of Nevada Commission on Mineral Resources 2021).

Geothermal resources in Utah are plentiful in the middle and northwest portions of the state, although a lack of transmission capacity may hinder development. Geothermal resources in Utah have the potential to supply 15,000 MW of electricity. As of 2019, there were four geothermal power plants in Utah with capacity of 90 MW (NREL 2021). Currently, there are no geothermal energy production facilities within GRSG habitat in the planning area in Utah. Future development of geothermal resources within GRSG habitat in the planning area is also highly unlikely.

In 2019, Oregon and Idaho had 4 and 1 operating geothermal power plants with a total capacity of 38 MW and 18 MW, respectively (NREL 2021). Between 2016 and 2019, Oregon had 4 developing projects and Idaho had 5 (NREL 2021).

3.10.2 Nonenergy Leasable Minerals

Nonenergy solid leasable minerals include sodium, phosphate, potassium, sulfur, and gilsonite. Similar to fluid leasable minerals (discussed above), nonenergy leasable minerals are governed by the Mineral Leasing Act of 1920, as amended, which authorized specific minerals to be disposed of through a leasing system. A prospecting permit provides the exclusive right to prospect and explore for leasable mineral deposits. There are three ways to obtain a mineral lease for nonenergy solid leasable minerals:

- Competitive lease: A competitive lease can be issued where there is an existence of a valuable mineral deposit. The BLM can designate such lands as Known Leasing Areas.
- Preference Right Lease: This is a noncompetitive lease. A prospecting permit application is filed and an exploration plan is approved. The plan must show how the existence and workability of a valuable deposit will be determined. If a valuable mineral deposit has been discovered, and other mineral-specific determinations are made in the positive, the BLM may issue a Preference Right Lease.
- Fringe Acreage Lease: This is a noncompetitive lease. A Fringe Acreage Lease application can be filed if the applicant has control over adjacent lands. The leased area must meet certain requirements,

including demonstration that the deposit continues from the lands controlled by the applicant and that the mineral deposit is not in an area of competitive interest.

Existing Conditions in the Planning Area

The discussion of nonenergy leasable mineral resources in the planning area focuses on gilsonite, phosphate, and sodium. Although the discussion for these minerals is planning area wide, each of these resources exists primarily in limited areas, described in detail below.

Sodium

The world's largest known trona deposit, a hydrous sodium carbonate mineral refined into soda ash, sodium bicarbonate, sodium sulfite, sodium tripolyphosphate, and chemical caustic soda (Gregory 2014) is located in southwestern Wyoming. Soda ash is the trade name for sodium carbonate, a chemical obtained from trona and sodium-carbonate-bearing brines. Primary uses are by the glass and chemical industries (USGS 2023a), which contribute to renewable energy components. This trona is found in the Green River Formation of Eocene age. The Wilkins Peak Member of the Green River Formation includes at least 42 trona beds, occurring from 400 to 3,500 feet below the surface. Trona is Wyoming's top export, and in the US, 90% of trona production comes from southwestern Wyoming. At current production rates of approximately 18 million tons per year Wyoming's estimated recoverable reserves would last over 2,000 years (Wyoming Mining Association 2023). A federally designated Known Sodium Leasing Area covering a 1,085 square mile area, almost entirely in Sweetwater County, Wyoming, is within the planning area and largely within HMAs.

The Piceance Basin of northwestern Colorado and adjacent states contains the world's largest and most economically significant deposit of a nahcolite, an evaporite mineral consisting of naturally occurring sodium bicarbonate. Within the planning area in Colorado, all of the sodium resources are found in the Parachute Creek Member of the Green River Formation, a small part of this area is within HMAs. The sodium resource in the basin was estimated at 32 billion short tons (Dyni 1974) and 29 billion tons by Beard et al. (1974; Brownfield et al. 2010).

In Utah, there are approximately 175,200 acres of planning area federal mineral estate in the population areas on which sodium occurs. All sodium deposits in the population areas are within the Rich and Box Elder population areas. The Rich Population Area has 158,900 acres with sodium deposits, all of which is within the decision area. The Box Elder Population Area has 16,300 acres of federal mineral estate on which sodium occurs, of which 2,500 acres (16%) is within the decision area. In Utah, there are no federal sodium leases in the planning area (BLM 2015a).

Phosphate

Phosphate is primarily contained in phosphate rich sedimentary rock deposits, typically deposited in shallow marine or low energy environments (Delaney 1998). Phosphate is primarily used in ammonium phosphate fertilizers and animal feed supplements (USGS 2023b). The BLM manages phosphate leasing and development on most public land.

Phosphate is currently mined in North Carolina, Florida, Idaho, and Utah. Production from Idaho and Utah has been steady while eastern production has been decreasing, leading to an increasing reliance on western deposits for domestic production. In the west, the richest phosphorite accumulations are found in southern Idaho and northern Utah. A deposit does exist in Wyoming but is currently unavailable due to existing withdrawals. Mining for phosphate primarily occur using surface mining methods where large quantities of waste rock are typically moved to extract the ore. Lands known to have a valuable phosphate resource have been designated as Known Phosphate Leasing Areas and are leased through a competitive leasing process.

Lands outside a Known Phosphate Leasing Area may also be leased, but the existence of a valuable phosphate resource must first be demonstrated, through prospecting. Leasing is a discretionary action; however, when issued, a federal phosphate lease conveys to the lessee the exclusive rights to explore for and extract the phosphate resources contained in the lease, subject to existing laws and regulations.

Phosphate mining in Utah occurs primarily in the Meade Peak Member of the Phosphoria Formation (Rupke 2015). HMAs overlap this formation in some areas. There are currently four federal phosphate mining leases in the state.

Idaho has 8 known phosphate leasing areas, totaling 80,168 acres and approximately 86 federal leases covering approximately 43,000 acres. Approximately half of the leases have been mined. There are currently 3 active producing phosphate mines; 2 permitted mines under construction that will replace producing mines as they are depleted; and 1 mine being permitted. The known phosphate leasing areas in Idaho have some overlap with HMAs. The phosphate industry has been an important industry in southern Idaho since about 1907. As a result, average wages in Caribou County are among the highest in the State of Idaho. The ore produced from the federal leases is an important source of phosphate fertilizer and elemental phosphorus produced at industrial plants in Pocatello and Soda Springs, Idaho. Currently, 10 unmined leases and one mine in permitting, encompassing 4 of the unmined leases, are located in GRSG HMA.

Gilsonite

Gilsonite is a solid hydrocarbon formed in veins or dikes that is mined primarily underground. Gilsonite is a unique industrial mineral found only in the Uinta Basin in eastern Utah. Gilsonite areas have some overlap with HMAs. The main markets for gilsonite are the oilfield and printing ink industries. In the oilfield industry, gilsonite is used as a fluid loss control agent and shale stabilizer for oil-based drilling fluids and water-based drilling fluids. It is also used as a loss circulation material and slurry density reducer for cementing fluids (Boden and Tripp 2012).

3.10.3 Coal

Leasing and developing federal coal resources is described in the federal regulations at 43 CFR Part 3400. Coal leases are made available for sale through a competitive bidding process in each BLM state office. Provisions of the lease documents in relation to surface and subsurface resources and resource uses are dictated by the current RMPs for each field office within which leases are offered. In general, these RMPs specify types of restrictions on coal leasing within each field office boundary based on identification of lands with potentially developable coal resources and determination of lands found suitable for coal leasing using the 20 criteria listed in Section 522 of the Surface Mining Control and Reclamation Act.

Coal leases are subject to readjustment of their stipulations. The first readjustment could occur 20 years after the initial date of issuance and then every 10 years thereafter. For lands found suitable for leasing, analysis of acceptability for leasing would consider protective measures identified in the then-current RMP. Depending on the field office, these protections may include design, reclamation, and mitigation of proposed measures.

Most but not all protections are attached to leases at the time of sale, and the protections may identify exception criteria for granting temporary or permanent relief from a specific measure. In addition, federal regulations give the BLM the authority to ensure coal is developed in a manner that minimizes impacts on other resources and uses and is protective of human health and safety. These protections are accomplished through the attachment of COAs to each project in conjunction with the NEPA process and during review of individual permit application.

BLM-administered lands are acceptable for coal leasing only after the lands have been evaluated through the BLM's multiple-use planning process (43 CFR Part 3420.1-4). In areas where development of coal resources may conflict with protection and management of other resources or land uses, the BLM may identify mitigating measures as either lease stipulations or operational restrictions.

Existing Conditions in the Planning Area

Coal resources within the planning area are primarily found in eastern Utah, northwestern Colorado, southwestern and northeastern Wyoming, and many parts of Montana.

Wyoming has the largest federal coal program in the BLM and is the nation's largest producer of coal at 34% of national production. Most Wyoming coal is used for steam generation in the electrical utility industry. The planning area contains bituminous and sub-bituminous deposits. The Powder River Basin, which extends into northern Converse County, contains some of the largest low-sulfur coal deposits in the world. In 2022, Wyoming produced a total of 244 million short tons of coal with 237 million short tons produced from the Powder River Basin on federal and non-federal Lands (Mine Safety Health Administration 2023).

Other coal formations and fields in Wyoming with significant historic and projected coal production include Adaville, Evanston, and Frontier formations in southwest Wyoming, and the Hanna Field in southcentral Wyoming. Reserves in the Adaville Formation are estimated at 1 billion tons, and currently is being mined at Chevron Mining, Inc.'s surface mine near Kemmerer. Within the Rawlins Field Office, there are six significant coalfields containing coal resources of sub-bituminous to bituminous rank: Hanna Basin, Carbon Basin, Great Divide Basin, Rock Creek, Kindt Basin, and Little Snake River (Berryhill et al. 1950).

Colorado coal has the second highest quality (low impurity content) in the nation. Most Colorado coals are bituminous and subbituminous. The Green River Coal Region, which occupies most of Moffat County and the western portion of Routt County, is the largest coal-producing region in Colorado (Carroll 2005).

A recent USGS report determined that more than 162 billion short tons of available coal resources are within the Montana portion of the Powder River Basin with about 35 billion short tons recoverable by surface mining methods. An additional 42 billion short tons of underground coal resources are within the Montana portion of the Powder River Basin and 80% (34 billion short tons) are within 500 to 1,000 feet of the surface, (Haacke et al. 2008). Four mines (Absaloka, Decker, Rosebud, and Spring Creek) mine sub-bituminous coal beds within the Tongue River member of the Fort Union formation in the Montana portion of the Powder River Basin. Most of the coal mined in the planning area is shipped out of state and the remainder of the coal is burned at local power plants. A small amount of coal is trucked in state to power plants and manufacturing facilities.

Coal resources occur throughout Utah, with an estimated 15 billion tons of recoverable coal. The most notable coal-bearing formation in the planning area is the Blackhawk Formation in central and eastern Utah, a lower middle unit of the Mesaverde Group. Coal beds in this formation are up to 25 feet thick, with most mined seams in the 6- to 13-foot range. The high-quality coal in this formation is bituminous with a relatively high heat content and low sulfur content. The Ferron Sandstone member of the Mancos Shale in central and eastern Utah also contains coal beds. Coal in the Ferron Sandstone member is bituminous but has higher sulfur and ash contents and slightly lower heat content than coal in the Blackhawk Formation. There are significant reserves of sub-bituminous C to high-volatile A bituminous coal in the Kiaparowits Plateau Late Cretaceous Straight Cliffs Formation (Hettinger et al. 2000). Much of the coal in central Utah has been extracted, and the remaining coal resources in this area are difficult to access or extract and some is of lower quality. The Dakota Formation in southern Utah contains coal beds up to 27 feet thick with subbituminous coal. These coal beds are higher in sulfur and ash contents and lower in heat content than coal mined in the Blackhawk Formation. The Carbon Population Area contains most of the coal operations in the planning area. Most mines in that area are deep underground mines, primarily in the Wasatch Plateau and Book Cliffs region.

3.10.4 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, as amended. Locatable minerals include metallic minerals such as gold, silver, copper, lead, zinc, molybdenum, uranium, and non-metallic minerals such as fluorspar, asbestos, talc, mica, and lithium.

Acquisition of locatable minerals is done by staking a claim over the deposit and acquiring the necessary permits to explore or mine, or the mineral rights can be acquired by purchase. 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. Only the Secretary of the Interior may withdraw areas from further location of mining claims or sites. Mining claims located after the Surface Resources Act of 1955, remain open to the public for other multiple uses which do not materially interfere with exploration, mining, and reasonably incident activities.

Existing Conditions in the Planning Area

Locatable mineral exploration and production occurs throughout the planning area. Locatable minerals found in the planning area are listed in **Table 3-11** (**Appendix 9**). Because locatable minerals are governed under the requirements of the Mining Law of 1872, as amended, the BLM has limited baseline data on the production and revenue associated with locatable mineral development in most of the states in the analysis area. Many locatable mineral prospecting and exploration activities fall under the definition of casual use and thus can occur without notifying the BLM. Required filings of claims, notices of intent or plans of operations do not require the identification of the particular locatable minerals being sought or developed. There is also no requirement to report the locatable mineral commodities produced or amounts produced each year. As a result, information regarding the existing conditions of locatable mineral development in the planning area is not available.

3.10.5 Mineral (Saleable) Materials

Saleable minerals, also referred to as mineral materials, include common construction materials and aggregates, such as sand, gravel, limestone aggregate, building stone, cinders, moss-covered rock (moss rock), roadbed, decorative rock, clay, and ballast material. The Materials Act of 1947, as amended (61 Stat. 681), authorizes disposal of mineral materials on BLM-administered lands through a sales system and provides for free use of material by government agencies, municipalities, or nonprofit organizations, if the material is not used for commercial purposes. Permitting removal or extraction (i.e., disposal) of mineral materials on BLM-administered lands is a discretionary activity. An operator and permittee may request use of mineral materials, but the BLM has no obligation to provide mineral materials for commercial and free use operations. The BLM will not authorize the disposal of mineral materials if it is determined that the damage to BLM-administered lands and resources would exceed the public benefits expected from the proposed disposal; nor will the BLM dispose of mineral materials from areas identified in Land Use Plans as not appropriate for mineral materials disposal (43 CFR Parts 3601.11 and 3601.12).

Sand and gravel are extremely important resources and their extraction varies directly with the amount of development nearby – road building and maintenance, and urban development. The proximity of both transportation and markets are key elements in the development of a deposit. Future demand for mineral materials will vary depending upon 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.

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 agencies are the largest users of gravel and sand resources through free use permits. A negotiated sale is an exclusive site proposed by a single party, often commercial, and 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 of these sales are for less than one ton. Free Use Permit sites are used sporadically and may be scattered throughout a field office or district office, to reduce hauling costs. A pit may be inactive for several years before it is needed for a road project in the area.

A gravel pit is initially developed by scraping off the vegetation and topsoil, which is then stockpiled for future reclamation. Most gravel pits are 5 to 15 acres in size. No infrastructure other than an access road is generally needed for mineral materials disposals. Most mineral material removal activity occurs during the summer months and during daylight hours.

Existing Conditions in the Planning Area

Mineral materials are the largest single mineral resource present across all the states with the largest potential for development. The volume of material sold and used varies by state. Specific closures of areas to saleable mineral materials, such as in Areas of Critical Environmental Concern (ACECs) or crucial or essential wildlife habitat, exist throughout much of the planning area. Some Land Use Plans apply use and development restrictions in terms of seasonal timing limitations to protect GRSG habitat and leks, similar to oil and gas leasing; however, this is not consistent across the planning area. Many of the LUPs in the planning area encourage the use of existing disposal sites until the material is depleted.

3.10.6 Oil Shale and Tar Sands

Oil shale is an organic-rich sedimentary rock consisting of calcareous shale with a large amount of organic material consisting of shale with a large amount of mixed organic compounds known as kerogen. Kerogen may be converted to oil through destructive distillation and exposure to heat. The U.S. holds more than half the world's oil shale, with the largest deposits located in the Green River Formation in Colorado, Utah, and Wyoming. Tar Sands are sedimentary rocks containing a heavy hydrocarbon compound called bitumen, which can be refined into oil. The Mineral Leasing Act of 1920, as amended, authorizes the leasing of federal lands for the development of oil shale and tar sands and the Energy Policy Act of 2005 authorizes the BLM to accelerate development of oil shale and tar sands in those states. Pursuant to Section 369 of that Act, the BLM issued a Final Programmatic Environmental Impact Statement (PEIS) in 2008 amending 10 RMPs in Utah, Colorado, and Wyoming to make approximately 2 million acres of public lands potentially available for commercial oil shale leasing and development and 430,000 acres potentially available for tar sands leasing and development. Because of litigation, the BLM released another Final PEIS/Proposed RMP Amendment in November 2012 and accompanying Record of Decision (ROD) in March 2013. The ROD reduced the areas available in Utah, Colorado, and Wyoming for potential development of federal oil shale and tar sands to approximately 800,000 acres. Areas open to oil shale leasing are for research, development, and demonstration leases only. The BLM would issue a commercial lease when the lessee satisfies the conditions of its research, development, and demonstration leases and applicable regulations. Preference right acreage in addition to the research, development, and demonstration lease acreage may be included in the commercial lease if specified. The Oil Shale and Tar Sands ROD removed federal mineral estate within all GRSG HMAs in Utah from potential oil shale and tar sands leasing, subject to valid existing rights.

Existing Conditions in the Planning Area

The most prospective oil shale deposits in the US are within the Green River Formation in the greater Green River Basin (including Fossil Basin and Washakie Basin) in southwestern Wyoming and northwestern Colorado, the Piceance Basin in northwestern Colorado, and the Uinta Basin in northeastern Utah (BLM 2013c). The resource potential of these shales is estimated to be the equivalent of 1.5 to 1.8 trillion barrels of oil in place (Bartis et al. 2005). Although resource potential within the Piceance Basin totals approximately 1.2 trillion barrels of oil in place, only part of it can be recovered depending on accessibility of the oil shale for development and method of mining used (Taylor 1987). The Green River Basin, which covers a large area in southwest Wyoming, northwest Colorado, and northeast Utah, contains an estimated 244 billion barrels of shale oil in the Tipton Shale Member, Wilkins Peak Member, and Laney Member of the Green River Formation. Oil shale occurs throughout most of the Green River Basin and in thin beds (less than 4 feet thick) in Fossil basin. The beds in the upper part of the Tipton Shale are up to 75 feet thick and yield up to 24 gallons of oil per ton. Other important oil shale beds in the Wilkins Peak Member and the Laney Member are slightly to the east of the southeast border of the Kemmerer Field Office.

Oil shale areas of interest in southwestern Wyoming lie within the Green River and Washakie Basins. These areas are presently withdrawn from locatable mineral entry to protect the oil shale resource. Although the oil shales within these basins are of lesser quality than Colorado oil shales some of these are estimated to contain several trillion barrels of oil per square mile (Trudell et al. 1973). The Green River and Washakie Basins contain approximately 476 billion barrels of in-place oil within the shale. These oil shale deposits have not been leased, nor have they received major attention from industry, primarily due to high development costs of underground and surface mining methods. Several in-situ research projects and tests conducted west of Rock Springs more than 30 years ago suggested marginal results for extraction of this mineral resource. Final federal regulations governing oil shale leasing and development were published in the Federal Register on November 18, 2008 (43 CFR Parts 3900, 3910, 3920, and 3930). There are currently no federal oil shale leases in the Green River and the Washakie Basins. There are no expressions of industry interest to explore for or to develop oil shale resources in this area.

3.11 ACECs and RNAs

Areas managed under Special Designations are regulatory or congressionally mandated and are designed to protect or preserve certain resource qualities or uses. Only ACECs and Research Natural Areas (RNAs) are included for analyses in this effort - other designated areas were not analyzed in detail (refer to **Chapter 1, Section 1.5.2**).

3.11.1 ACECs

FLPMA mandates prioritizing the designation and protection of ACECs in the development and revision of land use plans (43 U.S.C. 1712(c)(3)). An ACEC is defined in the FLPMA, Section 103(a), as an area on BLM-administered lands where special management attention 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 ensure safety from natural hazards. BLM regulations for implementing the ACEC provisions of the FLPMA are found in 43 CFR Part 1610.7-2 *Designation of areas of critical environmental concern*. These regulations were revised as part of the BLM's Public Lands Rule (PLR) in April 2024 and an updated BLM ACEC Manual 1613 was issued in August 2024. Although the Notice of Availability (NOA) for the GRSG RMP Amendment and EIS was published prior to the effective date of the PLR, and is, therefore, not expected to incorporate all elements of the PLR as per BLM IB 2024-048, the GRSG Proposed RMPA/FEIS is largely consistent with the PLR.

ACECs differ from some other special management designations as the designation does not automatically prohibit or restrict other uses in the area. The special management attention for an area designated as an ACEC is designed specifically to protect the relevant and important values and, therefore, may vary from area to area depending on the particular values identified. Management direction for proposed ACECs that meet the relevance and importance criteria are identified and analyzed during the RMP process. ACECs can be nominated at any time, but they are designated through an RMP or relevant RMP amendment process (when ACECs are within the scope of the plan amendment). Nominated ACECs that are found by BLM to meet the relevance and importance criteria must be evaluated in at least one alternative in the EIS or EA for the RMP or relevant RMP amendment (43 CFR Part 1610.7(g)). In the decision record for the planning effort, the BLM must provide justification and rationale for both ACEC designation decisions and decisions not to designate a proposed ACEC (43 CFR Part 1610.7-2(j)(2)). Designated ACECs must be managed, "…in a manner that conserves, protects, and enhances the relevant and important values and only allow causal use or uses that will ensure the protection of the relevant and important values" (43 CFR 1610.2(j)(3)). In order to designate an ACEC it must meet the relevance, importance, and need for special management criteria described in 43 CRF Part 1610.7-2(d). In addition, ACECs are protected by the provisions of 43 CFR Part 3809.11(c), which requires an approved plan of operations for activities resulting in more than five acres of disturbance under the mining laws.

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 for ACEC designation. Because this planning effort is only considering amending 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. The BLM also received nominations for ACECs during the comment period on the Draft EIS. Nominations that were not related to GRSG will be considered by BLM during the next RMP or applicable RMP amendment process in the area where the ACEC was nominated. The BLM considered the nominations received and if the area met the relevance and importance criteria, it was identified as a potential ACECs in Alternatives 3 and 6 in Draft EIS. The following table lists the potential ACECs that were identified:

Table 3-1. Potential ACECs Identified in Alternatives 3 and 6 in the Draft EIS

State	Potential ACEC	Acreage
Colorado	Case Flats	4,547
Idaho	Owyhee	653,199
	Shoshone Basin	244,935
	Camas-Laidlaw	457,724
	Big Desert	333,528

State	Potential ACEC	Acreage
Montana	South Valley Phillips	615,888
	Carter Crook	110,162
Nevada/California	Warm Springs	89,539
	North Fork O'Neil	937,512
	Grass-Kobeh Valley	852,979
	South Fork Dixie Flats	122,395
	Idaho Border	49,019
	Hays Canyon	340,850
	Vya-Massacre	239,677
	Montana Mountain	314,370
	Butte Long Valley	606,293
	Eureka North and South	66,905
	Monitor Valley	173,507
	Reese River	85,000
	Utah Border	58,650
	Buffalo Skedaddle	182,213
	Owyhee East	487,122
	Owyhee West	704,650
Oregon	None identified	-
Utah	Rich	132,924
	Box Elder	232,258
Wyoming	Golden Triangle/Little Sandy	272,557
	Carter-Crook (border w/ MT)	19,400
	Sagebrush Focal Areas (South Central/Western)	33,166
	Greater South Pass and Upper Green River Basin	311,229

Between the Draft and Final EIS, the BLM removed the Antelope, Mountain Valley Complex, Upper Snake Complex, and Triangle areas in Idaho and the Little Butte Long Valley in Nevada from consideration as ACECs. The BLM also updated the acres analyzed for ACECs in Idaho, Nevada, and Wyoming between Draft and Final. Please refer to **Appendix 5** for additional information and details.

Appendix 5, Evaluation of Areas of Critical Environmental Concern for Greater Sage-Grouse Habitat, provides a comprehensive review of the internal and externally nominated ACECs, the relevance and importance criteria evaluation process that was conducted, and a summary of the relevance and importance values of each of the potential ACECs identified. The appendix also describes changes made in the ACECs analyzed between Draft and Final EIS and the effects of the alternatives and the Proposed RMP Amendment on the potential ACECs considered.

3.11.2 Research Natural Areas (Oregon Only)

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, and provide an essential network of diverse habitat types that will be preserved in their natural state for future generations. Under certain circumstances, deliberate manipulation may be used to maintain the unique features for which the RNA was established. RNAs in the planning area 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). Under current BLM policy, research natural areas must meet the relevance and importance criteria of ACECs and are therefore designated as ACECs. Under current guidelines, ACEC procedures also are used to designate outstanding natural areas.

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. 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. While management practices necessary to maintain or restore ecosystems may be allowed and perhaps are necessary to sustain values, such as invasive plant control, it is crucial to align these practices with the overall goals and considerations outlined in the alternatives. Notably, certain alternatives may incorporate specific language allowing juniper treatment, and any allowance or necessity for such practices should be consistent with the chosen alternative and its objectives.

Existing Conditions

In Oregon, there are fifteen RNAs with important GRSG conservation values. All fifteen RNAs were designated in the underlying district RMPs and were labeled as key RNAs in the 2015 GRSG Approved Resource Management Plan Amendment (ARMPA). Five of the existing RNAs included GRSG and GRSG habitat relevance and importance values prior to the 2015 GRSG ARMPA. Two of the RNAs (Foster Flats and Guano Creek-Sink Lakes) were closed to livestock grazing prior to the 2015 GRSG ARMPA. Neither the 2015 nor 2019 GRSG plan amendments changed management or decisions on these RNAs. See **Table 17-1** (**Appendix 17**). The 2015 GRSG ARMPA made all or portions of the other thirteen key RNAs unavailable to livestock grazing. BLM Oregon districts with key RNAs have closed all or portions of some key RNAs through the required grazing regulations and NEPA processes, as indicated in **Table 2-26**. The 2015 GRSG Final Environmental Impact Statement estimated that approximately 21,957 acres in these key RNAs would be unavailable to livestock grazing. During the 2019 GRSG amendment process that number was corrected to 21,959 acres. **Tables 3-12 and 3-13** (**Appendix 9**) show the vegetation types by the key RNAs.

3.12 Social and Economic Conditions (Including Environmental Justice)

This section includes a summary of social and economic conditions, including identified environmental justice communities, and 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. Detailed information is included in **Appendix 14**, Socioeconomic Baseline Report. Updated information is also provided for BLM resources, including an overview of nonmarket values pulling from the 2015 discussion with updates from 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 2022c). 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. 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 analyses use a different analysis 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 a larger percentage of the area as GRSG habitat management areas on BLM-administered lands or minerals. These counties make up the areas where there is expected to be the biggest impacts on social and economic conditions due to management actions. An overview of counties included in each state analysis area is included in **Appendix 14**.

3.12.1 Baseline Demographic and Economic 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. They also provide context for how land use planning changes could affect the local population, further informing associated economic analyses. **Appendix 13** provides an overview of population changes since 2010 and provides a summary of economic data, including trends and current conditions for per capita income and unemployment. The unemployment rate is a key indicator measuring the percentage of unemployed people to the number of people in the labor force and 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 economic distress (Bondarenko 2024). Changes in the unemployment rate from year to year provide a good picture of the relative health of the economy over time. **Appendix 13** also identifies and describes major economic sectors in the socioeconomic study area that can be affected by public land management actions. 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.

3.12.2 BLM Land and Resource Use Revenue

Details are provided below for revenue and economic contributions associated with BLM lands and resources in the analysis area. Additional details for current and historic levels of resource use are included in the respective resource sections of this document.

Leasable Minerals

Fluid Minerals (Oil and Gas)

Oil and gas extraction is important for supporting the local economies in many communities in the analysis area, especially where a large percentage of employment comes from the fluid mineral industry on federal lands. These areas include northwestern Colorado, southeastern Idaho, southeastern Montana, northeastern Nevada, southwestern North Dakota, central to eastern Utah, and northeastern and southwestern Wyoming. Oil and gas extraction provides funding outside these areas for public services through royalties and taxes distributed to the states where the extraction occurred. The government collects revenues from leasable mineral extraction on public lands through bonuses, royalties, and rents paid by producers which are 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.

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.

See **Appendix 13**, Socioeconomic Baseline Report, and **Section 3.10**, Mineral Resources, for more information on current conditions of fluid mineral extraction and disbursements.

Coal Mines and Production

Although coal accounts for a small percentage of total economic contributions and employment in local communities, jobs associated with coal mining tend to be high paying compared with other types of employment in rural communities. 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% over the 5-year period). This reduction of coal production was observed globally and was largely driven by the reduction in natural gas prices that increased the demand for natural gas and reduced the demand for coal (EIA 2023b).[2]

Due to the reduction in demand for coal-fired generation, many economies throughout the socioeconomic analysis area could face significant financial impacts from 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 (Wyoming Legislative Service Office 2022; Wyoming Consensus Revenue Estimating Group 2023).

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%. Montana had a decline in disbursements from 2018 to 2021, but then disbursements increased from 2021 to 2022. See **Appendix 13**, Socioeconomic Baseline Report, and **Section 3.10**, Mineral Resources, for more information on current conditions of coal extraction and disbursements.

Nonenergy Mineral Extraction

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% of gross value of output for phosphate and sulfur and 2% 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

[2] 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.

states allocate a portion of the disbursements to counties, local governments, municipalities, and school districts. 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 to 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. 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.

California receives disbursements for nonenergy minerals produced in the state. However, minerals are extracted outside the California socioeconomic analysis area so changes in BLM management decision on GRSG HMAs would likely not impact disbursements for nonenergy minerals in California.

See **Appendix 13**, Socioeconomic Baseline Report, and **Section 3.10**, Mineral Resources, for more information on current conditions of nonenergy mineral extraction and disbursements.

Locatable Minerals

The value of minerals and their contribution to local and regional economies vary based on market conditions and 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. 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 supported by locatable minerals, hard-rock mining jobs tend to be some of the highest paying jobs in rural communities, especially in Nevada.

See **Appendix 13**, Socioeconomic Baseline Report, and **Section 3.10**, Mineral Resources, for more information on current conditions of locatable minerals on federal land.

Mineral Materials

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 and extraction directly with the amount of development—road building and maintenance, and urban development—nearby. 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 2016).

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 is to improve road access for wildfire 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. A pit may be inactive for several years before it is needed for a road project in the area.

See **Appendix 13**, Socioeconomic Baseline Report, and **Section 3.10**, Mineral Resources, for more information on current conditions of mineral materials on federal land.

Renewable Energy

Geothermal Energy

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).

See **Appendix 13**, Socioeconomic Baseline Report, and **Section 3.10**, Mineral Resources, for more information on current conditions of geothermal production and disbursements.

Wind and Solar

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 2021c). 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 2022d).

Chapter 2, Demographic and Economic Baseline Conditions, of **Appendix 13** discusses the jobs in key sectors for each state in the analysis area, and **Table A-2** through **Table A-21 (Part 3)** in **Appendix 13** show the number of jobs and labor income by sector county in each state of the analysis area, as reported by the US Bureau of Economic Analysis. Renewable energy, such as wind and solar development and operations and maintenance, support jobs in various industries, such as the construction industry, so the US Bureau of Economic Analysis includes the jobs that are supported through renewable energy in the employment numbers for these various industries rather than reporting jobs for renewable energy separately.

See **Appendix 13**, Socioeconomic Baseline Report, and **Section 3.8**, Lands and Realty (Including Renewable Energy), for more information on current conditions of wind and solar on federal land.

Livestock Grazing

The BLM-administered lands and other public and private lands support values to the local economies across the socioeconomic study area by providing forage to permitted ranchers at a price below that of private land forage or purchased feed. Seasonal use of public land forage can offset higher feed cost incurred at other times of the year and lower overall input costs associated with producing livestock for market. These animals can make up a significant portion of farm sales and provide food to the ranchers, their families, and the surrounding communities. Grazing fees paid by ranchers under their federal grazing permits also generate revenue which is returned to the states or counties where the fees were generated. Under the Taylor Grazing Act, a portion of BLM grazing revenue is returned to the county of origin; 50% of Section 15[3] fees collected are returned to counties, and 12.5% of Section 3[4] 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 between public land grazing and ranching lifestyles in the analysis areas.

For the purposes of examining how the BLM management decisions in this effort will affect different ranches in the analysis area, a discussion on the different types of ranches in the analysis area is provided. The USDA Economic Research Service developed a classification, or "typology", of farms and ranches based on annual gross cash farm income (the farm's revenue prior to deducting expenses), primary occupation of the operator, and ownership of the farm or ranch. Ranches are broadly categorized into family and non-family ranches based on whether the majority of the ranch 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 farm: 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 ranch 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.

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 income from their livestock than small family ranches with other sources of income and they tend to have less flexibility and resources to operate on smaller margins or modify business practices based on the BLM management decisions than ranches with higher sales or supplemental forms of income (for example, they have less ability to absorb higher costs, if ranching costs were to increase). See **Appendix 13**, Socioeconomic Baseline Report, and

[3] 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.
[4] 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.

Section 3.8, Livestock Grazing, for more information on current conditions of livestock grazing on BLM land.

Wild Horse and Burros

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 land health standards.

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 et al. 2018)

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).

See **Appendix 13**, Socioeconomic Baseline Report, and **Section 3.7**, Wild Horses and Burros, for more information on current conditions of wild horses and burros management and social values associated with wild horses and burros on BLM land.

Public Finances

State and local governments collect a variety of revenues related to the use of natural resources. Many western states and local governments are heavily dependent upon these mineral revenues for a significant portion of their annual budgets and rely on dollars generated from mineral development to fund schools, roads, and other public services. These revenues could be directly 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 Nevada, South Dakota, or 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 **Appendix 13**, Socioeconomic Baseline Report, for more information on the severance tax, including severance tax rates on oil and gas production 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 Legislature 2021).

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).

Payments in Lieu of Taxes (PILT) are federal payments to local governments that help offset losses in property taxes due to nontaxable federal lands within their boundaries.[5] PILT is not guaranteed and are subject to annual congressional budget appropriations. PILT payments 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 PILT payments in 2023 for nearly 27.9 million acres of federal lands. About 70.5% 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 **Section 3.7.1,** State and Local Revenues, and **Table 3-16** in **Appendix 13**, for more details on PILT by county and state across the analysis area).

3.12.3 Social Setting and Nonmarket Values

Social Conditions and Community Interests

The 10-state planning area encompasses 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; however, attitudes, beliefs, values, opinions, and perceptions about BLM-administered public resources and effects of policies and actions can vary substantially across social and geographic groups around and associated with the socioeconomic analysis area. 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 people have with BLM-administered lands. Those with common interests can typically be defined by communities of place or communities of interest, or both. Discussion of communities of place and communities of interest is included in **Appendix 13**.[6]

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 and have a

[5] 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.

[6] 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.

readily observed market value. Others have a less clear connection to market activity, even though they provide society benefits. 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-administered lands and resources. Total value is the sum of market value from economic activities and nonmarket value. However, 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, creating challenges 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 2013b). 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 Suhr Pierce 2021). Additional details are included in **Appendix 13**.

People also receive intrinsic benefits from nature that are diverse in inspiration but consistently highly valued. These include benefits from seeing or knowing a flourishing, biodiverse sagebrush ecosystem exists; benefits from feeling secure such habitats will exist for the enjoyment and health of future friends and family members; or 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.

3.12.4 Environmental Justice

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) and 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 considering these populations when developing mitigation measures. Details of the Environmental Justice Screening Criteria and results, including maps and tables of identified communities are included in **Appendix 13**.

Identified populations that met the criteria for further consideration as environmental justice communities are:

- Both counties included in the California analysis area
- Seven of the eight counties in the Colorado analysis area
- In the Idaho analysis area, 25 of the 27 counties
- In the Montana analysis area, 18 of the 26 counties
- The entire Nevada analysis area
- No county in the North Dakota analysis area
- Seven of the eight counties in the Oregon analysis area
- In South Dakota's analysis area, Butte County
- Across the Utah analysis area, 18 of the 23 counties
- In the Wyoming analysis area, 15 of the 21 counties

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, low-income, and American Indian and Alaska Native 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.

Environmental Justice Issues of Concern

As discussed above, Environmental justice includes the principle of meaningful involvement for all individuals, regardless of their race, color, national origin, or income. In 2022 through 2024, the BLM initiated formal consultation with tribes and outreach and meetings with the public, including those who meet the criteria for environmental justice consideration that have interests or traditional cultural properties in the analysis area. In January 2022, the BLM held two virtual public scoping meetings at different times during the day to encourage public participation across a wide group of people in various locations and to accommodate various needs. The meetings were recorded and shared on the project's ePlanning website for those who were unable to attend. 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 (BLM and Forest Service 2012; BLM 2012; see Chapter 5, Consultation and Coordination, for more detail on government-to-government consultations with tribes as well as meetings and outreach to the public for this effort).

The BLM maintains the project's website as well as a national GRSG conservation website that aims to help the public learn how BLM is working on maintaining and restoring GRSG. These sites provide background information, updated documents, information on public meetings, and contact information.

Comments that the BLM received during these outreach efforts helped guide resource and impact analysis considerations. Additionally, the BLM 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.

A key issue relating to environmental justice populations for many states, including California, Nevada, Colorado, Idaho, Montana, Oregon, South Dakota, and Utah, pertained to the interests of those who identify as American Indian, the cultural significance of the GRSG to American Indian 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 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.

The preservation of GRSG habitat would have beneficial effects for those who identify as American Indian who hold cultural value for the bird (BLM and Forest Service 2012). American Indian 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 Tribal members. The profound connection between the GRSG habitat and American Indian populations 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 where reservations are surrounded by PHMAs.

Another issue of concern includes the 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, at the time of this analysis, there is a lack of evidence that the types of operations that are most likely to be impacted by BLM management decisions (such as mining, renewable energy, and small family-owned ranching and livestock operations) employ a higher percentage of people who identify as a minority, low-income, or American Indian and Alaska Native. Therefore, there is no evidence that impacts on economic conditions due to BLM decisions will lead to disproportionate impacts on environmental justice populations, and economic impacts on environmental justice populations will not be carried forward in the impacts analysis on environmental justice populations. Impacts on economic conditions may occur across the area, and these impacts on economic conditions will be included in the impacts analysis on social and economic conditions, as it relates to all populations in the surrounding analysis area. Additional screening and consideration of environmental justice populations and analysis of any disproportionate and adverse 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. Depending on conditions at that time, communities with environmental justice concerns may change.

Concerns were identified about impacts on food prices and availability due to restrictions on grazing and mineral development (especially trona mining) in Wyoming and Idaho. These comments were 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. This issue will be carried forward and examined in the impacts analysis on environmental justice populations.

The 2015 EISs identified issues that were not brought up in public comments but were considered important issues for analyzing impacts on environmental justice populations. One 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 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 considered in the 2015 EISs. The 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 issues raised by the public, as discussed above, the BLM will consider and analyze other concerns for environmental justice populations. These issues include impacts from potential changes in water quality, air quality, and climate change from mineral development under alternatives with less restrictions. These issues were not analyzed in the 2015 EISs but are considered important to the analysis in the current efforts.

3.13 Air Resources and Climate

This planning effort is limited to making land use planning decisions specific to the conservation of GRSG habitats. No decisions related to the management of air quality will be made. Impacts on air quality and climate from the alternatives being analyzed are presented in **Section 4.3**.

3.13.1 Air Resources

Air resources involve ambient air quality (measured by the concentration of air pollutants) and air quality-related values such as visibility and atmospheric deposition. Air quality indicators include concentration of criteria air pollutants, hazardous air pollutants (HAPs), and sulfur and nitrogen compounds, which could contribute to visibility impairment and atmospheric deposition.

Regulatory Framework

Clean, breathable air, expansive vistas, and minimal acidification of the lands, streams, and lakes are goals pursued by the BLM air resources program. The Clean Air Act and FLPMA require the BLM to comply with local, state, Native American Tribal, and other federal agency air quality standards and regulations. FLPMA further directs the Secretary of the Interior to take any action necessary to prevent unnecessary or undue degradation of the lands (Section 302 (b)), and to manage the public lands “in a manner that will protect the quality of scientific, scenic, historical, ecological, environmental, air and atmospheric, water resource, and archeological values” (Section 102 (a)(8)). Air resources management is accomplished by establishing desired outcomes (goals and objectives) and allocations for allowable resource uses (management direction) that, at a minimum, must ensure authorized activities are in compliance with regulatory standards.

The U.S. Environmental Protection Agency (EPA) which has the primary responsibility for regulating air quality, has established national ambient air quality standards (NAAQS) under the Clean Air Act for six criteria air pollutants which include: carbon monoxide, lead, nitrogen dioxide, ozone, two classes of particulate matter (particulate matter with an aerodynamic diameter less than or equal to 10 microns [PM_{10}] and particulate matter with an aerodynamic diameter less than or equal to 2.5 microns [$PM_{2.5}$]), and sulfur dioxide. NAAQS include primary standards established to protect public health, including the sensitive populations (e.g., children, the elderly, or asthmatics), and secondary standards to provide public welfare protection, including protection against decreased visibility and damage to the environment (e.g., crops, vegetation, animals, buildings).

The Clean Air Act requires federal, state, Tribal, and local agencies to work in partnership to manage and regulate air quality. Local governments are responsible to comply with NAAQS but also may establish local air quality standards that are no less restrictive than the NAAQS. The Clean Air Act has established permitting programs, generally implemented by states and local agencies, to carry out the goals of the Act. States are responsible for development of a state implementation plan to ensure standards are met.

In addition to criteria pollutants, the EPA and state air quality management agencies are responsible for controlling air toxics, or HAPs, at all major sources and some area sources in specific source categories (40 Code of Federal Regulation 51). HAPs are those known or suspected to cause cancer or other serious health problems (e.g., respiratory problems, birth defects, or reduced fertility) or environmental effects (e.g., mercury deposition).

In addition to improving air quality, the Clean Air Act addresses maintaining clean air. This program, known as the Prevention of Significant Deterioration program, maintains clean air by limiting emissions of air pollutants so that significant deterioration of air quality will not occur. The program protects air quality within Class I areas by allowing only slight incremental increases in pollutant concentrations. Class I air quality areas include National Parks larger than 6,000 acres and wilderness areas larger than 5,000 acres that existed or were authorized as of August 7, 1977. They receive the highest degree of air quality protection under the Clean Air Act.

Current Conditions and Trends

The Clean Air Act requires each state to identify areas with ambient air quality in violation of the NAAQS using monitoring data collected through state monitoring networks. Areas that violate the NAAQS are designated as nonattainment areas for the relevant criteria air pollutants, while areas that comply with the NAAQS are designated as attainment areas for the relevant criteria air pollutants. Areas of uncertain status due to insufficient monitoring data are generally designated as unclassifiable but are treated as attainment areas for regulatory purposes. Most of the planning area is in attainment/unclassifiable for the NAAQS. As shown in **Table 3-14** (**Appendix 9**), portions of the planning area in California, Colorado, Idaho, Montana, Utah, and Wyoming are nonattainment for one or more of the NAAQS.

In conducting a thorough general conformity applicability review, the BLM has determined that conformity is not applicable. This conclusion is underpinned by the comparison of the Reasonably Foreseeable Development (RFD) outlined in **Appendix 12**, which indicates that the projected development associated with the actions is either the same or less than the No Action alternative. As a result, net emissions are anticipated to remain unchanged.

Areas that have been redesignated from nonattainment to attainment are considered maintenance areas. **Table 3-15** (**Appendix 9**) shows the areas that were redesignated from nonattainment to maintenance areas and the dates of the redesignation. These areas have current attainment of the NAAQS, showing air quality in the planning area has improved over the last two decades.

Emission Inventory

The EPA, in collaboration with state, local, and Tribal agencies, compiles a National Emissions Inventory every 3 years. The total criteria pollutant emissions reported from the planning area counties in the most recent (2020) National Emissions Inventory[7] (EPA 2023b) is shown in **Table 3-16** (**Appendix 9**). Although there is no NAAQS for volatile organic compounds (VOCs), they contribute to ozone formation in the atmosphere. As shown in the table, in the planning area counties, wildfires were the primary emitter of carbon monoxide (72.7%) and $PM_{2.5}$ (62.1%) and the second highest emitter of VOCs (35.9), sulfur dioxide (35.5%), and PM_{10} (27.0%). Biogenics were the number of one source of VOCs (48.3%), while point sources were the number one source of sulfur dioxide (57.5%) and area sources were the number one source of PM_{10} emissions (70.2%). Nitrogen oxides emissions were highest from point sources (23.1%), followed by on-road mobile sources (22.6%).

Air Quality Monitoring Data

The EPA compiles air monitoring data from state monitoring networks and presents annual air pollutant concentration values by county in its Air Quality Statistics Report (EPA 2023b). **Table 3-17** (**Appendix 9**) presents air pollutant concentration values, which are key indicators in assessing air quality and represent a calculated measure that reflects the highest long-term concentrations of pollutants. This information helps evaluate the overall air quality trends and compliance with standards for planning area counties in California, Colorado, Idaho, Montana, Nevada, Oregon, South Dakota, Utah, and Wyoming. There are no monitoring stations in the planning area counties in North Dakota. While monitoring data are available for the range of criteria pollutants, depending on location, **Table 3-17** (**Appendix 9**) focuses on the pollutants of most concern in the planning area, including ozone, PM_{10}, and $PM_{2.5}$, based on the county nonattainment status. Values in bold indicate a level above the NAAQS for that pollutant. However, these bolded values are not direct design values and serve as general indicators. The EPA determines attainment status, and this disclaimer is included for clarity.

All planning area states except Idaho have recorded concentrations for one or more pollutants above the NAAQS in some counties in some years (**Table 3-17** [**Appendix 9**]). In some areas, the elevated concentrations may reflect urban conditions where monitoring stations are located, potentially not accurately representing air quality conditions in more rural BLM-administered lands.

<u>Ozone</u>. Ozone is formed by photochemical reactions of precursor air pollutants, including volatile organic compounds and nitrogen oxides. These precursors are emitted by mobile sources, stationary combustion equipment, and other industrial sources. Ozone formation is enhanced by increased sunlight and higher air temperatures. Ozone exposure can lead to respiratory issues and aggravate pre-existing conditions such as asthma and chronic obstructive pulmonary disease. Elevated ozone concentrations may also occur during winter in snow-covered rural areas. Since 2000, ozone concentrations have decreased by 16% nationally (EPA 2023c). The West (including California and Nevada) has seen a decrease in ozone concentrations of 11%, while the Southwest (including Utah and Colorado) has seen a decrease of 2%. Conversely, ozone concentrations in the Northern Rockies and Plains have increased 14% since 2000, while the in the Northwest (including Oregon and Idaho) concentrations have increased by 2% (EPA 2023c).

<u>Particulate Matter (PM_{10} and $PM_{2.5}$)</u>. Particulate matter is a complex mixture of small particles and liquid droplets found in the air. $PM_{2.5}$ consists of both primary particulate matter, generated mostly from combustion-related activities, and secondary particulate matter, which is formed from atmospheric chemical

[7] First released version of the 2020 National Emissions Inventory.

reactions of precursor emissions. Sources of particulate matter include agricultural activities, industrial processes, smoke from wildland fire, fossil fuel development, physically disturbed soils, and dust from unpaved roads. $PM_{2.5}$ emissions are primarily generated by internal combustion diesel engines, soils with high silt and clay content, and secondary aerosols formed by chemical reactions in the atmosphere. Particulate matter affects deposition on plants and surfaces (including on snow, which can contribute to climate change) and visibility. PM_{10}, consisting of larger particles, can irritate the eyes, nose, and throat and may exacerbate respiratory conditions. $PM_{2.5}$, comprising finer particles, poses health risks as it can penetrate deep into the lungs, potentially causing or worsening respiratory and cardiovascular problems.

PM_{10} concentrations have decreased by 36% nationally since 2000 (EPA 2023d). This decrease is observed in annual PM_{10} concentration averages. Over this same period, the West (including California and Nevada) saw a decrease of 66% and the Southwest (including Utah and Colorado) saw a decrease of 22%. Conversely, PM_{10} concentrations in the Northern Rockies and Plains increased 9% since 2000, while in the Northwest (including Oregon and Idaho) concentrations increased 21% (EPA 2023d). $PM_{2.5}$ concentrations have decreased by 37% nationally since 2000 (EPA 2023e). Concentrations decreased 28% in the West (including California and Nevada), 23% in the Northwest (including Oregon and Idaho), 16% in the Northern Rockies and Plains, and 13% in the Southwest (including Utah and Colorado) since 2000 (EPA 2023e).

Climate Change and Greenhouse Gases

The Intergovernmental Panel on Climate Change (IPCC) describes climate change as "a change in the state of the climate that can be identified (for example, by using statistical tests) by changes in the mean and/or the variability of its properties, and persists for an extended period, typically decades or longer. Climate change may be due to natural internal processes or external forcings such as modulations of the solar cycles, volcanic eruptions and persistent anthropogenic changes in the composition of the atmosphere or in land use" (IPCC 2013, 2021). Current ongoing global climate change is caused, in part, by the atmospheric buildup of greenhouse gases, which may persist for decades or even centuries. Although largely invisible to the short wavelength incoming solar radiation that heats the earth's surface, greenhouse gases absorb a portion of the outgoing long wavelength infrared heat radiated back from the surface, preventing it from escaping out into space. As a result, the buildup of greenhouse gases since the start of the industrial revolution has increased the global mean temperature and has altered the earth's climate in complex ways.

Greenhouse gasses exhibit different speciation characteristics, with each gas having unique properties. CO_2, primarily released from fossil fuel combustion and deforestation, is a major contributor to global warming. Methane, emitted from livestock, agriculture, and energy production, is a potent but short-lived greenhouse gas. Nitrous oxide, originating from agricultural and industrial activities, has a longer atmospheric lifespan. While greenhouse gasses primarily influence climate patterns, they also have direct and indirect health impacts. Climate change resulting from greenhouse gas emissions contributes to extreme weather events, altered disease patterns, and impacts on air and water quality. Additionally, certain greenhouse gasses, like methane, can indirectly affect human health by contributing to ground-level ozone formation (IPCC 2013, 2021).

Warming of the earth's climate since the industrial revolution has been observed to coincide with widespread effects throughout the earth-atmosphere system, including reductions in the extent and duration of polar sea ice and mountain winter snowpack, rising sea levels, increases in mean nighttime minimum temperatures, shifts in historical rainfall patterns, and changes in the frequency, severity, and duration of weather events. These effects, in turn, have affected natural and human systems regardless of cause, implicating the sensitivity of natural and human systems to changing climate (IPCC 2013, 2021).

The IPCC (2021) has concluded that human activities such as the burning of fossil fuels have caused greenhouse gas concentrations to increase since the mid-18th century and that “it is unequivocal that human influence has warmed the atmosphere, ocean and land.” The IPCC’s (2021) best estimate of the human-caused increase in global surface temperatures between 1850-1900 to 2010-2019 is 1.93 degrees Fahrenheit (°F), and it is “very likely” that well-mixed greenhouse gases were the main driver of this warming since 1979. Evidence of the observed change and the human influence in extreme events such as heat waves, heavy precipitation, and droughts has strengthened since the IPCC Fifth Assessment Report (IPCC 2013). For example, it is “virtually certain” that the frequency and intensity of extreme heat events have increased across most regions since the 1950s, and cold extremes have become less extreme and less severe; there is “high confidence” that human-induced climate change is the main driver of these changes (IPCC 2021).

Across the United States, annual average temperatures have increased by 1.8°F since the beginning of the 20th century and by 1.2°F over the last few decades (BLM 2020a; US Global Change Research Program 2018). According to the National Climate Assessment (US Global Change Research Program 2018), the largest increases in annual average temperatures since the beginning of the 20th century were observed in the western United States, while the southeastern United States had the least warming. Annual precipitation has increased in the northern and eastern United States since the beginning of 20th century and decreased in most of the southern and western United States (US Global Change Research Program 2018). The frequency and intensity of heavy precipitation have increased in most parts of the United States since the 20th century (US Global Change Research Program 2018).

Over the contiguous United States, annual average temperature is expected to increase by 2.5°F over the next few decades compared to present-day, regardless of future emissions (US Global Change Research Program 2018). By the end of the 21st century, the annual average temperature for the contiguous United States is expected to increase by 3 to 12°F depending on future emissions scenarios, and high temperature extremes are expected to increase accordingly (US Global Change Research Program 2018). The frequency and intensity of heavy precipitation are projected to continue increase over the coming century in the United States, and winter and spring precipitation are projected to increase significantly over the Northern Great Plains, the Upper Midwest, and the Northeast (US Global Change Research Program 2018).

The 2021 BLM Specialist Report on Greenhouse Gas Emissions and Climate Trends (BLM 2020a) presents climate trends for many of the western states. Information from that report is incorporated by reference and summarized in **Table 3-18** (**Appendix 9**). Climate trend information is further supplemented by the National Oceanic and Atmospheric Administration’s State Climate Summaries (NOAA 2022), among other sources. In the Planning Area greenhouse gas emissions come primarily from the combustion of fossil fuels in energy use. Energy use is largely driven by economic growth, with short-term fluctuations in its growth rate created by weather patterns that affect heating and cooling needs and changes in the fuel used in electricity generation. In 2020, carbon dioxide emissions from combustion of fossil fuel for energy production in the US were equal to 73% of total United States anthropogenic greenhouse gas emissions (US Energy Information Administration 2022). Other major greenhouse gases that are caused by human activity include methane (11%) and nitrous oxide (7%; United States Energy Information Administration 2022).

Different greenhouse gases have different impacts on Earth’s warming based on their ability to absorb energy and how long they stay in the atmosphere; therefore, total greenhouse gas estimates use carbon dioxide equivalent (CO_2e) which takes the radiative power of each gas for a given timeframe. In 2022, total GHG emissions from livestock grazing, other agriculture, commercial, industry, residential, and transportation sources was equal to 29,436 million metric tons of CO_2e per year (**Table 3-19** [**Appendix 9**]).

Greenhouse gas emissions are offset to some degree by carbon that is sequestered in terrestrial ecosystems. Carbon sequestration is the process of capturing and storing atmospheric carbon dioxide (e.g., in vegetation and soils). Historically, natural carbon sequestration in plants and soils has been able to lock up about 29% of all human-caused emissions on a global scale (Merrill et al. 2018). Terrestrial ecosystems on federal lands were estimated to have sequestered an average of 195 million metric tons of CO_2e per year nationally between 2005 and 2014, which would offset emissions from extraction and end-use combustion of fossil fuels on federal lands by approximately 15% (BLM 2020a).

3.14 Soil Resources

BLM's Rangeland Health Standards determine properly functioning physical conditions of soil resources in a planning area. This helps the BLM with soil management because determination on conditions will guide management adjustments and provide direction to make significant progress toward achieving the stated Standards. Since GRSG are dependent on sagebrush, and sagebrush viability is dependent on soil health, soils are a crucial element of GRSG habitat. Soil health is also integral to the BLM's mandate to sustain the health, diversity, and productivity of BLM-administered lands. Many resources and resource uses, including livestock grazing, wildlife habitat, riparian habitat, special status species, fisheries, recreation, water quality, and forestry, depend on suitable soils. Consequently, soil attributes and conditions are important to BLM management direction.

Soils are defined by the interaction of the processes that form them, including parent material (geology), climate, topography and biologic organisms. Through time, these processes form unique soil types and influence what plants may grow upon them. Soil surveys indicate that climate and topography are the primary influences on soil formation. Soil development processes, such as rock weathering, decomposition of plant materials, accumulation of organic matter, and nutrient cycling, are controlled largely by climate. Soil moisture and temperature strongly affect the rates of addition, removal, translocation, and transformation of material within the soil. Topography influences site conditions such as precipitation amounts and effectiveness, drainage, runoff, erosion potential, and temperature (Weltz et al. 2017).

Soils play an integral part in vegetation community development. Plants, including sagebrush, use soil as an anchor, a means to provide water for growth, and a storehouse for the nutrients needed for growth. Plant communities are most noticeably influenced where soil texture and thickness of soil horizons change, depth to restrictive layers including abrupt soil horizon boundaries exist, and by soil drainage, moisture holding capacity, or depth to the water table. Native plant communities require management considerations that include the ability of soil to produce a healthy ecosystem over the long term. Reducing the risk of erosion from water and air processes, limiting compaction from traffic source or grazing, and allowing water to infiltrate at a normal rate for the given soil texture will allow vegetative communities to thrive and further protects the soil resources (Weltz et al. 2017).

3.14.1 Existing Conditions

The discussion of existing conditions contains a description of soil resources for the planning area, regardless of landownership.

Conditions of the Planning Area

Soil Productivity

Soil productivity within the planning area varies widely due to the diversity of soils and site characteristics, including varying climatic, vegetative, topographic, and geologic conditions. The planning area landscape varies greatly from broad valleys to mountains. Average annual precipitation and temperature in the project area vary by elevation and aspect (NOAA 2022). Due to low soil temperatures in high elevations and rugged mountains, the chemical reactions that release plant nutrients from minerals take place slowly. The rate of biologic activity is also limited by temperature, resulting in a slow rate of biologic decomposition, seed germination, and root growth. These factors combine to give the soils low fertility (Weltz et al. 2017).

Some of the most productive soils in the planning area are found in well drained valley bottoms, toe-slopes, benches, and broad ridge tops. On uplands where rainfall is moderate to low, medium-textured soils may produce favorable conditions, depending on land uses such as livestock grazing. Favorable conditions arise because medium-textured soils have the capacity to retain moisture, supporting vegetation even in less rainy environments. Livestock grazing, as a land use, plays a role by influencing the composition and health of vegetation. The interaction between livestock grazing and vegetation affects soil stability and water retention, contributing to overall suitability of medium-textured soils in uplands with limited rainfall. Soils that feature shallow clay pans, hardpans, or salts pose substantial constraints to land use and land use management. Shallow clay pans and hardpans limit root penetration and water drainage. Additionally, the presence of salts can lead to soil salinity, affecting the suitability of the land for various land uses. Soils in the planning area vary from calcareous to alkaline and surface texture ranges from strongly alkaline loams, sandy loams, loams, to clay loams underlain by sandy loam to clay textures, and rock outcrop complexes. Permeability ranges from very slow to moderately rapid, and erosion hazard for most soils is moderate, with some ranked as severe. Some of these soils are highly saline. Due to the salt content in these soils, vegetative cover can be sparse, resulting in soil particles not being anchored in place; thus, the soil is easily eroded by wind and water (Weltz et al. 2017).

Biological soil crusts are an important component of a broad range of ecological sites in the planning area. They function as a living mulch by retaining soil moisture, increasing organic matter, and discouraging annual weed growth (Belnap et al. 2001). Biological soil crusts also have a preventative effect on cheatgrass germination (Reisner et al. 2013). They are more prevalent at lower elevations, compared to higher elevations with greater precipitation, where vascular plant growth precludes biological crust development (Belnap et al. 2001). Although biological crusts are well adapted to severe growing conditions, they are extremely susceptible to physical disturbances, chronic and heavy domestic livestock grazing, and recreational activities. Such physical disturbances degrade biological soil crusts and eliminates native perennial bunchgrasses, creating conditions that promote cheatgrass invasion (Molvar et al. 2024). Wildfire can also damage the crust, and shrub presence and cheatgrass may increase wildfire intensity, decreasing the likelihood of early vegetative or crust recovery after a burn (Brooks and Chambers 2011). Over the past 30 years, annual herbaceous cover (led by cheatgrass, Ventenata, and medusahead wildrye) has steadily increased, while sagebrush has declined (Rigge et al. 2021c, indicating that current land-use decisions continue to drive cheatgrass expansion, rather than it being solely an artifact of past overgrazing (Rigge et al. 2021c).

Management practices affect the ability of soils to maintain productivity because of displacement, compaction, erosion, and alteration of organic matter and soil organism levels. For instance, when vegetation is removed for specific management purposes, it alters organic matter levels, influencing productivity content of the soil. When soil degradation occurs in semiarid, high desert regions, natural processes are slow to return site productivity. This is because conditions in these areas, with limited water and harsh climates, slow down natural recovery of the soil. The lack of sufficient moisture and the challenging environment make it difficult for the soil to bounce back quickly after degradation. Prevention of soil degradation is far more cost-effective and time effective than remediation or waiting for natural processes. Management practices, such as proper stocking rates for livestock, rotation of grazing, periodic rest from grazing, improved site design, construction and maintenance of roads, selective logging, rehabilitation of unneeded surface disturbance, restricting vehicles to roads and trails, rehabilitating mined areas, and control of concentrated recreational activities, can reduce erosion effects and improve soil conditions. This encompasses efforts to create a more favorable environment for sustainable and productive soil.

Soil Erosion

Erosion is a continuing natural process that can be accelerated by human disturbances. Factors influencing soil erosion include soil texture, structure, length and percent of slope, vegetative cover, and rainfall or wind intensity. Soils most susceptible to erosion by wind or water are typified by bare or sparse vegetative cover, incohesive soil particles with slow infiltration rates, and moderate to steep slopes. Wind erosion processes are less affected by slope angle but are highly influenced by wind intensity. Semi-arid regions of much of the planning area have a low percentage of natural plant community ground cover, allowing the soils to erode naturally in wind and during infrequent rain events (Al-Hamdan et al. 2015).

While erosion occurs under natural conditions, rates of soil loss may be accelerated if human activities are not carefully managed. Soils are affected by surface uses that loosen topsoil and damage or remove vegetation or other ground cover. Surface-disturbing activities include any authorized actions that disturb vegetation and/or surface soil, thereby increasing erosion potential above normal site conditions. Surface-disturbing activities include construction of well pads and roads, pits and reservoirs, pipelines and power lines, mining, vegetation treatments, livestock grazing, and concentrated OHV cross-country travel.

Soil erosion rates can be controlled by managing vegetation, plant residues, and soil disturbance. Vegetative cover is the most significant factor in controlling erosion because it intercepts precipitation, reduces rainfall impact, restricts overland flow, and improves infiltration (Weltz et al. 2017). Biological soil crusts are especially important for protecting the soil and controlling erosion in desert regions, but are easily disturbed by various factors, including human activities (Weltz et al. 2017).

Wind erosion is particularly hazardous when surface litter and vegetation are removed by wildfire or other disturbances. Soils are considered fragile or of high erosion hazards if they contain the following characteristics: (1) Soils rated as highly or severely erodible by wind or water, as described in soil survey reports; (2) landslide areas, as identified in soil survey reports; and (3) Soils on slopes greater than 35% (Weltz et al. 2017).

Trends

The overall guidance for soil resources is to maintain or improve the ability of the soil to support vegetation and allow water and nutrients to be cycled by either macro or microorganisms, all of which promote and improve the health of the land. Degradation by excessive grazing, overpopulated wild horse and burro herds, recreation, erosion, or land developments have caused a reduction in soil function as one or perhaps many of the soil properties are changed thereby affecting the functions necessary for healthy soils. These essential functions include maintaining adequate fertility, supporting plant growth, promoting water retention, and sustaining a diverse ecosystem. The interconnectedness of soil properties and functions underscores the significance of preserving soil health for overall ecosystem well-being. BLM's rangeland health standards work toward conditions in which vegetation and ground cover maintain soil conditions that can sustain natural biotic communities. By implementing sustainable practices like controlling grazing rates, these standards aim to strike a balance that supports both the health of the land and the diverse ecosystems it sustains.

In the planning area, impacts on soil resources have resulted from various factors, including increasing temperatures, changing precipitation patterns, wildfire seasons, infestations like pine bark beetle, juniper and cheatgrass invasion, compaction from livestock grazing, mineral and energy development, long-term increases in outdoor recreation, as well as natural processes like erosion and weathering, and other activities influencing the soil (NOAA 2022). The potential for maintaining or restoring these ecological communities and conserving the soil resource depends on specific soil types and how resource programs are managed. Different soil types, like sandy or clayey soils, have varying abilities to retain water and nutrients, affecting restoration. Resource program management, involving practices like erosion control, directly influences the success of conserving and restoring the soil.

3.15 WATER RESOURCES

Water quality on public lands is regulated by the Clean Water Act, Safe Drinking Water Act, Public Land Health Standards, the Watershed Conservation Practices Handbook and other laws, regulations, and policy guidance at the federal, state, and local levels. The Clean Water Act (33 U.S.C. 1251 et seq.) mandates the protection, monitoring, and restoration of the physical, biological, and chemical integrity of waters in the United States. Sections 208 and 319 of the Clean Water Act specifically address the importance of implementing control strategies to address nonpoint source pollution. On BLM-administered lands, soil and water conservation practices, such as erosion control and watershed management, along with best management practices like proper grazing management, aim to prevent soil erosion and runoff. These practices reduce transport of pollutants into water bodies, effectively mitigating nonpoint source pollution on BLM-administered lands. The U.S. EPA supports this perspective in their guidance (EPA 1987). The Safe Drinking Water Act presumes aquifers are underground sources of drinking water, unless they are specifically exempted or if they have been shown to fall outside the definition of underground sources of drinking water (Safe Drinking Water Act 1996). Water rights are regulated by state law.

As a designated management agency, the BLM must: (1) implement and enforce natural resource management programs for the protection of water quality on federal lands under its jurisdiction; (2) protect and maintain water quality where it meets or exceeds applicable state and Tribal water quality standards; (3) monitor activities to assure they meet standards and report the results to respective states; and (4) meet periodically to recertify water quality BMPs (Weltz et al. 2017). BMPs include methods, measures, or practices to prevent or reduce water pollution, including but not limited to structural and nonstructural controls, operations, and maintenance procedures. BMPs are applied as needed to projects. BMPs work by using various strategies such as physical barriers and operational changes to prevent water pollution. Each project receives customized BMPs to ensure effective application.

3.15.1 Existing Conditions

The discussion of existing conditions contains a description of water resources for the planning area, regardless of landownership. Where specific to BLM-administered lands the description is limited to describing water resources associated with GRSG and their habitats. Wetlands and livestock water developments are important sources of water that influence GRSG and their habitat. Apart from wetlands and livestock water developments, other important water sources for GRSG include natural springs, creeks, and seasonal ponds.

Conditions within the Planning Area

Within the planning area, major water features are streams, lakes, wetlands, playas, and dry lakes. Streams can be ephemeral, intermittent, or perennial. Ephemeral streams do not flow during an average water year, but they do flow in response to large precipitation events. Intermittent streams flow during spring runoff for an average water year, but they generally dry up later in the summer. Perennial streams contain some water all year. Lakes can be permanent or temporary. Wetlands and floodplains vary in extent on water inundation onto a floodplain and depth (degree of saturation) throughout the year. Permanent waters can also be in the form of ponds and reservoirs developed for human or livestock consumption. Additionally, snow melt contributes to recharge surface waters, influencing intermittent stream flow. Springs also serve as a source for surface flows.

Stream channels and floodplains play a vital role as their shape and condition significantly impact key aspects of river systems. The configuration and health of these components influence speed of water flow, determining how quickly water moves through the system. Additionally, their morphology contributes to water storage capacity within basins, affecting the retention and release of water. Furthermore, shape and condition of stream channels and floodplains have implications for water quality, as certain features can filter pollutants. The interplay of these factors also connects to erosional impacts, with shape and condition influencing the extent of erosion within the river system. Consequently, these factors have far-reaching effects on fish and wildlife habitat, agriculture, recreation, and the hazard and risk of local communities and landowners to floods. Hazard and risk, or vulnerability of streams and floodplains, also include impacts on water availability (i.e., how much water is stored within the basins) and water quality.

Surface Water

The United States is divided and sub-divided into successively smaller hydrologic units called regions, sub-regions, accounting units (basins), and cataloging units (sub-basins). Each hydrologic unit is identified by a unique hydrologic unit code consisting of two to eight digits. The fourth level of classification (sub-basin) is represented by an eight-digit hydrologic unit code, indicating a more detailed and specific identification compared to the other hydrologic units mentioned above.

Due to the semi-arid nature of BLM-administered lands within the planning area, surface waters are extremely valuable. Surface water flow volumes differ greatly throughout the year and across the planning area. Most surface runoff in the planning area comes from snowmelt or rainfall, producing peak discharges in the spring and early summer. Many streams in lower elevation semi-arid areas are either intermittent, with segments of perennial flow near springs, or ephemeral, with flow only during spring runoff and intense summer storms.

Springs and seeps occur in areas where water from aquifers reaches the surface. Many springs form the beginning of stream channels; others flow into small ponds or marshy areas that drain into channels. Some springs and seeps form their own channels that reach flowing streams, but other springs lose their surface expression and recharge alluvial fill material or a permeable layer. Springs and seeps are important to aquatic habitats because of the perennial base flow they provide to a stream. The outflow from springs in summer usually helps to maintain lower water temperatures because groundwater is of lower temperature by nature. In winter, especially in small streams, base flow helps to maintain an aquatic habitat in an otherwise frozen environment (Weltz et al. 2017).

Riparian areas are ecosystems that exist along rivers, streams, or waterbodies. These areas exhibit vegetation or physical characteristics reflective of permanent surface or subsurface water influence. The BLM uses proper functioning condition assessments for evaluating riparian-wetland areas. These assessments provide a comprehensive understanding of the health and functionality of these ecosystems. Proper functioning condition assessments consider factors like vegetation cover, soil stability, and hydrological processes to determine ecological health of riparian-wetland areas.

The historic scarcity of stream flow in the planning area has led to increased flow regulation by the states. Projects for irrigation, livestock, human use, and flood control have significantly altered natural flow regimes. This has changed habitat conditions, channel stability and timing of sediment, and organic material transport. Stream flow has been altered by management activities such as water impoundments, water withdrawals, road construction, energy and mining development, vegetation manipulation, grazing, wildfire suppression, and timber harvesting (Weltz et al. 2017). Water developments are also influential sources of water for GRSG. Water developments can function for multiple uses. They provide additional and alternative sources of water for wildlife and livestock, and can decrease use of riparian areas (Connelly and Doughty 1989). Within the planning area, the BLM maintains an unknown number of water developments.

Groundwater

Groundwater resources in the planning area include local basin-fill aquifers, deep, regional aquifers and, in some areas, geothermal aquifers. Basin-fill aquifers are typically located within local basins, serving as sources of groundwater. Deep, regional aquifers extend over larger areas, providing a broader regional water source. Geothermal aquifers, found in specific areas, contain water with elevated temperatures suitable for geothermal energy extraction. Groundwater recharge primarily occurs at higher elevations where precipitation exceeds evapotranspiration. Excess precipitation either remains at the surface as overland flow or goes beneath the surface, recharging groundwater systems. Groundwater is used for irrigation, domestic use, and livestock use.

Quality of the groundwater is a function of the chemical makeup of the underground formation containing the water. Aquifer properties, such as hydraulic conductivity (the ability of an aquifer to transmit water) and primary and secondary porosity (open spaces in rock or soil), also influence water quality based on the residence time of the groundwater in the subsurface. Longer residence time means more interactions with the surroundings, influencing water quality. In the planning area, much of the geology consists of consolidated sedimentary formations with water-bearing properties that are largely dependent on secondary porosity from faults, fractures, and joints. The mineral content of several sedimentary formations underlying the planning area includes relatively high amounts of soluble minerals and salts. Most of the planning area contains water that is typically suitable for common uses; however, it is considered hard, indicating a higher concentration of minerals like calcium and magnesium. Additionally, it contains moderate levels of dissolved minerals, which may include substances such as bicarbonates, sulfates, and chlorides.

Groundwater near the land surface is available for plants and can contribute to the alluvium of stream systems. This occurs as plants draw water from shallow groundwater and release moisture into the atmosphere. This water movement through plants, known as transpiration, helps transport minerals and sediment from the groundwater into the soil. Over time, these transported materials contribute to the composition of alluvial deposits in stream systems. Alluvial aquifers are found along larger perennial, intermittent, and interrupted flow segments. Interrupted flow segments refer to areas where the continuous flow of water is intermittently disrupted or broken, potentially due to factors such as topography, geological features, or human activities. These interruptions in the flow contribute to the formation of the alluvial aquifers, which are typically composed of alternating coarse sand and gravel deposits with layers of clay, silt, and sand. The alluvial aquifers also serve as either a recharge or discharge zone for underlying bedrock aquifers. Springs and seeps occur in areas where water from aquifers reaches the surface. Such activities as livestock or wild horse grazing and watering, recreation use, mining, road construction, and vegetation management have affected spring systems in the past by disturbing soil, vegetation, and natural drainage patterns, altering water flow, quality, and overall spring conditions. Well drilling or blasting can affect springs by reducing the volume of water in their aquifers or by affecting subsurface flow patterns. Moreover, when wells are drilled or blasting occurs, natural permeability of the aquifer may be disturbed, potentially causing a reduction in water volume by affecting the ability of the aquifer to store and release water.

Water Quality

Water quality, as defined by the Clean Water Act, includes the physical, biological, and chemical characteristics affecting existing and designated beneficial uses. Beneficial uses in the planning area are public and private domestic water supplies, industrial water supply, irrigation, livestock watering, fish and aquatic life, wildlife, and hunting, fishing, boating, water contact recreation, and aesthetic quality. Section 303(d) of the Clean Water Act is utilized to identify waters which are water quality impaired because they fail to meet standards for criteria. Section 303(d) requires each state develop a list of water bodies that fail to meet water quality standards, along with delineation of those segments and associated listing criteria. The 303(d) list of impaired waters is updated biannually, and each state is required to develop a total maximum daily load allocation for each pollutant of concern.

Water quality typically varies as a function of flow conditions. During high flow conditions, dilution may result in lower concentrations of pollutants. Conversely, low flow conditions can result in higher pollutant concentrations. This variability can be impacted by water uses (e.g., agriculture, oil and gas development, and surface disturbance), vegetation, groundwater interaction, and pollutants discharged into water bodies from point and non-point sources. The quality of runoff in ephemeral and intermittent stream channels is largely dependent upon the amount of salts, sediments, trace elements, and organic materials that accumulate in dry stream channels between flow periods. Periodic flushing of accumulated salts, trace elements, organic materials, and sediments occurs during peak flow events, which often represent the only time water quality samples can be collected. Factors that govern the accumulation of salt, trace elements, organic materials, and sediments include physical properties of the watershed (e.g., topography, geology, and climate), land use, and seasonal fluctuations in temperature and precipitation. Topography influences flow of water, determining the potential for sediment transport. Geology contributes to the types and amounts of minerals in the water. Climate affects the overall hydrological cycle, influencing precipitation patterns and evaporation rates. Land use practices can introduce pollutants and alter natural drainage patterns. Seasonal fluctuations in temperature and precipitation impact the rate of weathering and erosion processes, influencing composition of materials entering streams.

The major water quality concern for streams in the planning area has been water temperature (Danforth et al. 2016), which correlate to the beneficial use of fish spawning and rearing habitat. Conditions that affect stream temperature, such as the amount of near-stream vegetation, channel shape, and hydrology, operate through complex interactions. Near-stream vegetation helps regulate water temperature by providing shade. The type and density of vegetation influence the extent of shade. Channel shape plays a role in sunlight exposure; wider channels may receive more direct sunlight, potentially leading to higher temperatures. Hydrology, which involves water flow rate and patterns, affects temperature dynamics. Some conditions vary daily or seasonally. In the planning area, conditions affecting stream temperature, such as the amount of near-stream vegetation, channel shape, and hydrology, are most associated with land use practices. Wild horses can also impact water source quality, aquatic ecosystems, and riparian communities (Griffin et al. 2019). Other land uses associated with degraded streams include roads, trails, water withdrawal, reservoir storage, and release, which can contribute to stream degradation through mechanisms such as increased sedimentation, altered drainage patterns, and potential pollution. Construction and use of roads and trails, along with large-scale water withdrawal and reservoir operations, may disrupt natural flow patterns, impacting streambed stability, water quality, and overall stream health. (Weltz et al 2017). Additionally, water quality issues are often exacerbated by wild horse and burro herds.

Other water quality stream impairment in the planning area is due to a variety of causes, including pathogens, biological integrity, oxygen depletion, flow and habitat alterations, nutrients, toxic inorganics, metals, mineralization, and pH conditions. Lake and reservoir impairment is attributed to a variety of factors, including oxygen depletion, high temperatures, phosphorus, polychlorinated biphenyls and mercury in fish tissue, total dissolved solids, and acidic conditions. These impairments can be linked to activities such as animal feedlots, crop production, livestock grazing, habitat alterations, construction activities, permitted discharges from industrial, municipal, and stormwater sources, and lesser so from channelization, sewage disposal, mine tailings, hardrock mining, industrial forestry, and recreation and tourism. Not all areas with such activities resulted in water quality impairments as they are generally site specific in nature (Weltz et al. 2017).

Water Quantity

Water availability can vary annually, depending on the volume of water recharged and the volume of water used in the planning area. Since most water in the planning area originates from precipitation, yearly climatic conditions play an important role in the volume of water available. This, in turn, determines available riparian habitat and conditions, particularly in systems that are more dependent on snowmelt and local precipitation events (Weltz et al. 2017). Activities associated with recreation, energy development, and grazing have resulted in significant impacts on water supply and quality within GRSG habitat. Invasive species, such as salt cedar (*Tamarix* spp.) and Russian olive (*Elaeagnus angustifolia*), further reduce available water by consuming significant quantities that would otherwise support beneficial uses (USGS 2022). Vegetation management, including the treatment of invasive species such as pinyon-juniper, tamarisks, and Russian olive, also affects water availability.

Peak flow times relate to spring runoff and snow melt, with a decrease to near base flow in later summer months, depending on winter accumulations of snow and other factors such as precipitation. Seasons, referring to periods such as summer or dry seasons, and years of low water yield are particularly crucial periods for most of the beneficial uses of water in the planning area.

States issue water rights for various beneficial uses for both groundwater and surface water. Consumptive water uses in the planning area are agricultural, municipal, mining and milling, industrial, stock watering, and wildlife. The BLM authorizes development of water-related infrastructure, such as ROWs, on BLM-administered lands, enabling applicants to apply water to beneficial use. When the United States reserves public land for Indian reservations, military reservations, national parks, forests, or monuments, it also implicitly reserves sufficient water to satisfy the purposes for which the reservation was created. The date of priority, or seniority, of a federal reserved right is determined by the date the reservation was established.

Trends

As early land management actions, such as vegetation reduction, wildlife extirpation, and wildfire suppression, impacted watersheds, overland flow of water increased, and stream channels deepened (Northern Woodlands 2023). Channel incisions eventually lead to bank failures and subsequent channel widening. This process alters the natural dimensions and morphology of the channel. As channel widening and bank failures continued, new low flow channels began to form in the debris from bank failure. Many of the stream channels in the planning area were in the process of this initial buildup in the 1980s. This process was influenced by factors such as changes in land use, natural sedimentation processes, or alterations in hydrological conditions. New channels are usually lower than pre-disturbance channels, and the old floodplain now functions primarily as a terrace (a flat or gently sloping elevated area next to a stream). This shift in elevation is a consequence of the sedimentation and changes in channel morphology during the build-up process. Some terraces may be the result of climatic variations and associated changes in flow and sediment supply. Climatic variations influence river flow and supply of sediment. The resulting changes in sediment transport and deposition contribute to the formation of terraces along streambanks. Terraces, in this context, serve as indicators of past climatic and hydrological conditions. The stage of channel evolution results in a new bankfull channel (when a river is filled to its highest point without spilling onto nearby land) and active floodplain (the area next to a river that gets flooded regularly) at a new, lower elevation, which is observed in many stream channels in the planning area.

Existing climate change impact models in the planning area predict less water and water availability, a difference in timing of delivery, and increased stress on vegetation (Weltz et al. 2017). In particular, the models indicate longer and more severe droughts, changes in precipitation runoff and potential for changes in flooding patterns, increased wildfires, changes in the relationships among plants, water, nutrients, and soils on grazed lands, and increased susceptibility of ecosystems to invasion of nonnative species. Certain areas among the various states may experience trends that are not necessarily consistent with the rest of the range.

Activities associated with recreation, energy development, and grazing have resulted in significant impacts on water supply and quality within GRSG habitat. These include changes in stream morphology and vegetation, affecting the trends of water resources (Beck and Mitchell 2000). Within GRSG habitat, recreation activities, including both motorized uses like OHV activity and non-motorized uses such as hiking and equestrian activities, have resulted in surface disturbance, such as erosion, sediment production and gully creation that require mitigation to prevent water resource damage (Weltz et al. 2017). Non-motorized uses can also degrade water quality through soil loss along trails, improper disposal of human and pet waste, and the discharge of wastewater containing soaps, oils, or other chemicals into the environment. OHV activity has increased significantly in more easily accessible wildland urban interface boundaries as well as more remote areas, due in part to population growth. The expansion of the wildland urban interface is anticipated to have long-term impacts on surface water quality and flow, including increased runoff, changes in nutrient levels, and altered sedimentation patterns.

Demands on water resources have increased over the past few decades. Although most early water rights were established for irrigation and mining, today's demand includes municipal water supplies, commercial and industrial supplies, and maintenance of adequate streamflow for fish, recreation, and water quality. These changes, driven by shifts in demand for water right uses, may significantly impact the hydrology of streams, riparian areas, and wetlands on BLM-administered lands. Alterations in water usage patterns can lead to changes in flow regimes, affecting the ecological balance of these ecosystems. The limited availability of water in much of the planning area may pose challenges for additional developments that depend on water, potentially impacting GRSG habitat and associated ecosystems. Water scarcity can influence the feasibility and sustainability of projects affecting the natural environment. Changing and persistent drought conditions across most of the planning area have also significantly impacted water availability and conditions (Weltz et al. 2017). Future water development for wildlife, recreation, and livestock would require a state water right before project implementation could occur. This crucial step ensures compliance with regulations and addresses potential impacts on GRSG habitat.

3.16 CULTURAL RESOURCES

A cultural resource is a definite location of human activity, occupation, or use identifiable through field survey, historical documentation, or oral evidence (BLM Manual Section 8100). The term cultural resources is inclusive and has been adopted and widely used to refer to the diverse human record found in sites, structures, objects and places created and/or used by people. These may comprise archaeological, historic, or architectural sites, structures, objects, or places, and may include locations of traditional cultural or religious importance to a particular social and/or cultural group, often referred to as Traditional Cultural Properties (See **Section 3.17**, Tribal Interests). The term includes "historic properties," as defined in the National Historic Preservation Act of 1966, as amended (NHPA), and the implementing regulations found at 36 CFR Part 800. Historic properties are cultural resources determined to be eligible for listing on the National Register of Historic Places (NRHP). The term also includes "archaeological resources" as defined in the Archaeological Resources Protection Act of 1979, and other sites, structures, objects, items, and places as addressed in other statutes/regulations (e.g., American Indian Religious Freedom Act of 1978, the Antiquities Act of 1906, NEPA, and the Native American Graves Protection and Repatriation Act of 1990). "Historic property" has a specific meaning under the NHPA, referring only to those properties determined to be eligible for or listed in the NRHP regardless of property type or period of use (e.g., traditional cultural property or archaeological site, and historic or prehistoric).

Cultural resources are represented by the full temporal range of human occupation of the continent, from the first known peoples' arrival and settlement in the planning area more than 12,000 years ago (Jenkins et al. 2012), possibly much longer (Davis et al. 2019), and subsequent expansion of Tribal groups throughout to more recent incursions of fur trappers, homesteaders, miners, and ranchers of the last 200 years. Cultural resources can include surface and buried artifacts and cultural features made and left by human cultures in archaeological sites; items built by past cultures (e.g., houses/house remains and activity areas); and places associated with traditional cultural uses (See **Section 3.17**, Tribal Interests).

3.16.1 Considering Effects on Cultural Resources Pursuant to Section 106 of the NHPA

Cultural resources are most frequently identified and recorded through federal compliance with Section 106 of the NHPA (now recodified as 54 U.S.C. 305108) and subsequent consultation with Native American Tribes and State Historic Preservation Offices (SHPOs). Section 106 requires federal agencies that fund, approve, authorize, license, or permit actions or undertakings to consider effects on "historic properties" that could occur due to proposed undertakings.

Federal regulations define specific criteria for NRHP eligibility and provide the measures for evaluating cultural resources for their eligibility (36 CFR Part 60.4). Once a cultural resource has been determined to be eligible for the NRHP, the agency must consider potential effects of the proposed action on the historic property and provide measures to either avoid, minimize, or mitigate any adverse effects. Compliance with Section 106 provides a primary mechanism for federal agencies to assess and take into account effects of proposed federal actions or undertakings on cultural resources during NEPA reviews.

The BLM follows alternative procedures, defined in state specific protocols, for meeting Section 106 obligations allowed for and pursuant to the implementing regulations of the NHPA (36 CFR Part 800.14). In collaboration with the Advisory Council on Historic Preservation and the National Conference of State Historic Preservation Officers, the BLM developed alternative procedures that define how the agency will comply with Section 106 of the NHPA. These procedures are defined in a national Programmatic Agreement, revised in 2012, between the three parties. The Programmatic Agreement procedures are implemented by state specific protocol agreements with each state's SHPO. The protocols further define how the BLM will coordinate with the SHPO in each state to fulfill Section 106 responsibilities.

Prior to initiating proposed actions for protection and enhancement of GRSG and GRSG habitat, the responsible manager shall determine the area of potential effect, review existing information on known and anticipated historic properties that could be affected, seek information (in coordination with environmental review and land use planning processes) from Native American Tribes and other parties likely to have knowledge of or concern with historic properties (including places of traditional cultural and religious significance), determine need for field surveys or other actions to identify historic properties, make a good faith effort to identify and evaluate historic properties, assess and determine effects on historic properties, and identify measures to avoid, lessen or mitigate adverse effects on historic properties.

3.16.2 Conditions of the Planning Area

Given the vast planning area (see **Map 1.1**, Greater Sage-Grouse West-Wide Planning Area [**Appendix 1**]) types of cultural resources as well as the types and amount of data available about them vary greatly. Therefore, information about current conditions of cultural resources is high level and qualitative. The majority of the planning area has not been inventoried since resource inventories are driven by project-based cultural resource. New discoveries are documented regularly through regulatory compliance actions.

Some well-known historic properties and districts do occur across the planning area. These properties, along with other properties eligible for listing on the NRHP in the planning area, would need evaluation for the effects of proposed undertakings related to GRSG habitat improvement prior to implementation. Formal determinations of eligibility have not been completed for most known cultural sites in the planning area but known resources are treated as eligible until determined otherwise. Areas not previously inventoried would be subjected to full cultural resources analysis for ground-disturbing actions.

Cultural areas are often correlated to physiographic regions, with the current planning area falling within the Great Basin, Plateau, and Plains culture areas (d'Azevedo 1986). These cultural areas roughly correspond to distinctly different Indigenous groups with different languages and resource-based economic systems and social structures. While these areas are associated with cultural groups and distinct Tribes, cultural boundaries are fluid and overlapping. Tribes with interest in the planning area are listed and further discussed in **Section 3.17**, Tribal Interests. Additionally, the BLM recognizes the importance of Indigenous Knowledge (IK), which reflects the deep relationship between Indigenous peoples and the land over millennia. The BLM also acknowledges the history of those who settled the West in the mid-1800s, while being mindful of the complex impacts of that period on Indigenous communities.

3.16.3 Trends

Cultural resources are subject to deterioration over time due to both anthropogenic and natural processes. BLM-administered lands are currently and will continue to be managed for the protection and preservation of cultural resources, pursuant to pertinent regulation and policy. More concerted government-to-government consultation with Tribes is occurring to address Tribal interests and concerns, including those regarding cultural resources. For example, the 2021 Secretary's Order 3403: *Joint Secretarial Order on Fulfilling the Trust Responsibility to Indian Tribes in the Stewardship of Federal Lands and Waters* furthers these interests. Efforts have also increased in public education and outreach to create awareness about our nation's cultural heritage and Tribal contributions. These efforts continue to improve public understanding and awareness, resulting in increased preservation of cultural resources. Cultural resource inventories continue to regularly document previously unknown resources. Trends relevant to cultural resources and more specific to the planning area include increasing recreation use and demand (see **Section 3.19**, Recreation and Visitor Services), grazing (by livestock as well as wild horses and burros), and continued development like that related to mineral resources, renewable energy development, and utilities (**Section 3.9**, Lands and Realty [Including Renewable Energy], and **Section 3.10**, Mineral Resources).

3.17 Tribal Interests

Tribal interests include economic rights such as Indian trust assets, resource uses, and access guaranteed by treaty rights. Traditional cultural resources or properties include areas of cultural importance to contemporary communities. These areas can encompass sacred sites, resource gathering areas, locations tied to historical reenactment, or places significant to various communities, such as those related to Japanese internment, among others. While this section addresses traditional cultural resources or properties in the context of Tribal interests, it is important to recognize that traditional cultural resources or properties extend beyond Tribes and can hold significance for diverse ethnic and cultural groups.

The federal government has a unique and distinctive relationship with federally recognized Native American Tribes as set forth in the Constitution of the United States, treaties, statutes, Executive Orders, judicial decisions, and agreements. This relationship is different from the federal government's relationship with state and local governments or other entities. The United States government has a trust responsibility to federally recognized Native American Tribes that covers lands, surveys, boundary risk assessments, resources, money, or other assets held by the federal government in trust, and the ability of those Tribes to exercise their rights. Tribal members use BLM-administered lands to gather plants or other native materials (e.g., stone for flint-knapping), hunt animals, and fish. The United States recognizes Native American Tribes as sovereign nations. The Tribes maintain active interests in the planning area.

Native American treaties are negotiated contracts made pursuant to the Constitution of the United States and are considered the "supreme law of the land." They take precedence over any conflicting state laws because of the supremacy clause of the Constitution (Article 6, Clause 2). Treaty rights are not gifts or grants from the United States, but are bargained for concessions. These rights are grants-of-rights from the Tribes rather than to the Tribes. The reciprocal obligations assumed by the federal government and Native American Tribes constitute the chief source of present-day federal Native American law.

The BLM and other federal agencies have the responsibility to identify and consider potential impacts of project alternatives identified for GRSG planning on Native American trust resources, including fish, game, and plant resources, and on off-reservation, treaty-reserved fishing, hunting, gathering, and similar rights of access and resource use on BLM-administered lands. This also includes rights of access and use for ceremonial and other traditional cultural practices. The BLM, as lead federal agency, also has the responsibility to ensure meaningful consultation and coordination concerning GRSG planning is conducted on a government-to-government basis with federally recognized Tribes to consider Tribal treaty rights and trust resources. BLM-administered lands retain social, economic, and traditional value for Tribal people, as well as contemporary and ongoing spiritual and cultural uses. Through consultation with the Tribes, the BLM is aware of their treaty and trust obligations and the Tribes' desire to capitalize on opportunities that maintain or enhance resources critical to the exercise of treaty rights, traditional customs, subsistence, and cultural uses of the land.

BLM consultation with Native American Tribes, as it pertains to Tribal interests, treaty rights and trust responsibilities, is conducted in accordance with the following direction:

- Executive Order No. 13175 – Consultation and Coordination with Indian Tribal Governments, November 6, 2000
- Secretarial Order 3317 – Department of Interior Policy on Consultation with Indian Tribes, December 1, 2011

- Bureau Manual Handbook H-1780-1 – Guidelines for Conducting Tribal Consultation (Transmitted 12/03/04)
- The National Historic Preservation Act of 1966 as amended (PL 89-665; 80 Stat. 915; 16 U.S.C. 470; recodified as 54 U.S.C. 305108).
- Archaeological Resources Protection Act of 1979 (PL 96-95; 93 Stat. 721; 16 U.S.C. 470aa et seq.) as amended (PL 100-555; PL 100-588)
- American Indian Religious Freedom Act of 1978 (PL 95-431; 92 Stat. 469; 42 U.S.C. 19960
- Native American Graves Protection and Repatriation Act of 1990 (PL 101-601; 104 Stat. 3048; 25 U.S.C. 3001)
- Executive Order No. 12898 – Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, February 11, 1994
- Executive Order No. 13007 – Indian Sacred Sites, May 24, 1996
- Executive Order No. 13084 – Consultation and Coordination with Indian Tribal Governments, May 14, 1998
- Government-to-Government Relations with Native American Tribal Governments (Memorandum signed by President Clinton; April 29, 1994)
- Tribal Consultation and Strengthening Nation-to-Nation Relationships (Memorandum signed by President Biden on January 26, 2021)
- Uniform Standards for Tribal Consultation (Memorandum signed by President Biden on November 30, 2022)
- Order No. 3175 – Departmental Responsibilities for Indian Trust Resources (Section 2 of Reorganization Plan No. 3 of 1950 – 64 Stat. 1262; November 8, 1993)
- USDA Department Regulations 1340-007 and 1350-002
- Joint Secretarial Order on Fulfilling the Trust Responsibility to Indian Tribes in the Stewardship of Federal Lands and Waters (SO 3403)
- Departmental Manual Part 303: Indian Trust Responsibilities, Chapter 7: Standards for Indian Trust Lands Boundary Evidence (303 DM 7)

In the planning area, there is extensive geographic, environmental, historic, economic, social, ethnic, and religious diversity reflected in Tribal interests and traditional cultural resources that may be valued by American Indian communities. There is no comprehensive way to define all of the resources on this broad scale, especially where confidentiality is often required.

Known topics of interest or concern to Tribal communities with interest in this planning effort include GRSG population and habitat condition, cultural practices related to the GRSG, ethnographic resources (locales and sites, structures, objects, and landscapes assigned cultural significance by traditional users), grazing, and energy or mineral development (BLM and Forest Service 2015). The effects of this planning effort on Tribal interests would largely be tied to implementation level actions. The BLM continues to inform and consult with interested federally recognized Native American Tribes as the BLM implements projects. Federally recognized Native American Tribes that are located within or have cultural ties to the planning area are listed in **Table 3-20** (**Appendix 9**).

Traditional cultural resources or properties are places associated with cultural practices or beliefs of a living community. They can be considered a subset of the broader category of cultural resources discussed in **Section 3.16**. Traditional cultural properties are rooted in the community's history and are important in maintaining cultural identity. Examples include natural landscape features, aboriginal title lands, ceremonial and worship places, plant gathering locations, traditional hunting and fishing locations, ancestral archaeological sites, artisan material locations, rock art and communal resources such as community-maintained irrigation systems. The boundaries of these resources and impact areas are often difficult to assess. Resources tied to particular locations and that meet the criteria for eligibility can be listed on the National Register of Historic Places. Some traditional cultural resources have values that do not have a direct property referent and may not manifest themselves by distinguishable physical remains, but still are subject to consideration in planning. It is the continuity of their significance and importance to the maintenance of contemporary traditions that is important.

While many traditional cultural resources are well known, some locations or resources may be privileged information that is restricted to specific practitioners or clans. For Tribes, maintaining confidentiality and customs regarding traditional knowledge may take precedence over identifying and evaluating these resources, resulting in information being unavailable for inclusion in the NEPA analysis.

Resource-gathering areas are a broad category that can include trust assets; treaty and subsistence rights and resources; and culturally significant plants, animals, fish, and minerals. Plant resources can include foods that were established as part of a traditional seasonal round. Examples include traditions of gathering pine nuts, berries, and a variety of seed plants. Other examples include fibers used for basketry and weaving, and wood for building, carving, and fuels. Many plants are gathered for medicinal and religious use. Plant gathering is often a communal activity with cultural and religious significance. Loss of access to these plants or gathering locations, or losing the ability to maintain their habitats, can affect religious and ceremonial uses.

Most Native American Indian Tribes and individual Tribal members conceive of spirituality, or sacred sites and daily activities, as interconnected (Forest Service 1997). Many of the resource uses and use areas also have a spiritual or sacred dimension. Sacred sites can also include places that are an expression of belief systems in the land or nature. For some sacred areas, there may be no observable cultural function to an outsider or even to Tribal members who have not been entrusted with the information. Locations such as landscape features, mountain tops, trails, water courses, springs, caves, offering areas, shrines, and rock art sites often figure in these groups' oral traditions concerning their origins, mythology, and nature of the world. There are frequently active or ancestral ceremonial locations that are treasured. Archaeological sites, burials, and historic sites are often seen as important ties to ancestors and traditions that are not to be disturbed (Bengston 2003).

Tribal resources would experience trends similar to those experienced by cultural resources. Similar to cultural resources, Tribal resources are expected to move away from desired conditions over time unless management actions exist to protect these resources. The status of the local ecosystem, including but not limited to vegetation composition and any wildlife, is integral to many native cultures. Potential changes in local ecosystems associated with effects of climate change may alter the availability of plants, wildlife, or other natural resources for traditional uses.

3.18 Lands with Wilderness Characteristics

Section 201 of FLPMA requires the BLM to maintain on a continuing basis an inventory of all public lands and their resources and other values. This inventory requirement includes maintaining information regarding wilderness characteristics. Section 202 of FLPMA requires the BLM to rely on resource inventories in the development and revision of land use plans, including inventory information regarding wilderness characteristics. Lands with wilderness characteristics inventories will be updated for any site-specific project NEPA analyses conducted in the planning area to determine if a project will have impacts to lands with wilderness characteristics identified in accordance with BLM Manuals 6310 – Conducting Wilderness

Characteristics Inventory on BLM Lands (BLM 2021a) and 6320 – Considering Lands with Wilderness Characteristics in the BLM Land Use Planning Process (BLM 2021b). These revised policies do not address or affect policy related to Congressionally designated Wilderness or existing Wilderness Study Areas (WSA) pending before Congress. The Wilderness Act of 1964 requires the BLM to preserve the wilderness character of each designated wilderness area while FLPMA mandates that the BLM manage WSAs so as not to impair their suitability for wilderness preservation until Congress either designates them as wilderness or releases them for other uses. No such statutory authority exists with regard to non-wilderness, non-WSA lands possessing wilderness characteristics. Although lands with wilderness characteristics share the same criteria used to identify wilderness and WSAs, they are not subject to protective requirements prior to a planning or project-level management decision, though consideration for protection opportunities is part of the land use planning process. According to BLM Policy Manual Section 6320, when the BLM has inventoried an area and determined that it possesses wilderness characteristics, the BLM is not required to protect those characteristics as a priority over other resource values and multiple uses. Inventory and management are separate activities, carried out under different provisions of FLPMA (Sections 201 and 202, respectively).

3.18.1 Current Conditions

Within the planning area, there are approximately 14,246,000 acres outside of existing designated Wilderness Areas and WSAs the BLM has identified as having wilderness characteristics. Of these lands with wilderness characteristics units, approximately 2,673,600 acres are within PHMA and approximately 2,515,700 acres are within GHMA.

The portions of the planning area within the State of California contain approximately 2,400 acres of BLM-administered lands that have been inventoried for lands with wilderness characteristics that overlap with GRSG PHMA. The Eagle Lake Field Office and Surprise Field Office in California completed their RMPs in 2008. These field offices did not include an inventory of wilderness characteristics or make management decisions regarding wilderness characteristics in their land use planning. However, lands with wilderness characteristics (LWC) inventories will be updated for any site-specific NEPA analyses of the planning area to determine if a project will have impacts on wilderness characteristics identified through previous or updated inventorying.

The portions of the planning area that are within the State of Colorado contain approximately 673,000 acres of BLM-administered lands that have been inventoried for LWC that overlap with GRSG habitat, 261,000 in PHMA and 392,000 in GHMA and 20,000 in OHMA. Within the Colorado River Valley Field Office and Grand Junction Field Office, the BLM is currently completing LWC inventories but is deferring determinations of management actions for lands with wilderness characteristics until the release of the revised RMPs for those field offices.

The portions of the planning area that are within the State of Idaho contain approximately 417,000 acres of BLM-administered lands that have been inventoried for LWC that overlap with GRSG habitat - 283,000 in PHMA, 89,000 in GHMA, and 45,000 in OHMA. The BLM has completed LWC inventories in the Bruneau, Jarbidge, Salmon, and Pocatello Field Offices. The Upper Snake Field office has a draft inventory, and partial inventories have been completed in the Owyhee, Shoshone, and Burley Field Offices. The Pocatello Field Office has no LWC. The Bruneau, Salmon, Owyhee, Burley, Shoshone, and Jarbidge Field Offices found areas that do contain LWC. Currently no Field Offices have taken their LWC through a complete planning process to determine how they will be managed.

The portions of the planning area within the State of Montana contain approximately 18,900 acres of BLM-administered lands that have been inventoried for LWC that overlap with GRSG habitat, 9,200 in PHMA and 9,700 in GHMA. Currently no field offices have taken their LWC through a complete planning process to determine how they will be managed.

Portions of the planning area that are within the State of Nevada contain approximately 167,000 acres of BLM-administered lands that have been inventoried for LWC that overlap with GRSG habitat - 87,000 in PHMA, 57,000 in GHMA and 23,000 in OHMA. Seven units were found to possess wilderness characteristics within the Winnemucca District Office during the most recent RMP revision in 2015 and are currently managed to meet multiple use and sustained yield objectives. Within the Battle Mountain, Elko, Ely, and Winnemucca Districts, the BLM is currently completing updated LWC inventories. The Carson City District and Southern Nevada District have recently updated inventories for LWC. Other than the seven units within the Winnemucca District which have decisions from the 2015 RMP revision how to manage LWC, the BLM is deferring determinations of how all other inventoried areas will be managed until updated RMP revision processes are undertaken.

As part of the original FLPMA Section 603-mandated inventories, inventories were conducted for the North Dakota Field Office beginning in 1978. The initial phase of inventories resulted in all lands within North Dakota being dropped from further wilderness consideration (the only solid block of BLM-administered lands within the planning area acres is also a developed oil and gas field).

Portions of the planning area within the State of Oregon contain approximately 3,001,000 acres of BLM-administered lands that have been inventoried for LWC that overlap GRSG habitat, 1,360,000 in PHMA and 1,641,000 in GHMA. Eastern Oregon is currently completing LWC inventories but is deferring determinations of management actions in the Burns, Lakeview, Prineville, and Vale Field Offices for LWC until the release of revised RMPs.

Portions of the planning area within the State of South Dakota contain approximately 73,000 acres of BLM-administered lands within 4 units that have been inventoried for LWC. None of these areas were found to possess wilderness characteristics.

Portions of the planning area within the State of Utah contain approximately 986,000 acres of BLM-administered lands that have been inventoried for LWC that overlap GRSG habitat. Of these areas, 13 units totaling approximately 52,000 acres are natural areas managed for wilderness characteristics in the Uintah Population area where some land uses are restricted or prohibited under the Vernal RMP. The remaining LWC areas that overlap GRSG habitat do not currently have determinations made in an RMP for the specific management of these areas.

Portions of the planning area within the State of Wyoming contain approximately 12,000 acres of BLM-administered lands that have been inventoried for LWC that overlap GRSG habitat - all are in GHMA. The Newcastle Field Office has not identified any parcels potentially meeting the 5,000-acre roadless requirement nor have any citizen's groups nominated parcels that may contain wilderness characteristics. Thus, no inventory forms have been produced to date. One unit in the Buffalo Field Office has wilderness characteristics and is currently managed for their protection. Within the Casper Field Office the BLM is currently completing LWC inventories but is deferring determinations of protection for LWC until the next RMP revision for those field offices. The Cody and Worland Field Offices identified 45 units for LWC, but no specific management for retention of wilderness characteristics was carried forward. Lander Field Office identified 8 potential units for LWC, but management was only carried forward for one unit. Kemmerer

Field Office, Pinedale Field Office, Rawlins Field Office, and Rock Springs Field Office are not managing the inventoried lands with wilderness characteristic areas in their RMPs for Wilderness Characteristics. However, those inventories are considered and reviewed in all site-specific NEPA analyses.

3.18.2 Trends

As the BLM completes its inventories of wilderness characteristics, more units might be determined to contain wilderness characteristics. Until an inventory can be completed for all lands in the decision area, lands not yet inventoried for wilderness characteristics will be evaluated when any surface disturbing activity is proposed. Any lands with wilderness characteristics found in an inventory update will be considered in alternatives formulation and impacts of the proposal on their wilderness characteristics will be analyzed and disclosed in individual NEPA analyses. Absent specific management direction for protecting wilderness characteristics, the BLM anticipates that some characteristics may degrade over time depending upon BLM-administered activities, which will be subject to project-level NEPA analyses.

3.19 Recreation and Visitor Services

The BLM's Recreation and Visitor Services Program manages recreation resources and visitor services to offer the greatest benefits possible to individuals and communities and to better enable communities to achieve their own desired social, economic, and environmental outcomes (BLM 2019a). The planning area offers abundant settings for a wide range of recreational opportunities requiring no permits and no or minimal fees on BLM-administered lands. Most recreation users on BLM-administered lands participate in dispersed recreation activities, including hunting, fishing, camping, biking, hiking, horseback riding, skiing, off-highway vehicle (OHV) use, snowmobiling, rafting/floating, swimming, photography, rock climbing, boating on area lakes and rivers, pleasure driving, and wildlife viewing. Users often participate in these activities individually or in small groups. In parts of the planning area where recreation is a primary resource management consideration, the BLM designates and manages recreation management areas.

The BLM issues permits for a variety of organized activities, such as commercial river permits, big game hunting outfitter permits, and permits for organized groups, competitive events, or other types of commercial recreation outfitters such as bike tours. The BLM manages organized, commercial, and competitive recreation activities on BLM-administered lands and related waters with special recreation permits (SRPs). Issuance of an SRP is discretionary, with proposed activities subject to NEPA compliance and mitigation requirements specific to the proposed activity. The BLM may deny a permit request for several reasons, including if an assessment indicates unacceptable impacts, if an approved moratorium or restricted allocation system exists for the proposed activity, location, or timeframe, if there are serious health and safety concerns, or if past performance by an applicant has been deemed unacceptable and problematic.

3.19.1 Trends

Five key drivers are causing changes to recreation in the planning area:

1. Changing public expectations and demand for outdoor recreation opportunities, especially for dispersed recreation (BLM 2019b). In fiscal year 2022, the agency recorded more than 81 million visits, representing a 40% increase in use since 2012, with nearly a third of that growth occurring since 2020 (BLM 2023).
2. Continued growth in the recreation and tourism industries (BLM 2019c).
3. Increased energy development in portions of the planning area, which can lead to potential conflicts with recreation associated with placement and design of industrial infrastructure, concerns regarding visitor safety, as well as noise, smell, and air quality concerns (BLM 2022b).

4. Close proximity of BLM-administered lands to private property, and the growing use of BLM-administered lands as a community-based recreation asset (BLM 2019c).
5. Technological advances, such as all-terrain or utility vehicles and e-bikes, affordable global positioning system (GPS) units, as well as better outdoor equipment and clothing.

These drivers will impact the activity opportunities that can be offered and the recreation experience and opportunities that can be produced by land managers and partners.

3.20 Travel and Transportation

Visitors to BLM-administered lands use roads and trails for a variety of activities involving various modes of travel. Most roads in the planning area are not managed by the BLM, with an estimated 10% to 15% under BLM management. The remaining roads are managed by other entities, including state, local, and private jurisdictions.[8] Motorized travel in the planning area ranges from standard passenger vehicles driving on maintained roads to OHVs and e-bikes operating on primitive roads and trails. Transportation routes are mainly concentrated around urban areas or where surface activities, such as mineral extraction, require access. Portions of the planning area are remote and rugged, limiting motorized travel on roads and trails in those areas.

An OHV is any vehicle capable of, or designed for, travel on or immediately over land, water, or other natural terrain. OHVs include dirt motorcycles, dune buggies, jeeps, four-wheel drive vehicles, and snowmobiles (43 CFR Part 8340.0-5(a)). Executive Order 11644 and CFR (43 CFR Part 8340) both require the BLM to designate all BLM lands nationally as open, closed, or limited for OHV use, defined as:

- **Open -** areas where there are no special restrictions, or where there are no compelling resource protection needs, user conflicts, or public safety issues to warrant limiting cross-country travel.
- **Limited -** areas where travel must be restricted in order to meet specific management objectives. For areas classified as Limited, the BLM must consider a full range of possibilities, including travel that will be limited to types or modes of travel (such as foot, equestrian, bicycle, motorized, etc.); existing roads and trails; time or season of use; certain types of vehicles (i.e., wheeled versus nonwheeled); licensed or permitted vehicles or users; or BLM administrative use only.
- **Closed -** areas where the BLM restricts all motorized travel and transportation for all or a portion of the year. The BLM designates areas as Closed where a prohibition on motorized travel is necessary to protect resources, promote visitor safety, or reduce use conflict.

3.20.1 Trends

Overall trends in travel management on BLM-administered lands within the planning areas include an increase in OHV use, hiking, and mountain biking as human populations increase within and adjacent to the project boundaries, and throughout GRSG habitats. Many areas currently designated as open to cross-country travel could be changed to limited or closed designations to minimize resource impacts in the future. However, changing areas from OHV open or limited to closed may not be possible due to RS 2477 rights associated with existing roads. The alternatives in this FEIS limit Travel and Transportation Management (TTM) to existing routes within PHMA and GHMA and do not propose the closure of any roads.

Construction of new routes for underground mining and renewable energy projects are also expected to increase as minerals, oil and gas, solar, and wind resource demands increase with energy demands in areas

[8] The estimate is based on typical road management proportions in BLM planning areas, where the majority of roads tend to fall under state, local, or private management.

surrounding the project areas. New energy and mining developments will require new roads for transportation of resources. Previously constructed roads may also require upgrading in width and ROW as drilling operations are transported to collection and production facilities. Recreationists will also use these routes even though they are not designed for improved recreational experiences.

Private properties adjacent to BLM-administered lands will likely continue to be subdivided. Subdivision of private property has increased the number of adjacent properties owners and the number of new access routes to public lands within planning zones. This may result in continued unauthorized social trails that are unmanaged and user-created routes that will impact GRSG resources as they cut through habitat. However, the remoteness of many areas within GRSG habitat may be beneficial for these areas as they have not experienced significant changes from travel disturbances.

Chapter 4. Environmental Consequences

4.1 Introduction

This chapter is organized by topic area and identifies and discloses environmental impacts resulting from the Proposed RMP Amendment outlined in **Chapter 2**. This chapter is complemented by **Appendix 10**, which details each topic area and includes the method of analysis, indicators of impacts, and assumptions specific to each topic area. **Appendix 10** also assesses the environmental consequences resulting from the management actions across Alternatives 1-6, as presented in **Chapter 2**. **Appendix 14** provides supplemental information for the environmental consequences analysis, including details on state and local conservation plans and efforts, the allocation acres for Habitat Management Areas (HMAs), locatable minerals, and fluid minerals for the eight mid-scale Habitat Assessment Framework (HAF) groups by alternative in **Section 14.4**. The 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). Please note, the allocation acres for the locatable minerals and fluid minerals represent a combination of existing allocations in existing Resource Management Plans (RMPs) and allocations identified under the alternatives in this RMP Amendment. For example, for locatable minerals, proposed mineral withdrawals for the purposes of GRSG conservation are only proposed and considered under Alternative 1 and Alternative 3 in this RMP Amendment.

This chapter first describes the nature and type of effects, then focuses on direct and indirect impacts that may benefit, enhance, or improve, or impair a resource because of management actions, and analyzes the cumulative impacts associated with the Proposed RMP Amendment. Some management actions may affect only certain resources. If an activity or action is not addressed in a given section, either no impacts are expected, or the impact is expected to be negligible.

The projected impacts on land use activities and the associated environmental impacts of land uses are characterized and evaluated for each of the alternatives (see **Appendix 10** for Alternatives 1-6) and the Proposed RMP Amendment. These are described in relation to the current condition or situation, as described in **Chapter 3**. Some impacts are described using ranges of potential impacts or in qualitative terms. **Table 4-1**, Summary of Environmental Consequences, summarizes the environmental consequences by topic for Alternatives 1-6 and the Proposed RMP Amendment. The column describing the Proposed RMP Amendment focuses on comparisons with the plan currently being implemented (Alternative 1) and the preferred alternative presented in the Draft EIS (Alternative 5).

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4.1.1 Summary of Environmental Consequences Table

Table 4-1. Summary of Environmental Consequences

Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Alternative 6	Proposed RMP Amendment
Greater Sage-Grouse						
Exemptions from restrictions on development, such as to waivers, exceptions, or modifications (WEMs), stipulations and avoidance/exclusion areas, would be applied within HMAs. As a result, fluid mineral leasing, locatable mineral development, 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 SFAs in some states. As a result, there would be more acres of GRSG habitat open to fluid mineral leasing. 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 to habitats 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 saleable minerals, as well ROWs due to ACEC management as ROW exclusion areas.	The Proposed RMP Amendment would offer heightened protection for GRSG compared with Alternative 1. It would manage a larger area of PHMAs and imposes stricter NSO stipulations without waivers, exceptions, or modifications in some areas of PHMA. This approach reduces potential disturbances from fluid mineral development compared with Alternative 1. Additionally, the Proposed RMP Amendment would set a 3% disturbance cap at the HAF fine scale and would mandate compensatory mitigation before project initiation. These measures would better limit habitat fragmentation and preserve habitat quality compared with Alternative 1.

Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Alternative 6	Proposed RMP Amendment
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 fluid mineral leasing 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 saleable minerals, as well ROWs due to ACEC management as ROW exclusion areas.	The Proposed RMP Amendment would include comprehensive measures to manage vegetation and GRSG habitat more effectively, compared with Alternative 1. Specifically, the Proposed RMP Amendment would expand NSO stipulation areas to offset disturbances. This approach would minimize damage to vegetation and reduce disturbances to fish, wildlife, and special status species. The Proposed RMP Amendment would improve habitat conditions and offer stronger protections compared with Alternative 1 by managing PHMA with limited exceptions and increasing protections from surface-disturbing activities.

Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Alternative 6	Proposed RMP Amendment
Wildland Fire Ecology and Management						
Implementation of a comprehensive strategy for wildland fire management, including use of the Fire and Invasives Assessment Tool (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.	Impacts would be the same as described for Alternative 1. No Alternatives include changes to wildfire management.

Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Alternative 6	Proposed RMP Amendment
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 within established 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.	Impacts under the Proposed RMP Amendment would be similar to those described for Alternative 1, with enhanced GRSG conservation measures benefiting wild horses and burros. The 3 % disturbance cap and RDFs in habitats would improve forage and habitat conditions while reducing human impacts, compared with Alternative 1. This could lead to fewer and more complex authorization applications in PHMA, potentially resulting in reduced AMLs and adjustments in herd management to maintain habitat quality.

Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Alternative 6	Proposed RMP Amendment
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 fluid mineral leasing, 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 saleable minerals, as well ROWs due to ACEC management as ROW exclusion areas.	The 3% disturbance cap and compensatory mitigation requirements aim to reduce impacts on forage and grazing operations, compared with Alternative 1. Increased NSO stipulations and state-specific measures would further protect livestock and forage. In Oregon, additional restrictions could limit grazing in certain areas but may increase available grazing land in key RNAs, compared with Alternative 1.

Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Alternative 6	Proposed RMP Amendment
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.	Under the Proposed RMP Amendment, PHMA would be designated as exclusion areas for utility-scale wind and solar energy development, including met towers. Managing PHMA as ROW exclusion areas, with limited exceptions, would impose stricter protections, reducing the likelihood of certain ROWs being developed, compared with Alternative 1. This approach could lead to reduced opportunities for new ROWs, similar to Alternative 1, but with the added benefit of standardized management practices across the planning area. Impacts in these exclusion areas would likely include increased project costs and planning periods, and potential abandonment of future projects, particularly for utility-scale solar and wind projects in PHMA.

Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Alternative 6	Proposed RMP Amendment
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. Making PHMA and IHMA NSO would make less land available to fluid mineral leasing. State-specific TLs and lek buffers in GHMA would slow or reduce leasing and development. Management of SFAs would impose restrictions or close areas to fluid mineral leasing and development, nonenergy leasable mineral leasing, coal leasing, 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. In general, Alternative 2 would reduce impacts by allowing for more fluid mineral leasing.	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.	Managing PHMA and IHMA with NSO stipulations would reduce available land for location and entry and mineral leasing. While more acreage might be available for leasing in some states, the prioritization process for leasing EOIs could result in fewer acres being offered. Similar to Alternative 1, these restrictions could lead to increased project costs, extended planning periods, and potential abandonment of future projects. A 3% disturbance cap in PHMA/IHMA may delay fluid mineral exploration or development depending on site-specific factors compared with Alternative 1.

Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Alternative 6	Proposed RMP Amendment
ACECs and RNAs						
Management of 15 key RNAs with important GRSG conservation values in Oregon would continue, including managing all or portions of 13 of the key RNAs as unavailable to livestock grazing. Alternative 1 does not propose designation of ACECS. Under this alternative the ACEC areas proposed for designation under Alternatives 3 and 6 would be managed predominately as PHMA and this would provide the areas with a relatively high level of protection but the exceptions allowed in PHMA under this alternative could allow for impacts to the relevant and important values.	Impacts would be the same as described for Alternative 1, however under Alternative 2, 13 key RNAs would be re-opened to grazing. Alternative 2 does not propose designation of ACECS. The effects to the ACEC areas proposed for designation under Alternatives 3 and 6 would similar to those identified be managed predominately as PHMA and the effects would be similar to those identified in Alternative 1.	The 32 ACECs proposed for designation under Alternative 3 and 6 would receive the greatest amount of protection under Alternative 3.	Impacts would be the same for key RNAs as described for Alternative 1. Alternative 4 does not propose designation of ACECS. Under this alternative the ACEC areas proposed for designation under Alternatives 3 and 6 would be managed predominately as PHMA and this would provide the areas with a relatively high level of protection but the exceptions allowed in PHMA under this alternative could allow for impacts to the relevant and important values.	Impacts would be the same for key RNAs as described for Alternative 1. Alternative 4 does not propose designation of ACECS. Under this alternative the ACEC areas proposed for designation under Alternatives 3 and 6 would be managed predominately as PHMA and has a slightly higher emphasis on resource uses than Alternative 4 and so while the effects would be similar to those anticipated under Alternative 4, impacts to the relevant and important values may be greater under this alternative.	Impacts would be the same for key RNAs as described for Alternative 1. The 32 ACECs proposed for designation under Alternative 3 and 6 would receive similar protections under Alternative 6 as under Alternative 3 but the less stringent management direction in Alternative 6 could result in some degradation of the relevant and important values of the ACECs.	Under the Proposed RMP Amendment, ACECs would not be designated but the relevant and important values of the ACECs proposed for designation would either be managed predominately as PHMA or PHMA with limited exceptions and the effects of this management would protect the relevant and important values of the ACECs identified under Alternatives 3 and 6 from irreparable damage to the potential ACECs relevant and important values due to the exclusion of solar and wind, the NSO for fluid mineral development, and avoidance of major rights of way in PHMA. The PHMA with limited exceptions direction provides even higher levels of protection to several of these areas by allowing no exceptions to the solar and wind exclusion, NSO stipulation, and excludes major rights way with a limited exception.

Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Alternative 6	Proposed RMP Amendment
(See above.)	*(See above.)*	*(See above.)*	*(See above.)*	*(See above.)*	*(See above.)*	Under the Proposed RMP Amendment, there would only be 69 acres unavailable for grazing in the Mahogany Ridge key RNA, and there would be a 5-acre or less exclosure proposed to remove livestock use within the North Ridge Bully Creek key RNA, South Ridge Bully Creek key RNA, and Spring Mountain key RNA.

Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Alternative 6	Proposed RMP Amendment
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 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). 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.	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 direct labor income), and about $102 million in additional economic output (about $58 million in additional direct economic output) than under Alternative 1. 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.	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 (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.	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 (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.	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 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.	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 $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.	The impacts under the Proposed RMP Amendment would largely mirror those described under Alternative 5, with some specific differences highlighted below. The impacts on jobs, income, and economic output associated with oil and gas production would be similar to those outlined under Alternative 5. However, due to potential shifts in leasing priorities and the application of NSO stipulations, there could be minor variances in economic contributions across different states. Revenue from royalties, severance taxes, and other oil and gas-related taxes would remain consistent with Alternative 5, although minor differences could occur depending on site-specific conditions and the prioritization process for leasing EOIs.

Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Alternative 6	Proposed RMP Amendment
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 regarding access to nonenergy leasable mineral extractions; however, it is not anticipated that these impacts would be large. Under Alternative 1, all states would recommend the withdrawal of all SFAs, from location and entry under the Mining Law of 1872. If the Secretary withdraws these lands through a separate process, 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.	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 nonenergy leasable minerals in the planning areas compared to Alternative 1, which could improve economic and social conditions associated with nonenergy leasable minerals, such as lifestyle, culture, employment, and economic output. Alternative 2 does not include recommendations for the withdrawal of SFAs from location and entry under the Mining law of 1872, except in Montana which would continue the recommendation for withdrawal of SFAs as described under Alternative 1.	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. 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 the *Nature and Type of Effects* section.	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 could put strain on local governments' budgets and could impact public services that are offered to the communities.	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 services that are offered to the communities. Impacts on economic, nonmarket, and social conditions from changes in nonenergy leasable minerals would be the same as under Alternative 1.	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. Impacts on communities of interest are similar to Alternative 1, with some state analysis area level differences.	The economic impacts from geothermal development would be the same as those described under Alternative 1, with no significant changes in the number of jobs, labor income, or economic output expected across all states. For wind and solar energy, PHMA would be designated as exclusion areas, similar to Alternative 4. This could lead to the relocation of potential projects, which might not be feasible due to the high costs of developing new transmission lines or the impacts of ROW exclusion areas. As a result, the economic contributions from wind and solar activities could be similar to or slightly reduced compared with Alternative 1.

Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Alternative 6	Proposed RMP Amendment
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 social conditions associated with mineral materials is likely to be minimal, under Alternative 1. 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).	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 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.	Under Alternative 3, PHMA would be recommended for withdrawal from location and entry under the Mining Law of 1872. If the Secretary were to withdraw these lands through a separate process, 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. Under Alternative 3, all areas managed for GRSG would be PHMA and saleable 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.	Impacts on economic, nonmarket, and social conditions from changes in nonenergy leasable minerals would be the same as under Alternative 1. 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. 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 and impacts on mineral material development would be the same as described under the Alternative 2 Idaho section.	Impacts on economic, nonmarket, and social conditions from changes in mineral materials would be the same as under Alternative 1. Economic contributions from geothermal activities would be the same as Alternative 1. Economic contributions from wind and solar activities would be the same as Alternative 1. Impacts on economic, nonmarket, and social conditions from changes in livestock grazing would be the same as under Alternative 1. Impacts on nonmarket and social conditions from changes in GRSG conservation vary by state analysis area depending on state specific restrictions on development. Impacts on communities of interest are similar to Alternative 1, with some state analysis area level differences.	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 nonenergy 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.	The impacts on economic, nonmarket, and social conditions due to changes in nonenergy leasable minerals, and mineral materials would be consistent with those described under Alternative 5, which are largely aligned with the impacts outlined under Alternative 1. The economic impacts from livestock grazing in PHMA would remain consistent with Alternative 1, resulting in a similar number of jobs, labor income, and economic output across all states in the planning area. Management restrictions to protect GRSG habitat could potentially increase operational costs and time for ranchers, as described under Alternative 5.

Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Alternative 6	Proposed RMP Amendment
Under Alternative 1 the entire plan area except for Wyoming would limit lands used for ROWs in PHMA (or IHMA in Idaho) and GHMA for greater sage-grouse (see **Appendix 12**, 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, relocating wind and solar operations could result in increased costs if access to transmission lines is limited.	Economic contributions from geothermal activities would be the same as Alternative 1. Economic contributions from wind and solar activities would be the same as Alternative 1. Impacts on economic, nonmarket, and social conditions from changes in livestock grazing would be the same as under Alternative 1. 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. Impacts on communities of interest are similar to Alternative 1, with some state analysis area level differences.	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 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. Economic contributions from wind and solar activities would be 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.	Economic contributions from geothermal activities would be the same as Alternative 1. Economic contributions from wind and solar activities would be the same as Alternative 1. Impacts on economic, nonmarket, and social conditions from changes in livestock grazing would be the same as under Alternative 1. Impacts on nonmarket and social conditions from changes in GRSG conservation vary by state analysis area depending on state specific restrictions on development. Impacts on communities of interest are similar to Alternative 1, with some state analysis area level differences. Under Alternative 4, impacts from BLM management decisions on environmental justice populations through cultural resource disturbance would be similar to Alternative 1.	Under Alternative 5, impacts from BLM management decisions on environmental justice populations through cultural resource disturbance would be similar to Alternative 1. Impacts on environmental justice populations from changes in subsistence resource availability would be similar to Alternative 1. 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, rectify, and compensate for indirect impacts. Impacts on environmental justice populations from changes in water quality would be the same as Alternative 4. Impacts on environmental justice populations from changes in climate change would be the same as Alternative 4.	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 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. 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. Economic contributions from geothermal activities would be the same as Alternative 5.	The impacts on environmental justice populations under the Proposed RMP Amendment would closely align with those described under Alternative 5. This includes potential effects from cultural resource disturbances, access to subsistence resources, and changes in air and water quality. Efforts to avoid, minimize, and compensate for indirect impacts would be prioritized, particularly in reducing air quality impacts, which could positively affect environmental justice populations. The non-market value of GRSG conservation would be maintained at current conditions, with variability depending on the state-specific restrictions on development.

Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Alternative 6	Proposed RMP Amendment
On annual average, livestock grazing on allotments where PHMA accounted for at least 15% 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. Management restrictions for grazing may be applied to protect GRSG habitat, with potential to increase time and costs for management.	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 leasing.	On annual average, livestock grazing on allotments where PHMA accounted for at least 15% 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 the planning area combined, compared with Alternative 1. Lowest level of support for livestock grazing and wild horse and burro non-market values as a result of no permitted use for grazing in PHMA. Highest level of support for GRSG conservation related non-market values due to limitations on development and resources uses.	Impacts on environmental justice populations through subsistence resource availability could be reduced due to BLM management decisions on minerals. Under Alternative 4 impacts on air quality from fluid 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. Under Alternative 4 impacts on climate change from fluid 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.	*(See above.)*	Economic contributions from wind and solar activities would be the same as Alternative 5. Impacts on economic, nonmarket, and social conditions from changes in livestock grazing would be the same as under Alternative 5. Impacts on nonmarket and social conditions from changes in GRSG would be the same as under Alternative 5. Impacts from BLM management decisions on environmental justice populations would be the same as under Alternative 5.	*(See above.)*

Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Alternative 6	Proposed RMP Amendment
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. 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. 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.	*(See above.)*	Highest potential for impacts to groups associated with development, greatest level of support for those associated with conservation values. 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. 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.	*(See above.)*	*(See above.)*	*(See above.)*	*(See above.)*

Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Alternative 6	Proposed RMP Amendment
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 mineral 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 fluid mineral leasing 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, mineral 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 to habitats. 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 fluid 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.	Under the Proposed RMP Amendment, impacts on air quality would be similar to those described under Alternative 4. PHMA would be designated as exclusion areas for utility-scale wind and solar projects, with limited exceptions, to prioritize habitat conservation and minimize air quality impacts, similar to the approach under Alternative1. The Proposed RMP Amendment would apply stringent lease stipulations for fluid mineral development, reducing emissions and preserving carbon sequestration, similar to Alternative 4. Additionally, the plan would strengthen protections within ROW avoidance areas, promoting the use of designated corridors to reduce air quality impacts compared with Alternative 1. Overall, the Proposed RMP Amendment would minimize GHG emissions and retain carbon sequestration, offering stronger protections compared with Alternative 1.

Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Alternative 6	Proposed RMP Amendment
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 mineral 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 fluid mineral leasing, 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 fluid and locatable mineral 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 Alternative 4 in terms of allowing for fluid 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.	The Proposed RMP Amendment would implement enhanced management measures that could result in more targeted protections for soil productivity, erosion, and water resource conditions compared with Alternative 1. These measures include stricter lease stipulations, NSO designations, and enhanced mitigation measures for surface-disturbing activities, particularly within PHMA and IHMA. The Proposed RMP Amendment aims to balance resource development with conservation goals, reducing potential degradation of soil and water conditions. While similar to Alternatives 4 and 5, the Proposed RMP Amendment offers more stringent protections in certain areas, potentially leading to improved soil and water conditions over time compared with Alternative 1.

Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Alternative 6	Proposed RMP Amendment
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 fluid 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 mineral 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 1,2, and 4. However, Alternative 5 would be less restrictive than Alterative 4 in terms of allowing for fluid 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.	Impacts under the Proposed RMP Amendment would be similar to Alternatives 4 and 5, falling between the two in terms of impacts on cultural resources and Tribal interests. GRSG management and disturbance caps would apply similar protections as under Alternatives 4 and 5, with the potential for reduced impacts in areas designated with limited exceptions. Fluid mineral management would seek to minimize fragmentation, similar to Alternative 4, but with more waivers potentially increasing impacts compared with Alternative 1. Renewable energy restrictions would be comparable to Alternative 1, potentially displacing impacts to areas outside of HMAs. ROW avoidance designations would lead to shorter ROWs and reduced impacts compared with Alternative 1.

Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Alternative 6	Proposed RMP Amendment
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 fluid mineral leasing 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, saleable, 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 fluid 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.	Impacts on lands with wilderness characteristics from GRSG management and mineral resource allocations would align with Alternative 4, but with stricter protections in PHMA and IHMA. Renewable energy development would be restricted in PHMA with limited exceptions, consistent with Alternative 1, while GHMA would remain open with minimization measures. ROW avoidance designations would reduce impacts compared with Alternative 4, and livestock grazing impacts would be similar to Alternative 4, with additional protections and improvements aimed at minimizing new impacts.

Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Alternative 6	Proposed RMP Amendment
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. 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, nonenergy 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.	Existing restrictions on resource uses like fluid mineral leasing would reduce conflicts in PHMA, IHMA, and GHMA, indirectly benefiting recreation. The Proposed RMP Amendment's avoidance of utility-scale wind and solar energy development, which is less restrictive than under Alternative 1, could further enhance recreational experiences by reducing energy development conflicts. PHMA would cover a larger area compared with Alternative 1, potentially restricting more land for new recreation facilities due to disturbance caps. Limited exceptions for PHMA would offer additional protections, reducing conflicts with recreational uses and preserving naturalness and remoteness for improved recreational experiences.

Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Alternative 6	Proposed RMP Amendment
Transportation and Travel Management						
The existing GRSG travel and transportation allocations or management direction would continue. In PHMA and GHMA, OHV travel is limited to existing routes and no cross-country travel is allowed.	Same as Alternative 1 for Colorado, Idaho, Montana, Oregon, Utah, and Wyoming. NV/CA: Increase in OHV open areas by 4.82% compared with Alternative 1.	Same as Alternative 1 for Colorado, Idaho, Montana, and Wyoming. NV/CA: Decrease in OHV open areas by 6.92% compared with Alternative 1. OR: Decrease in OHV open areas by 3.70% compared with Alternative 1. UT: Decrease in OHV open areas by 1.68% compared with Alternative 1.	Same as Alternative 1 for Colorado, Idaho, Montana, and Wyoming. NV/CA: Increase in OHV open areas by 5.13% compared with Alternative 1. OR: Same as Alternative 2. Decrease in OHV open areas by 3.70% compared with Alternative 1. UT: Decrease in OHV open areas by 1.36% compared with Alternative 1.	Same as Alternative 1 for Colorado, Idaho, Montana, and Wyoming. NV/CA: Increase in OHV open areas by 4.78% compared with Alternative 1. OR: Decrease in OHV open areas by 4.80% compared with Alternative 1. UT: Decrease in OHV open areas by 0.33% compared with Alternative 1.	Same as Alternative 1 for Colorado, Idaho, Montana, and Wyoming. NV/CA: Increase in OHV open areas by 4.78% compared with Alternative 1. OR: Same as Alternative 5. Decrease in OHV open areas by 4.80% compared with Alternative 1. UT: Same as Alternative 5. Decrease in OHV open areas by 0.33% compared with Alternative 1.	Same as Alternative 1 for Colorado, Idaho, Montana, and Wyoming. NV/CA: Increase in OHV open areas by 4.44% compared with Alternative 1. OR: Same as Alternatives 5 and 6. Decrease in OHV open areas by 4.80% compared with Alternative 1. UT: Decrease in OHV open areas by 1.08% compared with Alternative 1.

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4.2 GREATER SAGE-GROUSE

4.2.1 Nature and Types of Effects

Habitat Designation and Management

Management actions addressed during the land use planning process include adjustments to designated HMAs, habitat objectives, disturbance caps, and mitigation strategies, all of which may vary by alternative. Changes to these issues are reflected in actions related to management of other resources, such as minerals. Adjusting HMA boundaries could lead to fewer or greater acres managed as PHMA, and subsequently, smaller or greater areas subject to restrictions on mineral resource management. Permitted activities within HMA boundaries may also vary by alternative. Therefore, impacts from GRSG management are incorporated into the impacts discussion for management of other resources.

Habitat management and designations impact GRSG and habitat by influencing the kind and level of activities and associated disturbances that can occur in GRSG habitat on BLM-administered lands. Impacts to GRSG and habitat resulting from GRSG habitat disturbances vary depending on proximity to important GRSG seasonal habitats, type and quality of the habitat disturbed, type of disturbance, associated indirect impacts (one-time human presence and noise disturbance or on-going maintenance and human presence), how the disturbance is distributed on the landscape, other existing threats, and disturbance density. Any habitat impacts that decrease nesting success and chick and adult female survival can impact population growth and viability (Taylor et al. 2012). Analyses of disturbance thresholds found that GRSG began negatively responding to disturbances at approximately 4.5% disturbance and did not use habitats when surface disturbance exceeded 8% (Kirol et al. 2012). Other research reported almost all occupied leks (99%) in the western portion of the range had less than 3% disturbance from urbanization within 3.1 miles of the lek (Knick et al. 2013). Rangewide lek trend analyses suggest that aggregated human influences on the landscape are associated with negative GRSG lek count trends (Johnson et al. 2011) and population persistence (Kirol et al. 2020). Varied methodology precludes direct comparisons of these studies. The BLM would use different criteria for calculating disturbance caps for some alternatives, as described in the Alternatives subsections below.

Habitat fragmentation can result in lower tolerance to disturbance (Doherty et al. 2016), increased movement distances, reductions in lek persistence, lek attendance, population recruitment, yearling and adult annual survival, female nest site selection, nest initiation, and complete loss of leks and winter habitat (Doherty et al. 2008). Large-scale disturbances, such as agricultural conversions, within surrounding landscapes affect GRSG habitat selection and population persistence (Wisdom et al. 2011). Habitat loss and fragmentation also decrease the connectivity between seasonal habitats, potentially resulting in population isolation or loss (Knick and Hanser 2011) and decreased genetic connectivity (Oyler-McCance et al. 2022).

GRSG habitat use varies by season (see **Chapter 3**), so the impacts of habitat disturbance may vary due to different life stages being affected and may result in changes to vital rates. Research has found negative responses of GRSG to ex-urban development on brood-rearing habitats (Westover et al. 2016), well pads and roads on nesting habitat (Zabihi et al. 2017), and human disturbance on all habitats once sagebrush landscape cover is reduced to a level where GRSG occupancy is negatively affected (Doherty et al. 2016). These effects are intensified in highly fragmented habitats with low sagebrush landscape cover. Considering the spatial area of disturbances in relation to seasonal habitats and different GRSG life history stages is important (Reinhardt et al. 2017).

Disturbances due to land use activities vary by geographical areas. Open plains, prairies, and plateaus may be suitable for wind and solar energy development, whereas mountainous regions may be more suitable for recreation. Rangewide lek persistence is related to environmental factors, including topography and landscape configuration (Wann et al. 2023), so impacts from disturbance likely vary by geographical area. Activities in higher quality habitat may have a greater impact on GRSG. Activities contributing to habitat fragmentation may interfere with gene flow and population persistence, particularly since GRSG may already avoid dispersal areas of rough terrain or steepness (Row et al. 2018).

Some alternatives include a disturbance and energy facility density cap to limit aggregated disturbance and impacts within GRSG management areas. Caps influence allowable level of disturbance within a GRSG HMA, which vary by alternative. A lower level of allowable disturbance would have fewer impacts to GRSG habitat and individuals. Adaptive management is included in some alternatives to address the possibility that habitat or populations continue to decline to the point that thresholds are met. The goal of adaptive management is to detect effects on GRSG habitats and populations and act in an appropriate time frame to effectively offset impacts.

Baseline data shows a total of 330,285 acres of disturbance on PHMA/IHMA in fine scale HAF units rangewide (excluding WY, for which fine scale HAFs have not yet been mapped), and the amount of disturbance in PHMA/IHMA within fine scale HAF units does not currently exceed 3% (BLM GIS 2023). The targeted annual warning system (TAWS), which identifies local populations exhibiting asynchronous decline relative to regional population patterns (Coates et al. 2021a), estimated 2.9% average annual declines in GRSG populations across their geographical range over a 29-year time period (Coates et al. 2023). A rangewide analysis conducted by the BLM showed that sagebrush availability declined by approximately 3% between 2012 and 2018, and 16 habitat triggers were tripped between 2015 and 2020 (Herren et al. 2021). Forty-two GRSG population triggers were tripped in the same time period (Herren et al. 2021). Most of the habitat triggers were the result of wildfires and the associated loss of sagebrush habitats. For population triggers, management changes were identified as needed to address the causal factor in almost half of the areas evaluated. These data indicate that similar trends may continue even with a 3% disturbance cap. These trends were calculated rangewide, but disturbance caps would be calculated at smaller scales. Not all the alternatives incorporate wildfire into the disturbance calculations, and since wildfire is a primary driver of sagebrush habitat loss, there may be differences in the total amount of disturbance needed to stay within the cap by alternative.

Minerals Management

Mineral extraction of all types in GRSG habitat may result in habitat loss from construction of infrastructure, surface or underground mines, and other associated facilities. GRSG population reestablishment in reclaimed areas may take upwards of 30 years (Braun 1998). The use of reclaimed areas is likely influenced by whether the sagebrush systems are mesic or arid, with GRSG more likely to use reclaimed mesic sagebrush systems which recover more quickly (Walker 2022). Where compromised by invasive grasses, reclamation may be minimally effective without additional intervention.

Necessary infrastructure, including location, construction, and use of ancillary facilities, staging areas, roads, railroad tracks, buildings and power lines cause additional direct and indirect impacts on GRSG (Green et al. 2017). These may also result in noise and light pollution, fugitive dust, human disturbance, increases in predator perch sites, and weed proliferation, any of which leads to habitat degradation (Hanser et al. 2018).

Fluid Mineral Resource Management

Industrial activity associated with oil and gas development disrupts the habitat and life cycle of GRSG, resulting in negative impacts to populations and habitats (Green et al. 2017). While advancements in drilling technologies over the past 15 years have reduced surface disturbance, significant challenges remain in minimizing the broader ecological impacts on GRSG populations, particularly with habitat fragmentation and disruption of critical breeding areas. GRSG populations typically decline following oil and gas development (Doherty et al. 2008), and impacts have been observed when leks occur within 2.5 miles of a producing well, when greater than eight active wells are within 3.1 miles of leks, or when more than 200 active wells are within 11 miles of leks (Johnson et al. 2011). Other studies reported increasing density of oil and gas wells correlated with decreasing lek attendance with effects observed at 3.98 miles from leks (Hanser et al. 2018). Abundance was also negatively affected for a distance of between 3 and 4 miles (Holloran 2005). In some instances, impacts were directly attributed to features associated with energy development (Doherty et al. 2008). A one-mile buffer from energy development in Wyoming and Montana resulted in a lek persistence of approximately 30%, whereas lek persistence in areas without oil and gas development averaged 85% (Walker et al. 2007a). Three miles was recommended as a minimum buffer to protect GRSG from energy development impacts in the Bi-State Distinct Population Segment area (Coates et al. 2013). Other impacts have been documented within varying distances from energy infrastructure and at different well densities (Manier et al. 2014).

A one to four-year time lag between oil and gas development and lek decline can occur, possibly because this activity negatively affects recruitment rather than causing avoidance or decreased survival (Green et al. 2017). Lags are potentially explained by avoidance and reduced survival and fecundity in GRSG generations produced following the onset of development (Holloran et al. 2010).

Direct and indirect impacts from energy development accrue both locally and at the landscape scale. GRSG populations typically decline following oil and gas development (Doherty et al. 2008). Indirect effects are habitat degradation or utilization displacement and are estimated to occur out to 11.8 miles from leks (Naugle et al. 2011). Noise from industrial activity may disrupt GRSG communication by interfering with acoustical signals that attract females to leks (Blickley et al. 2012b). Noise from oil and gas development may have been a factor in habitat selection and a decrease in lek attendance by GRSG in western Wyoming (Holloran 2005). Recent studies in oil and gas areas suggest that GRSG avoid leks exposed to human noise (Blickley et al. 2012a; Blickley and Patricelli 2012) and may cause declines in GRSG (Ambrose et al. 2021). Chronic noise pollution can also cause GRSG to avoid otherwise suitable habitat (Patricelli et al. 2013) and can cause elevated stress levels in the birds that remain in noisy areas (Blickley et al. 2012a).

Interaction and intensity of effects of habitat loss from energy development could cumulatively or individually lead to habitat fragmentation in the long term (Holloran 2005). This could negatively impact lek persistence and attendance, winter habitat use, recruitment, yearling annual survival rate, and female nest site choice.

To address population impacts identified, stipulations would be associated with new fluid mineral leasing in GRSG HMAs including NSO, CSU/disturbance caps, and TL stipulations on new leases. These stipulations are intended to reduce or avoid direct disturbance, protect HMAs from surface-disturbing activities, and conserve habitat and population connectivity contributing to genetic diversity. NSO stipulations on new leases would limit impacts to HMAs from surface-disturbance, ensure habitat connectivity between leks, and minimize habitat fragmentation. NSO stipulations can push infrastructure to surrounding private and state lands which may still result in GRSG habitat loss and fragmentation. Waivers, exceptions, and modifications (WEMs) could be applied to stipulations and could void or modify the stipulation depending on the alternative.

Other Mineral Resource Management (Saleable, Nonenergy Leasable, Locatable, and Coal)

Impacts from management of other mineral resources would be similar to those described for fluid mineral resources, and include disturbance, habitat loss/degradation. Infrastructure for locatable or coal mine developments is like that required for fluid minerals but is more localized in extent, but mines may have a large footprint. Direct habitat loss can occur from removing vegetation and soil to access mineral resources and storage of overburden (soil removed from mining activities or the formation of mine shafts) in undisturbed habitat. Construction of ancillary facilities, staging areas, roads, railroad tracks, and structures such as buildings and power lines can result in direct habitat loss. Indirect impacts, such as noise, light, human activity, dewatering of springs and surface water, loss or reduction of groundwater that may be connected or important to surface waters, and subsidence, can impact GRSG and habitat. The interaction and intensity of effects from habitat loss could lead to broader-scale habitat fragmentation in the long term. Surface mining has a greater direct habitat impact than underground mining but disturbance from related above ground infrastructure located in GRSG habitat can also result in direct loss of that habitat.

Several scientific studies examine the effects of coal mining on GRSG. In North Park, Colorado, overall GRSG population numbers were not reduced, but there was a reduction in the number of males attending leks within 0.8 mile of three coal mines, and existing leks failed to recruit yearling males (Braun 1986). New leks formed farther from mining disturbance (Remington and Braun 1991). Some leks that were abandoned adjacent to mine areas reestablished when mining activities ceased, suggesting disturbance rather than habitat loss was the limiting factor (Remington and Braun 1991). Hen survival did not decline in a population of GRSG near large surface coal mines in northeast Wyoming, and nest success appeared not to be affected by adjacent mining activity (Brown and Clayton 2004). Blasting, a practice used to remove overburden or the target mineral, produces noise and ground shock. The full effect of ground shock on wildlife is unknown, but noise from mining operations during lekking activity could result in lek or nest abandonment (Moore and Mills 1977). However, such abandonment may be short term, as leks have been shown to reestablish after mining activities cease (Remington and Braun 1991).

As to locatable minerals, the BLM could request that the Secretary of the Interior to withdraw sage-grouse habitat from location and entry under the Mining Law of 1872 pursuant to Section 204(a) of FLPMA. The Secretary could consider such a request filed according to the process outlined in Section 204 of FLPMA and any Secretarial decision to withdraw the lands must comply with NEPA and other applicable laws. Withdrawing land from location and entry under the Mining Law of 1872 is not a land use planning decision and a recommendation does not in itself change land status, restrict activities, or have any impacts. The alternatives analysis includes a description of the likely environmental effects should the Secretary propose and make a withdrawal in the future.

Lands and Realty Management

GRSG respond negatively to increased human infrastructure in sagebrush habitats, including roads, power lines, and communication towers (Manier et al. 2013). Transmission and power line construction does not generally result in substantial direct habitat loss, but it would permanently disturb individual GRSG and habitat along the ROW due to the associated human activity, equipment, noise, and habitat fragmentation. Transmission lines can also provide perches and nest sites for ravens and raptors, resulting in indirect negative impacts on GRSG survival and reproduction. Avian predator control methods and deterrents may reduce avian predation impacts on GRSG, but efficacy is variable.

In areas managed as ROW exclusion, the BLM would prohibit development of all or certain types/subsets of ROWs such as utility scale wind and solar testing and development. In areas managed as ROW avoidance the BLM would consider allowing ROW on a case-by-case basis. This flexibility may be advantageous where federal, state, tribal, and private landownership areas are mixed and exclusion areas may result in more widespread development, potentially in higher quality habitat, off of BLM administered lands.

Collisions with power lines, vehicles, and property fencing, and increased predation by raptors using these features may increase GRSG deaths at leks (Connelly et al. 2000a). Since GRSG deaths associated with power lines and roads occur year-round (Aldridge and Boyce 2007) roads and power lines may also indirectly affect lek persistence by altering productivity of local populations or survival at other times of the year. Artificial ponds created by development (Zou et al. 2006) can support breeding mosquitoes known to carry West Nile virus (Walker et al. 2007b) and elevate the risk of GRSG deaths in late summer (Walker and Naugle 2011). GRSG may also avoid otherwise suitable habitat as development increases (Lyon and Anderson 2003).

Avoidance of developed areas should be considered a reduction in the distribution of GRSG (Walker et al. 2007a) as avoidance can result in population declines when density dependence, competition, or displacement of birds into poorer-quality adjacent habitat lowers survival or reproduction (Aldridge and Boyce 2007). The specific response is tied to the type of ROW, its location, and associated human activity and infrastructure. GRSG exhibit extremely high site fidelity, which strongly suggests that unfamiliarity with new habitats may also reduce survival (Holloran and Anderson 2005), as evidenced in other grouse species (Yoder et al. 2004).

Renewable Energy Management

Potential impacts of renewable energy projects on GRSG and their habitats have not been as widely studied as other energy development. Studies of oil and gas development and associated infrastructure on the species (Becker et al. 2009) suggest that impacts to GRSG and their habitats can be anticipated from renewable energy projects, as well. GRSG have evolved in habitats with little vertical structure or other human-made features, therefore, tall vertical structures such as wind turbines may displace GRSG from their usual habitat (Johnson and Stephens 2011). Wind energy studies have found that nest and brood survival are negatively affected with proximity to wind turbines, likely a result of increased predation (LeBeau et al. 2014, 2017a, 2017b). Additional concerns with wind energy development include noise produced by rotating blades, GRSG avoidance of structures, mortality by flying into rotors, and the presence of new roads and power lines (Connelly et al. 2004; Manier et al. 2013). Disturbance from the footprint of infrastructure is negatively associated with GRSG viability (Kirol et al. 2020; Coates et al. 2021a). Development of solar facilities would have similar infrastructure effects (vertical structures, roads, fencing, other associated infrastructure, and related changes in vegetation), but would occur at a discrete location with intense development (i.e., a solar field). Negative impacts to GRSG and their habitats from solar facilities are anticipated to extend to ancillary infrastructure, such as transmission lines and substations as seen with other types of energy development. While there is less potential for mortality or injury due to collisions at solar versus wind facilities, there may be an increased risk of GRSG mortality due to collisions with fencing associated with solar facilities. Research on geothermal development in Nevada reported adverse effects on GRSG populations by decreasing nest survival, adult survival, and increased density of common ravens (Coates et al. 2021a).

Longer-term residual impacts may be cumulative and their contribution to GRSG population declines depend on the magnitude, frequency, and duration of human disturbance. GRSG may abandon leks if repeatedly disturbed by raptors perching on power lines or other tall vertical structures near leks (Ellis 1984), by vehicular traffic on roads (Lyon and Anderson 2003), or by noise and human activity associated with energy development (Kaiser 2006).

Travel and Transportation Management

The effect of development of roads can result in direct changes in habitat and GRSG populations and indirectly result in through avoidance behavior by these populations (USFWS 2010a). Roads alter and fragment habitat by impeding use of seasonal habitats, facilitating habitat degradation by creating a corridor along which invasive plants can spread, allowing for increased human noise disturbance, resulting in GRSG avoidance, direct mortality, and increasing mammalian and avian predator abundance (Formann and Alexander 1998).

GRSG persistence is inversely correlated with road density. Compared with currently occupied GRSG range, areas where GRSG no longer occur are 60% closer to highways and had 25% higher road densities (Manier et al. 2013). Within GRSG range, 95% of the mapped sagebrush habitats are within 1.6 miles of a mapped road and density of secondary roads exceeds 3.1 miles per 247 acres in some areas (Knick et al. 2011). Incremental effects of accumulating lengths of state and federal highways and interstates near leks included decreasing lek counts when there were more than 3.1 miles of federal or state highway within 3.1 miles of leks and when more than 12.4 miles of highway occurs within 11.2-miles of leks (Johnson et al. 2011).

Livestock Grazing Management

Livestock grazing in GRSG habitat may either improve or decrease habitat quality, depending on the type of habitat, spatial and temporal scale, and how the grazing is administered (Boyd et al. 2014). Numerous variables influence GRSG habitat on the landscape (e.g., vegetation present, soil, elevation, aspect, and precipitation). These, combined with historic and current levels and methods of livestock grazing, result in variable impacts on GRSG habitat from livestock grazing in both space and time (Manier et al. 2013). The nature and level of impacts discussed in this analysis are described in broad terms due to this variability. Habitat impacts from livestock consumption of vegetation are diffused over broad spatial or temporal scales and are different than discrete disturbances (Knick et al. 2011; BLM IM 2012-044, BLM National Greater Sage-Grouse Land Use Planning Strategy). Livestock can influence yearly vegetation conditions, and/or result in altered vegetation dominance over time. Prolonged selective grazing pressure on vegetation communities can affect the condition of individual plants, abundance of species, interspecific competition, and ultimately, community composition (Manier and Hobbs 2006). While specific effects and conditions from grazing are localized in most cases, the continuous and collective presence of these effects across the West may affect the regional condition of GRSG habitats (Manier et al. 2013).

Timing of grazing relative to plant growth stages (growth initiation, rapid growth, seed development, seed ripe, and dormancy) can influence the effects on vegetation (Veblen et al. 2011). Repeated grazing during periods of fastest growth of the dominant grasses and forbs in intermountain sagebrush steppe over multiple consecutive years tends to favor sagebrush growth (Pyke 2011) through reduced competitive ability of grasses (Manier et al. 2013). Spring grazing in winter habitat may improve GRSG winter habitat because grass reductions can increase sagebrush densities (Beck and Mitchell 2000), suggesting an opportunity to graze GRSG winter habitats in spring when non-overlapping brood-rearing habitats would be avoided, and vice versa (Manier et al. 2013). GRSG initiate nesting prior to new herbaceous growth, so grazing levels from the previous year and the residual grass can provide initial cover for nesting GRSG (Hausleitner et al. 2005; Holloran et al. 2005). Nesting GRSG consistently select areas with more sagebrush canopy cover and taller grasses compared with available habitats (Hagen et al. 2007), increasing the probability of a successful hatch (Manier et al. 2013). If nesting and early brood-rearing habitats are grazed in a manner that consistently results in a lack of sufficient residual grass cover the following spring, predation of GRSG nests could increase and the rate of nest success could decrease (USFWS 2010a).

The availability of forbs is an essential component of a pre-laying hen's diet (Barnett and Crawford 1994; Connelly et al. 2000b; Gregg et al. 2008). In Nevada, greater forb diversity and higher plant species richness were small-scale habitat factors associated with brood success (Casazza et al. 2011). A reduction in forbs due to livestock grazing would reduce the value of nesting and early and later brood-rearing habitat for GRSG and may cause them to use less optimal habitat, potentially affecting nesting GRSG (Barnett and Crawford 1994) and chick survival (Huwer et al. 2008). Forb diversity and concentration dramatically increase invertebrate densities, which are crucial for chick survival and growth (Johnson and Boyce 1990). Insect diversity and density are positively correlated with herbaceous density and diversity (Jamison et al. 2002). Recent research has found that grazing intensity was not ultimately detrimental to insect abundance and permitted some insect taxa to thrive (Richardson et al. 2023).

The effects from grazing also vary by kind of livestock, numbers of livestock, duration, and area (intensity), and grazing management systems. Grazing intensity has consistently been identified as having impacts on ecosystem and rangeland health (Veblen et al. 2011), including the vegetative structure required by GRSG. Livestock, especially cattle, prefer to concentrate near water sources and the location of water affects livestock distribution patterns. This pattern can result in disproportional use of riparian habitats and wet meadows, which can result in loss of riparian vegetation and cover, as well as compaction of soils and lowering of water tables, which alters water quality, invertebrate populations, and plant species composition. This can result in degradation of crucial habitats for GRSG.

Artificial water sources provided in support of livestock grazing may attract GRSG and expose them to insects that may serve as vectors for diseases such as West Nile virus (Naugle et al. 2004). The presence of livestock is also associated with increased raven occurrence (Coates et al. 2016), which can lead to increased GRSG predation. Livestock management practices provide ravens with resource subsidies, such as water sources, which are naturally scarce in the arid west. Structural range improvements, such as fences, represent potential movement barriers or predator perches and are a potential cause of direct mortality to GRSG due to collision (Manier et al. 2013).

Livestock grazing can be a management tool to aid in the management or maintenance of vegetation communities within GRSG habitat. Well managed livestock grazing may change plant community composition, increase productivity of selected species, increase forage quality, and alter structure to increase habitat diversity (Vavra 2005), and can positively effect GRSG habitat suitability (Manier et al. 2013). Many studies demonstrate weeds can be controlled through grazing at a specific time, intensity, and duration to reduce abundance of these species. Under controlled situations, where livestock is used as a targeted vegetation treatment tool, livestock can reduce fine fuel loads (e.g., cheatgrass) (Diamond et al. 2009). Cheatgrass completes its reproductive cycle, using limited soil moisture and nutrients, well before most native perennial grasses and is usually dry by mid-summer, which coincides with increased wildfire danger (Pellant 1996). Intense "flash" grazing during the winter or early-late spring, while it is still green, may control cheatgrass. Recent research also suggests bunchgrass community structure and the presence of biological soil crusts increases resistance to cheatgrass invasions. Grazing management that decreases those components decreases the vegetation communities' resistance to invasion (Reisner et al. 2013). Sheep and goats can be used to control noxious weeds such as leafy spurge, spotted knapweed, and yellow star thistle. Effectiveness of livestock as a management tool for the control of undesirable vegetation is highly dependent on the scale, livestock behavior, and ability to avoid grazing native vegetation. However, livestock grazing could be used to meet habitat objectives.

Although the potential for population level effects is uncertain, GRSG and their habitats may be directly impacted by livestock trampling of GRSG eggs or causing nest desertion from repeated disturbance (Beck and Mitchell 2000). Trampling by livestock under short-duration or season-long grazing may also kill sagebrush, particularly seedlings growing in the spaces between shrubs (Beck and Mitchell 2000), though effects are typically localized.

Under all alternatives, described in **Appendix 21**, livestock grazing would be managed to meet or make progress towards land health standards and improper grazing would be limited and addressed through implementation-level corrective actions. In this Proposed RMP Amendment/Final EIS, varying acres of GRSG HMAs would be available for livestock grazing. The actual number of AUMs authorized on a permit may be adjusted through permit renewals, permit modification, allotment management plan development, or other appropriate implementation activity. In areas unavailable for grazing, there would be no GRSG habitat alterations as a result of grazing. Removal of grazing would result in reduced landscape scale removal of fine fuels, which could indirectly impact GRSG habitat by increasing the potential for wildfire. The BLM could still implement targeted grazing treatments, but at a smaller scale than if more areas are available for grazing. In areas of mixed land ownership, making public lands unavailable for grazing that are adjacent to private, state or Tribal grazing lands could result in more fencing. This could impact GRSG due to increased perches for avian predators (O'Neil et al 2018) and increased risk of collision. Sale of private lands could also lead to an increased potential for urbanization which may impact GRSG due to habitat loss, fragmentation and disturbance.

Wild Horse and Burro Management

Wild horses may alter habitat conditions for GRSG by reducing vegetation abundance and cover, increasing shrub canopy fragmentation, lowered species richness, increased compaction in surface soil horizons, and increased dominance of unpalatable forbs (Coates et al. 2021b). Horse and burro populations can degrade riparian areas, decrease water quantity and quality, and increase soil erosion. Additionally, wild horses may disrupt the lekking activity, reducing lek attendance, and mating opportunities, and contributing to population declines (Munoz et al. 2021). Cumulatively this can reduce habitat quality for wildlife, including GRSG. Effects of wild horses on habitats may also be more pronounced during periods of drought or vegetation stress (NTT 2011). Wild horse and burro gather methods may also disturb GRSG and their habitats.

Fences used to manage horse distribution are a potential source of direct mortality to GRSG (Manier et al. 2013). Year-round water availability in horse herd management areas and wild horse territories is required by the Wild and Free-Roaming Horses and Burros Act of 1971. This can result in year-long use of riparian areas by wild horses and other modifications (fences, troughs). Negative effects are possible depending on how each facility is constructed. Range improvements would increase potential perch sites for avian predators (fences) and potential drowning hazards (troughs).

Predator Management

GRSG are prey for various predators including but not limited to, coyotes, badgers, bobcats, red fox, golden eagles, hawks, and corvids (Hagen 2011). Predation can be a threat to GRSG, with effects on population size and high distribution in many areas of the West, especially in areas of low population density where there is limited habitat or poor habitat quality (USFWS 2010a). Under some circumstances, predation rates can increase, such as when human subsidies attract increased numbers of predators. Raven populations have dramatically increased, with 293% more ravens within GRSG range compared to outside their range between 1966 and 2018 (Harju et al. 2021). This has led to concerns about increased predation rates which can be exacerbated by supplemental food resources, increased infrastructure supporting nesting and perching opportunities, increased paved roads and highways which are sources of roadkill, and livestock carcasses and afterbirths. Elevated raven abundance associated with human resource subsidies have been documented to cause elevated predation rates on GRSG (Coates et al. 2020). While managing these subsidies is important, it may not be sufficient to solve the raven problem on its own. Predator control in areas of compromised habitats with high populations of synanthropic predators (predators that live near, and benefit from, an association with humans) may be help ensure GRSG persistence until habitat conditions improve (O'Neil et al 2018). Predators, especially coyotes, are often controlled to prevent livestock loss, which may reduce predation on GRSG. Wildlife management, including predator control, remains the responsibility of state and/or federal wildlife agencies.

ACEC Designation

Special management areas such as ACECs can be used as a management tool to provide protection to GRSG and habitats through restrictions on uses and surface-disturbing activities. Management to protect the relevant and important values in these ACECs and others that overlap GRSG habitat may provide incidental protection to GRSG and their habitats by restricting land disturbances (including ROWs).

4.2.2 Proposed RMP Amendment

Habitat Designation and Management

Rangewide Environmental Consequences

Impacts from designating GRSG habitat as HMAs would be similar to, but more protective, than those described for Alternative 1 (the plan currently being implemented), though the BLM would manage approximately 2,056,000 acres (6%) more PHMA and 4,848,000 (18%) fewer acres of GHMA (**Table 2-15**). The HMA designations are more protective than under Alternative 1 because the delineations of the HMA areas under the Proposed RMP Amendment are based on updated science and data. 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) and, therefore, would be more effective in providing GRSG habitat protections where they are needed and where they will be most effective. Compared to the draft preferred alternative (Alternative 5) the BLM would manage approximately 592,000 (2%) more PHMA and 75,000 (less than 1%) fewer acres of GHMA. Additionally, there would be 4,213,000 acres of PHMA with limited exceptions which would provide additional protections for GRSG from impacts of wind and solar development, and the associated ROWs and surface impacts from fluid mineral development. Increasing amounts of PHMA would result in less habitat fragmentation and loss and disturbance to GRSG. However, where PHMA would be reduced, the decision was based on new information on GRSG habitat use, or loss of habitats due to non-anthropogenic impacts such as wildfire on BLM lands.

State-Specific Environmental Consequences

In WY PHMA would increase by 269,000 acres (3%), under the proposed RMP Amendment compared to plan currently being implemented (Alternative 1), resulting in an increase in protections from PHMA. PHMA would decrease by 12,000 acres (less than 1%) compared with Alternative 5, resulting in a slight decrease in protections. GHMA in WY would decrease by 191,000 acres (2%) compared with Alternative 1, resulting in a slight decrease in associated protections. GHMA would increase by 13,000 acres (less than 1%) compared with Alternative 5, resulting in a slight increase in associated protections. Approximately 273,000 acres in WY are identified as PHMA with limited exceptions. This subset of PHMA would have additional protections for GRSG habitats from renewable and non-renewable energy development and associated rights-of-ways.

Management in Wyoming SHMA (15,000 acres) would align with GHMA restrictions, increasing protections to GRSG.

In MT/DK PHMA would decrease by 42,000 acres (1%) and 68,000 acres (2%), under the proposed RMP Amendment compared to plan currently being implemented (Alternative 1) and the draft preferred alternative (Alternative 5), respectively. These changes would result in a decrease in protections associated with PHMA. GHMA in MT/DK would decrease by 452,000 acres (19%) compared with Alternative 1, resulting in a decrease in associated protections. GHMA would increase by 73,000 acres (4%) compared with Alternative 5, resulting in an increase in associated protections. Approximately 639,000 acres in MT are identified as PHMA with limited exceptions (there are no areas of PHMA with limited exceptions in North and South Dakota). This subset of PHMA would have additional protections for GRSG habitats from renewable and non-renewable energy development and associated rights-of-ways. the associated development restrictions

Under the Proposed RMP Amendment, MT/DK would designate Unique HMAs (Little Missouri HMA, South Carter HMA, and Connectivity HMA) to maintain, improve and restore sagebrush communities and increase habitat availability and quality for greater sage-grouse. These Unique HMAs cover 388,000 acres and are managed to provide greater protections from impacts described in Alternative 5.

In CO PHMA would increase by 4,000 acres (1%) and 1,000 acres (less than 1%), under the proposed RMP Amendment compared to the plan currently being implemented (Alternative 1) and the draft preferred alternative (Alternative 5), respectively. These changes would result in an increase of protections in PHMA. GHMA in CO would decrease by 2,000 acres (less than 1%) compared with Alternative 1, with impacts being the decrease in associated protections. GHMA under the Proposed RMP Amendment would not change when compared with Alternative 5. Approximately 5,000 acres in CO would be identified as PHMA with limited exceptions, protecting vital winter habitat. This area within PHMA would have additional protections for GRSG habitats from renewable and non-renewable energy development and associated rights-of-ways. the associated development restrictions. Linkage Management Areas would not change when compared with either Alternative 1 or Alternative 5.

In ID PHMA would increase by 395,000 acres (9%), under the proposed RMP Amendment compared to plan currently being implemented (Alternative 1), resulting in an increase in protections associated with PHMA. PHMA under the Proposed RMP Amendment would not change when compared with Alternative 5. IHMA in ID would decrease by 210,000 acres (8%), and GHMA would decrease by 259,000 acres (13%) compared with Alternative 1, resulting in a decrease in associated protections. Compared with Alternative 5, IHMA would increase by 23,000 acres (less than 1%), with an increase in protections under the Proposed RMP Amendment, while GHMA would decrease by 22,000 acres (1%), resulting in an associated decrease in protections. Approximately 251,000 acres in ID would be identified as PHMA with limited exceptions. This area within PHMA would have additional protections for GRSG habitats from renewable and non-renewable energy development and associated rights-of-ways and would contribute to the conservation of GRSG that cross the border with NV.

In NV/CA PHMA would increase by 394,000 acres (4%) and 164,000 acres (2%), under the proposed RMP Amendment compared to the plan currently being implemented (Alternative 1) and the draft preferred alternative (Alternative 5), respectively. These changes result in an increase in protections associated with PHMA. GHMA in NV/CA would decrease by 3,340,000 acres (58%) and 137,000 (5%) compared with Alternatives 1 and 5, respectively. These changes would result in a decrease in associated protections. OHMA would similarly decrease compared with Alternative 1 (764,000 fewer acres, 16% decrease) and with

Alternative 5 (29,000 fewer acres, less than 1% decrease). Approximately 3,001,000 acres in NV/CA would be identified as PHMA with limited exceptions. This area within PHMA would have additional protections for GRSG habitats from renewable and non-renewable energy development and associated rights-of-ways.

In OR PHMA would increase by 983,000 acres (21%), under the proposed RMP Amendment compared to the plan currently being implemented (Alternative 1). These changes would result in an increase in protections associated with PHMA. GHMA in OR would decrease by 810,000 acres (14%) compared with Alternative 1, resulting in a decrease in associated protections. PHMA and GHMA under the Proposed RMP Amendment would not change when compared with Alternative 5. Approximately 39,000 acres in OR would be identified as PHMA with limited exceptions. This area within PHMA, which is currently designated as an ACEC, would have additional protections for GRSG habitats from renewable and non-renewable energy development and associated ROWs.

In UT PHMA would increase by 54,000 acres (3%) and 507,000 acres (31%), under the proposed RMP Amendment compared to the plan currently being implemented (Alternative 1) and the draft preferred alternative (Alternative 5), respectively. These changes would result in an increase in protections associated with PHMA. GHMA in UT would increase by 207,000 acres (47%) compared with Alternative 1, with impacts being the increase in associated protections. Compared with Alternative 5, the Proposed RMP Amendment would manage 1,000 fewer acres (less than 1%) of GHMA, resulting in a slight decrease in associated protections. There would be no PHMA with limited exceptions identified in UT as the primary threats addressed with that designation do not occur within PHMA in UT.

Renewable Energy Management

Rangewide Environmental Consequences

Managing PHMA as exclusion for utility scale renewable energy (wind, solar) development and testing in the Proposed Amendment would provide protections for GRSG from these uses, similar to those as described for Alternative 1, and more restrictive than the avoidance criteria described in Alternative 5. In areas of PHMA with limited exceptions there would be no exceptions to these exclusions, providing additional protections to GRSG habitats. GHMA would be open, but the requirement for minimization measures and mitigation in the Proposed Alternative would provide more protections for GRSG and their habitats. Associated ROWs would be managed as exclusion for wind and solar energy development, offering greater protections for GRSG than identified under either Alternatives 1 and 5.

State-Specific Environmental Consequences

In OR PHMA is buffered by 0.5 miles to avoid potential indirect impacts from disturbance in adjacent non-habitats. GHMA is avoidance for both utility scale wind and solar, with specific criteria or co-location requirements to minimize direct and indirect disturbances associated with development. These requirements will increase protections for GRSG.

In GHMA would be avoidance in CO, OR, and NV/CA, increasing protection for GRSG. MT would also be avoidance in GHMA, and exclusion within 2 miles of active leks, crucial GRSG winter habitats and UMRBNM, protecting more habitat. UT would be avoidance within connectivity areas, conserving those corridors. ID and WY would be open, and ID would apply RDFs, lek buffers and mitigation. WY would apply state specific minimization measures from Alternatives 1 and 2, resulting in similar protections.

Minerals Management (including Fluid minerals, Saleable Minerals/Mineral Materials, Non-energy Leasable Minerals, and Locatable Minerals)

Rangewide Environmental Consequences

Under the Proposed RMP Amendment, impacts to PHMA GRSG habitats would be similar to those described for Alternative 5 for saleables, locatables, and fluid mineral objectives and allocations. In addition, management of PHMA with limited exceptions would be as NSO with no waivers, exceptions and modifications; closed to saleable minerals with fewer exceptions for new free use permits and expansion of existing pits; and closed to nonenergy leasables without expansions, would provide further protections for GRSG in these areas. Fluid mineral management direction under the Proposed RMP Amendment will be working with project proponents to promote measurable conservation objectives that reduce habitat loss and fragmentation. These approaches would reduce the risk of habitat degradation and fragmentation in PHMA, offering stronger protections compared to Alternative 1 (current plan). GHMA would be open rangewide, but with the state variations as noted below. Locatable mineral leasing would be open unless currently withdrawn in accordance with the Mining Law of 1872.

State-Specific Environmental Consequences

Fluid Minerals Allocation and Management Directions:

Exceptions in PHMA vary in CO, WY, MT/DK, OR, and NV/CA. For areas already leased, WY allows for exceptions to NSO within 0.6 miles if the development will not impact GRSG habitats and GRSG behavior. MT would not allow exceptions within 0.6 miles of an active lek, and CO would extend the NSO to 1.0 mile protecting these breeding habitats. In ID, OR, and NV/CA the exceptions would apply to areas beyond 3.1 miles of active leks. These state variations would accommodate ecological and topographical differences and would have similar impacts to those analyzed under Alternative 5.

The oil and gas lease stipulations summarized in **Appendix 2** would be applied in MT/DK; these stipulations would reduce the potential for impacts associated with fluid mineral leasing as described in in Nature and Types of Effects. Applying a 5% disturbance cap at the project scale in MT/DK and WY, and a 3% disturbance cap at the HAF fine scale area would limit disturbance to local populations, although it could allow for more potential fluid mineral development rangewide, increasing disturbance and habitat alterations, including fragmentation. Impacts from the disturbance cap would be similar to those described under Alternative 5 but may be less than the current plan (Alternative 1) since the larger scale at which disturbance was monitored did not consider actual location of GRSG habitat use. Compensatory mitigation must be in place when an exception is granted, as described under Alternative 4. To grant an activity based on compensatory mitigation in Colorado, the compensation project must be planned, funded, and approved in coordination with the State of Colorado. Impacts from the NSO in WY would be the same as described for Alternative 5, meaning similar protections would apply.

Impacts from consistency in stipulations in MT/DK HMAs and from closing the Upper Missouri River Breaks National Monument to fluid mineral leasing and development would be the same as those described for Alternative 3. This means that closing PHMA to fluid mineral leasing, saleable minerals, and nonenergy minerals would reduce potential impacts to GRSG and habitat more than under Alternative 1, protecting habitat from surface-disturbing activities and associated fragmentation, though valid, existing leases may still be developed.

In GHMA OR would retain a NSO designation, and UT would be NSO near leks and apply seasonal limitations. MT/DK would apply a NSO within 0.6 miles of active leks and crucial winter GRSG ranges, and UMRBNM would be closed. WY would apply NSO within 0.25 miles of active leks (this would also apply in

SHMA). CO and NV/CA would apply CSUs and seasonal limitations around leks. These state specific variations accommodate ecological and topographical differences and would provide additional protections when compared to Alternative 1 and are similar to those analyzed in Alternative 5.

Salaeable Minerals:
In PHMA OR, MT/DK and WY would be open for new free use permits if the BLM can verify the area proposed for development is not habitat and would not adversely impact any adjoining GRSG habitat. IHMA in ID would be open as would SHMA in WY. The impacts would be similar to Alternative 5.

In ID PHMA, the exception for new saleable mineral free use permits or expansion of existing permits would be less restrictive than Alternative 5, which may allow for greater impacts on GRSG and habitat. Lek buffers would be reduced in IHMA and further reduced in GHMA, resulting in similar effects to those described for Minerals Management under Alternative 1.

Nonenergy Leasable Minerals:
In WY expansion of existing operations would be permitted but subject to CSUs and TL to minimize disturbance to GRSG. In PHMA with limited exceptions WY would be closed except in cases of human health and safety. NV/CA allows project level considerations that demonstrate no impact to GRSG in PHMA. In CO, PHMA would have TL for construction, drilling or completions within 4 miles from occupied leks from March 1 to July 15 to conserve breeding birds and habitats. GHMA (and SHMA in WY) is open but state-specific minimization measures would be applied to conserve GRSG and their habitats. The addition of the state-specific minimization measures would reduce potential impacts to GRSG in GHMA, but would not remove them potentially resulting in loss and fragmentation of GRSG habitats.

Lands and Realty Management

Rangewide Environmental Consequences

Under the Proposed RMP Amendment, PHMA would be managed as avoidance with some exceptions for major and minor ROWs. This is similar to the protections described under Alternative 1. PHMA with limited exceptions is exclusion for major ROWs but can be considered within RMP designated corridors when the ROW is not "viable" in areas designated as open with restrictions and compensatory mitigation, similar to Alternative 3. Such management would decrease potential impacts from ROW development by excluding new ROW authorizations in PHMA. However, ROW routes, if made longer to bypass the PHMA exclusions, might increase surface disturbance, albeit outside PHMA.

GHMA would be open for major and minor ROWs but with applicable state minimization measures from 2015 and 2019, and compensatory mitigation to maintain habitats consistent with state agency designations (e.g., restoration, connectivity) and to preclude negative impacts to any adjacent PHMA. Impacts would be similar to those in the current plan (Alternative 1) and Alternative 2, but additional state-specific requirements outlined below would provide additional protections to GRSG.

State-Specific Environmental Consequences

In Colorado, GHMA would be avoidance for both major and minor rights-of-way to preclude negative impacts to PHMA, but open in designated corridors. Impacts would be the same as those described under Alternative 4. Compared with the current plan (Alternative 1), this would include increased restrictions on ROW development in GHMA areas, enhancing GRSG protection during critical life stages, but with the potential for higher costs or delays for ROW projects due to additional timing limitations and review processes.

In Idaho, PHMA management (avoidance) would be more restrictive than impacts analyzed under Alternative 5 due to the management direction that restricts anthropogenic development, and would be consistent with the 2021 Idaho Sage-grouse Plan (State of Idaho 2021). IHMA would be also avoidance for major rights-of-way with RDFs, lek buffers and mitigation for both major and minor rights-of-way with similar impacts. GHMA would be open with RFDs, buffers and mitigation for both major and minor rights-of-ways. Although impacts would be higher in GHMA, the state restrictions will reduce habitat losses.

MT would be exclusion for rights-of-ways in PHMA within 0.6 mi of active leks and crucial winter range, providing additional protection for those GRSG habitats and with similar impacts as described in Alternative 5. Projects would be considered if resulting impacts were neutral or beneficial for GRSG (also true for GHMA, LMHMA, SCHMA, and CHMA). In PHMA with limited exceptions no exceptions would be considered within 0.6 mi of active leks and crucial winter range, providing increased protection to these habitats. GHMA would be avoidance for minor rights-of-ways within 1.2 mi of leks and within crucial winter range, open with mitigation elsewhere.

In OR no new major rights-of-ways would be allowed in PHMA within breeding and nesting habitats and other limiting/high value seasonal habitats, which is more protective than described in Alternative 5. No major rights-of-ways would be permitted in GHMA within 0.5 mi of PHMA and would be avoidance within breeding, nesting, and limiting habitats, open with minimization and mitigation elsewhere. Although impacts would be higher in GHMA, the state restrictions will reduce habitat losses.

GHMA and SHMA would be open for major rights-of-ways in WY with state minimization measure and compensatory mitigation to maintain GRSG habitats and protect PHMA. No mitigation would be required for minor rights-of-ways in GHMA and SHMA. The potential impacts would be the same as considered in the current plan (Alternative 1). In UT, GHMA would be avoidance in connectivity areas but could be considered if a proposed project can document no negative impacts to PHMA or important seasonal habitats in GHMA.

Travel and Transportation Management

The Proposed RMP Amendment would change acres that that are closed to OHV use. While there would be changes in open and limited acres resulting from changes in PHMA (see **Section 4.20**), these changes would not result in substantial changes in effects on GRSG.

Livestock Grazing Management

Rangewide Environmental Consequences

Impacts from livestock and grazing management under the Proposed RMP Amendment would be the same as those described under Alternative 4 and would focus on managing livestock to meet Land Health Standards for Special Status Species (including GRSG). Direct impacts to GRSG from livestock range improvements would also be avoided. Managing to Land Health Standards would focus on maintaining robust and impact sagebrush habitats which would benefit GRSG. Additionally, existing range improvement projects for managing livestock would be reviewed during renewal processes to identify and possibly modify those that negatively impact GRSG and GRSG habitats. Current grazing allotments and permit levels would be maintained, but adjustments to active AUMs, and timing, intensity, duration, and frequency of grazing would be considered as needed to ensure meeting Land Health Standards. Mitigation measures such as adjusting grazing practices to avoid key GRSG habitats during critical periods would be implemented, remaining consistent with the provisions outlined under Alternative 5. In GHMA (and SHMA in WY) existing livestock management range improvements would not be evaluated during the grazing authorization process as they would be in PHMA, potentially retaining improvements that negatively impact GRSG or associated habitats.

State-Specific Environmental Consequences

In Oregon some key Research Natural Areas may be open to grazing which would increase the amount of grazing in some GRSG habitats. Those areas would still be managed to meet Land Health Standards. In some key Research Natural Areas closed to grazing authorizations water-related range improvements may be considered to ensure water availability. In ID, IHMA would have the same management as described above in PHMA.

Wild Horse and Burro Management

Impacts to habitat from wild horse and burro management under the Proposed RMP Amendment would be similar as those described under Alternatives 2 and 5, except AML levels would be focused on achieving or maintaining Land Health Standards (vs. specific GRSG habitat objectives). Managing to Land Health Standards would focus on maintaining robust and imtact sagebrush habitats which would benefit GRSG as well as other sagebrush-associated species. The impact of these management differences for GRSG would likely be negligible. The same population control measures, such as increased removals and fertility control programs, would be implemented to manage wild horse and burro populations. Consequently, the effects on habitat use and competition with GRSG would be consistent with those outlined under Alternative 5.

State-Specific Environmental Consequences

In WY, wild horse gathers would not be prioritized in PHMA, which would potentially maintain any negative impacts to GRSG if range conditions are not meeting or making progress towards meeting Land Health Standards as the result of wild horses in those areas.

Predation Management

Impacts from reducing opportunities for predators would be similar to those described for Alternative 3. The requirement for some project proponents to develop a proactive predator management plan for proposed projects in PHMA under the Proposed RMP Amendment would potentially reduce habitat loss and fragmentation and artificial predator food subsidies – primary contributors to increasing predators in GRSG habitats. These requirements would conserve GRSG habitats and reduce the influx of predator numbers, providing increased protection for GRSG than the current plan (Alternative 1). The BLM would also focus on conserving intact GRSG habitats to maintain predation at natural levels would be applied, and will work with predator control agencies (federal, state and local) as needed to address predation concerns.

State-Specific Environmental Consequences

NV will continue implementing their state GRSG conservation plan which addresses management to reduce predation on GRSG. ID will require a predator management plan in IHMA and NV/CA and OR will require a predator management plan in GHMA, extending those benefits across the range of the species in those states.

ACEC Designation

The Proposed RMP Amendment would not result in any impacts from ACEC designation since it does not propose designation of any new ACECs or include management for ACECs.

Travel and Transportation

None of the action alternatives, including the Proposed RMP Amendment, propose changes to the existing 2015 GRSG travel and transportation allocations or management direction. Therefore, under all alternatives, in PHMA and GHMA, OHV travel is limited to existing routes and no cross-country travel is allowed. The changing HMA allocations occurring across the alternatives could, however, result in changes to areas moving from open to cross country travel to limited to existing routes due to areas moving from non-habitat to either PHMA or GHMA and, conversely, areas could move from limited to open if previously identified habitat (GHMA or PHMA) is no longer identified as habitat and the areas are not otherwise limited or closed under an existing RMP decision. Under all alternatives and the Proposed RMP Amendment, there are no changes in acres of OHV allocations due to changes in HMA allocations in Colorado, Idaho, Montana/Dakotas, or Wyoming (refer to **Table 4-4** in **Appendix 9**).

In Nevada/California there is an increase in open areas when compared with the existing condition under Alternative 1 in all alternatives except Alternative 3, where there is a decrease in open areas (refer to **Table 4-5** in **Appendix 9**). The increase in open areas is greatest under Alternative 4. Alternatives 5, 6, and the Proposed RMP Amendment all increase open areas by approximately two million acres (refer to **Table 4-5** in **Appendix 9**). Although this increase in open areas could cause negative impacts to vegetation and soils and other wildlife; because these areas are now open. The fact that they would move to open means they are not identified as habitat and so there are no anticipated direct effects to GRSG or GRSG habitat by this increase in open areas and corresponding decrease in areas that are limited to existing routes. There could, however, be indirect effects to nearby habitat from potential increases in areas open to cross-country use.

In Oregon, there is decrease in open areas and corresponding increase in limited areas from the existing acres in Alternative 1 in all of the alternatives except Alternative 2 (refer to **Table 4-6** in **Appendix 9**). The largest decrease in open areas occurs under Alternatives 5, 6, and the Proposed RMP Amendment with approximately 600,000 fewer acres identified as open. Under 4 and 5, there are approximately 500,000 fewer acres allocated as open. These decreases in open areas in what is identified as habitat under alternatives 3, 4, 5, 6, and the Proposed RMP Amendment would reduce impacts from cross country OHV use to GRSG and GRSG habitat from the potential noise and disturbance effects from cross-country travel.

In Utah, like Oregon, there is a decrease in the amount of OHV areas that are open and a corresponding increase in areas that are limited as a result of changes in HMA allocations. The decrease in open areas is greatest under Alternative 3 followed by Alternative 4, and the Proposed RMP Amendment (refer to **Table 4-7** in **Appendix 9**). These reductions in areas open to cross country OHV use would reduce negative impacts from noise and disturbance to GRSG and GRSG habitat.

Management Directions (Habitat Management Objectives, Mitigation, Disturbance Caps, and Adaptive Management).

Habitat Management Objectives

Similar to Alternative 5, the Proposed RMP Amendment would manage GRSG habitats at multiple scales to ensure connected mosaics of sagebrush and associated communities to provide for all seasonal habitat needs, dispersal and migration. The HAF would be used, along with other available data such as ESDs, to assess habitat suitability, and identify areas for habitat improvement. Habitat management objectives was analyzed under Maintaining and improving suitable seasonal habitats at multiple scales will benefit GRSG conservation.

Mitigation

As was analyzed under Alternative 5 the BLM would emphasize avoidance and minimization of habitat loss given the challenges with restoring sagebrush habitats that support GRSG populations. Where impacts remain following application of avoidance and minimization measures compensatory mitigation to achieve no net habitat loss, as well as addressing indirect impacts would be applied. A no net habitat loss will require full restoration of functional GRSG habitats or enhancement of habitats such that the habitat can support the number of GRSG present prior to the disturbance. Where a State has a higher requirement for compensatory mitigation the BLM would comply with that requirement. Compensatory mitigation would be prioritized in the location to be affected to reduce potential for population loss and range contraction. Compensatory mitigation should be completed prior to initiating the activity, with monitoring for durability and efficacy. Mitigation will conserve GRSG habitats by preventing or minimizing losses and replacing impacted habitats to a level that conserves GRSG population numbers.

State-Specific Mitigation Requirements

In CO compensatory mitigation would first be conducted in PHMA and within the same CO Management Zone where the impact was realized. If those criteria cannot be met, compensatory mitigation would be considered within other GRSG populations in consultation with the State of Colorado.

For LMHMA in North Dakota, a MOU or restoration plan would be developed with partners and adjacent states (MT and SD) to establish a cooperative approach for mitigation. In OR, BLM would authorize mitigation in conformance with the State of Oregon mitigation policy, requiring mitigation when development exceeds 5 acres.

Disturbance Caps

For all states except WY and MT, a 3% disturbance cap for proposed and existing infrastructure would be applied in PHMA (and IHMA in ID) at both the project and HAF fine-scale. Loss of habitat from wildfire and agriculture would be addressed through the sagebrush availability objective included by all states, as well as the habitat objectives. The impacts would be similar to those analyzed for Alternative 5, with the addition of requiring compensatory mitigation to be in place before any exception to the disturbance cap is granted, as analyzed for Alternative 4. Minimizing disturbance from anthropogenic infrastructure projects reduces GRSG habitat loss and displacement in PHMA. Disturbance caps would not apply in GHMA.

State-Specific Environmental Consequences

In CO, disturbance caps would be calculated at state Management Zone population scales. Exceptions to the disturbance cap may be granted in NV if the project is in compliance with the NV GRSG Conservation Plan and the states regulatory Conservation Credit System.

In addition to the rangewide management direction OR would implement an additional limit of no more than a 1% increase per decade within Oregon priority areas of conservation.

In WY and MT a 5% disturbance cap would be applied at the project scale. WY would use their Disturbance Density Calculation Tool to calculate disturbance, and unlike other states would consider habitat losses due to wildfire and agriculture in their calculations. This is similar to the current plan (Alternative 1). The disturbance cap would not apply in LMHMA and SCHMA in MT, but project proponents would need to submit the information for BLM consideration for future recommendations.

Adaptive Management

Adaptive management is designed to address unanticipated negative impacts to GRSG and their habitats from changes in habitat conditions before consequences become severe or irreversible. The BLM would implement the adaptive management strategy for both habitat and population anomalies identified at the HAF fine-scale level, as well as by State wildlife agencies, as analyzed under Alternatives 3 – 6 for PHMA, GHMA, SHMA (WY) and IHMA (ID). Addressing habitat concerns, as indicated by any threshold identified through proposed adaptive management processes would provide additional conservation for GRSG habitats if the identified causal factor can be addressed before it becomes irreversible.

4.2.3 Cumulative Effects

The following two factors would apply for all resources and resource uses discussed below. First, GRSG state plans affect most resources and resource uses and must be considered in the cumulative effects analysis for the BLM Proposed RMP Amendment and alternatives. While 10 of the 11 States in the GRSG range have updated their State plans to conserve the species by incorporating new information, not all of these plans have been implemented or are regulatory in scope. Specifically, the regulatory conservation actions mandated by the State plans in WY, MT, OR, and NV provide the greatest degree of regulatory certainty in addressing potential threats to GRSG. Required mitigation in NV is through the Conservation Credit System (CCS) managed by the State of Nevada Sagebrush Ecosystem Program. The goal of the CCS is to generate a net benefit of greater sage-grouse habitat on public lands, but it may be adapted to support the ongoing preservation, enhancement, and restoration of NV sagebrush ecosystems. The regulatory plans may reduce or increase restrictions on resource uses in planning areas that would protect or limit impacts on natural and cultural resources and Tribal interests. For instance, regulatory plans could add to the potential complications and costs of large projects that span multiple states, such as transmission lines, pipelines, and fiber optics or in areas where the federal plan is inconsistent with the state plan.

The remaining State plans are voluntary in nature and do not meet a level of certainty for implementation and effectiveness; they may result in implementation of more compensatory mitigation than if no State plan existed, which could still provide long-term benefits to natural and cultural resources and Tribal interests. However, these voluntary state plans do have measurable goals and objectives for habitat and population management across the state.

Secondly, as described further in **Section 4.21.8** and **Appendix 12**, decisions made based on the BLM's ongoing Solar PEIS revision may change the availability of lands for solar energy development outside of GRSG habitat. Within the cumulative impacts study area but outside of GRSG habitat, natural and cultural resources, Tribal interests, and resource uses could be impacted by solar development, though the extent of such impacts could be limited by other exclusion criteria or design features imposed by the Solar PEIS. This analysis of cumulative effects discloses the short and long-term effects on GRSG and its habitat from implementing each RMPA/EIS alternative, in conjunction with other past, present, and reasonably foreseeable actions, such as implementation of the state plans referenced above. The cumulative effects analysis area for GRSG is the same as the planning area, which encompasses the entirety of the GRSG current range. The temporal scale of the analysis is the anticipated lifetime of the Proposed RMPA/Final EIS, i.e., 20 years.

The past, present, and reasonably foreseeable actions that, individually and together, affect GRSG are summarized in **Appendix 14, Table 14-1**. These include the ongoing and reasonably foreseeable actions across the entire range for GRSG, which are separated by state. However, the cumulative impacts analysis for the BLM Proposed RMP Amendment and alternatives considers multiple geographic scales, including the appropriate HAF groupings, which have biological significance to GRSG. Fine scale HAFs represent an individual's home range and are determined in part by the quality and juxtaposition of resources within and between seasonal habitats (Stiver et al. 2015).

The impacts of the BLM-authorized activities set forth in the EIS alternatives would add, cumulatively, to the impacts of these actions where they within GRSG habitat. The actions in **Appendix 14, Table 14-1** can broadly be characterized as regional and state land use and conservation plans; resource uses and projects such as energy development and grazing; wildfire, fuels, and vegetation/habitat management. The types of cumulative impacts that can occur from these activities are discussed in the sections below.

Regional and State Land Use and Conservation Plans

Regional efforts to manage threats to GRSG include land use/resource management plans and amendments conducted by the BLM, Forest Service, and by other federal and/or in cooperation with non-federal agencies, organizations, landowners, or other groups. The National Resources Conservation Service partners with private agricultural lands for the Working Lands for Wildlife to conserve habitat while keeping working lands. The Sage-Grouse Initiative is a part of the and targets conservation efforts where the returns are highest by targeting threats to the bird. At the state level, each state considered in the GRSG range has developed a GRSG conservation plan with a suite of management actions that aim to conserve GRSG habitat and populations across all land ownerships. In their 2015 determination not to list the GRSG as threatened under the ESA, the USFWS cited regulatory mechanisms provided by federal and the three existing state plans at that time, as having substantially reduced threats to the species in approximately 90% of the breeding habitat through avoidance and minimization measures (USFWS).

Plans developed by States for GRSG vary widely in the nature of the protective measures, but generally establish goals and objectives to maintain and increase GRSG populations statewide, and maintain, protect and increase GRSG seasonal habitats. They also generally include stipulations and guidelines, for leases, permits, and easements on state lands and conservation measures for activities such as oil and gas and locatable mineral development and wildfire prevention or suppression.

Mineral Development

Mineral leasing, exploration, and development occur throughout the planning area. These include activities associated with fluid minerals (oil, gas, and geothermal), locatable minerals, leasable minerals, and mineral materials. The types of impacts on GRSG and their habitats that could occur from these mineral developments are described in **Section 4.2**, and generally relate to surface and subsurface disturbance from exploration and development actions and infrastructure. These activities may contribute to fragmentation, removal or alteration of habitat, changes in GRSG use patterns, changes in GRSG demographics (e.g., nest survival, recruitment, and population growth), and an increase in invasive plant introduction and spread. Past, present, and reasonably foreseeable development related to fluid minerals in the planning area are included in the Reasonably Foreseeable Developments (RFDs) for those resources (see **Appendix 12** and **Appendix 14**). In addition, consideration of the proposed withdrawal of SFAs is underway in a process separate from this land use planning initiative; if the Secretary withdraws the land as proposed, the effects would be similar to those described under Alternative 1 for locatable minerals. The acres of HMAs subject to energy and mineral decisions within each HAF group are presented in **Appendix 14**.

Lands and Realty, including Renewable Energy Development

Effects on GRSG and its habitat from roads and ROWs have occurred throughout the planning area and are expected to continue to occur (**Table 14-1**). The likelihood for development would increase following the development of large-scale utility corridors. The types of impacts on GRSG and their habitats that could occur from lands and realty and solar and other renewable energy development are described in **Chapter 4**. Increasing development and population growth have increased demand and construction of transmission lines and roads within the planning area which fragments habitat and increases the risk of collision, predation, and mortality of GRSG. Road use is also a source of spread for invasive annual grasses which degrade GRSG habitats and increase wildfire frequency. This trend is expected to continue. In addition to the direct impacts on GRSG habitat, lands and realty decisions can influence adjacent and nonfederal lands by extending habitat fragmentation beyond the immediate project area. This can exacerbate cumulative impacts on GRSG populations by increasing human activity, reducing contiguous habitat, and heightening the spread of invasive species. These cumulative effects, when combined with other development pressures, further contribute to the degradation of habitat and ecosystem resilience.

Livestock Grazing

The BLM and other land management agencies authorize livestock grazing in accordance with their regulations (43 CFR Part 4100 for the BLM) and agency policies and guidance. Where lands are available for livestock grazing, BLM field offices will continue to administer grazing authorizations in conformance with the Taylor Grazing Act (TGA), FLPMA and other applicable laws. Land management agencies will authorize structural and nonstructural range improvements, and agencies like the NRCS and state agricultural departments will continue to work with private landowners to conduct projects on private rangelands. Several GRSG Candidate Conservation Agreements with Assurances (CCAA) have been initiated. These are voluntary agreements between the USFWS and landowners whereby landowners agree to manage their lands to remove or reduce threats to GRSG will help contribute to the long-term persistence of GRSG by helping to maintain intact habitats and implement conservation measures to reduce threats. Impacts to GRSG habitats from grazing on public and private lands would continue to occur as described in **Chapter 4**.

Wild Horses and Burros

Wild horse and burro grazing on BLM lands can impact GRSG habitat. Horse-occupied areas exhibited lower cover of grasses, shrubs, and total vegetative cover, as well as lower species richness at sites, a less contiguous shrub canopy (and lower sagebrush cover), and, at higher elevations only, greater forb cover (Beever 1999; Beever 2003). These effects impact GRSG by causing habitat alteration, such as loss of cover and forage (Coates et al. 2021b). There are approximately 168 wild horse and burro herd management areas across the planning area (15 million acres), and populations are continuing to grow, often exceeding AMLs. As such, impacts to GRSG habitats, such as degradation, will likely increase. Removal, adoption, and fertility control of animals from the range each year will help control herd sizes and lessen impacts to GRSG habitats.

Wildfire, Fuels, and Vegetation/Habitat Management

Wildfires result in the greatest direct loss of GRSG habitat and have been widely distributed in terms of frequency and severity. The spread and prevalence of invasive plant species contribute to increasing wildfire frequency and size. Increasing recurrence and severity of drought conditions have been predicted for much of the planning area as a result of climate change. These trends can contribute to increasing the occurrence, size, and severity of wildfires throughout the planning area. In addition, grazing during drought contributes to the feedback loops that tend to worsen the habitat impacts of drought, both in intensity and duration.

Fuels management and fuel reduction projects have been and continue to be implemented throughout the planning area by the BLM, other federal agencies such as the Forest Service, states, local or regional partnerships, and other groups to assist in wildfire management. These cooperative treatments seek to support and, where possible, improve natural resilience and resistance of sagebrush habitats to invasive plant species and wildfire. Treatments also seek to improve the ability of cooperative firefighting agencies to better suppress wildfires, minimizing the potential size of wildfires and the related acres of habitat burned. Where fuels projects reduce the potential for catastrophic wildfire, they would also reduce potential for GRSG habitat loss and fragmentation. They would also contribute to short-term impacts such a disturbance from use of equipment and habitat alterations.

Likewise, vegetation and habitat management projects for GRSG have occurred throughout the planning area and projects such as hazardous fuels reduction, pinyon-juniper removal, emergency stabilization and rehabilitation, and invasive species control have impacted vegetative cover and structure, which in turn influence wildfire risk and GRSG habitat conditions and availability. These projects have been and continue to be implemented by the BLM and other federal and state land management agencies and private landowners. Vegetation projects will continue throughout the planning area and new projects will be proposed, regardless of decisions made in this Proposed RMP Amendment/Final EIS. Where vegetation and habitat management projects focused on GRSG habitat occur, they would improve habitat for GRSG by improving native plant composition and structure and decrease the risk of habitat avoidance resulting from conifer invasion because trees displace species that are important to GRSG habitat (Manier et al. 2013). They would also reduce the potential for/mitigate the risks of catastrophic wildfire that creates stand replacing impacts or major changes to vegetation seral stages affecting habitat availability and suitability on a long-term basis. Vegetation treatments would contribute to short-term habitat impacts such a disturbance from use of equipment and temporary habitat alterations until desired conditions are achieved.

Travel Management and Recreation

Travel management planning on BLM-administered lands continues throughout the planning area. Travel management planning has been completed or is underway on certain BLM-administered lands to develop travel networks and manage access for all types of resources and resource uses. As demand for each resource use continues to grow, the use of existing routes, demand for new routes, and upgrading of existing routes would be considered in future travel management planning. Use of existing roads and development of new roads in GRSG habitat contributes to GRSG habitat loss, alteration, and fragmentation. Travel management plans typically include seasonal and permanent closures of roads and other mitigation measures reduce impacts to other resources, such as vegetation and wildlife, including GRSG.

Dispersed, organized, and concentrated recreation would continue throughout the planning area with specific management for certain activities per the recreation management allocations and management actions in individual BLM resource management plans. Overall visitation to the BLM-administered lands in the planning area is expected to continue to increase; however, the number of visitors would vary by season, year, location, and type of activity. Where roads, trails, and recreation occur in GRSG habitat it would contribute to disturbance, habitat alterations and fragmentation, and potential for injury or mortality from vehicle collisions.

Comparison of Alternatives

Consistent with multiple use management, each alternative would allow for some land use activities, including energy and mineral resource development, lands and realty, renewable energy development, grazing, recreation activities, and travel and trails. These land uses will have varying cumulative impacts of habitat loss and degradation and behavioral disturbance of individuals. The cumulative contribution of each alternative would vary due to differences in habitat designations, stipulations, management actions, and protections that would influence the type, extent, and magnitude of allowable activities within GRSG habitats.

Under Alternative 1, GRSG habitat would be separated into SFAs, PHMAs, IHMAs, and GHMAs (**Table 2-3**). Restrictions to land use and surface-disturbing activities would occur within each HMA and SFA, depending on the classification. Restrictions on development, such as stipulations and avoidance/exclusion areas would be applied within HMAs and would limit impacts to GRSG habitats. Under Alternative 1, the BLM would manage lands to conserve, enhance and restore GRSG habitat and the sagebrush ecosystem upon which GRSG populations depend. The BLM would incorporate adaptive management, mitigation, disturbance caps, buffers, habitat objectives, and monitoring. Including 3% disturbance caps at both project and biologically significant unit (BSU) scales for most states would reduce disturbance on both the local and landscape scales, therefore, provide protection for both the larger population and individual leks and their surrounding habitat. In MT/DAK and WY, a 5% disturbance cap would apply to land use activities; this would increase potential for habitat loss and alterations as well as direct disturbance to GRSG above those of 3%. Because the 5% cap would include wildfire and agricultural conversion in the calculation, there would be potential for added protection from impacts to habitats other than anthropogenic development (in contrast to considering only anthropogenic disturbance in the calculation).

Under Alternative 2, the contribution to cumulative impacts from designating HMAs and incorporating adaptive management, mitigation, disturbance caps, buffers, habitat objectives, and monitoring would be similar to Alternative 1 (**Table 2-3**). Alternative 2 would remove SFAs in some states, which would reduce protections to GRSG and habitat. It would also include more areas open to fluid mineral leasing. Fewer restrictions may result in greater impacts to GRSG habitats.

Under Alternative 3, the BLM would manage all HMAs as PHMA (**Table 2-3**). Management actions for PHMA, such as lek buffers and required design features would be more restrictive and designed to promote GRSG conservation to a greater extent than in previously designated GHMA. Therefore, managing previously designated GHMA as PHMA would minimize potential impacts to GRSG habitats to a greater extent than if they remained managed as GHMA. Expanding PHMA in some states to include areas of adjacent non-habitat, unoccupied historic habitat, or areas with potential to become habitat as PHMA would also decrease potential for disturbance to birds and habitat alterations because management restrictions associated with PHMA would occur over a larger area. Applying a 3% disturbance cap at the project scale and within HAF fine scale habitat selection area would include protection for both the larger population and individual leks and their surrounding habitat. Including no disturbance cap exceptions and wildfire and agriculture as part of the overall disturbance cap would also result in a lower level of disturbance overall, particularly since wildfire was the cause of the majority of habitat loss between 2012 and 2018 (Herren et al. 2021). Closing PHMA in all states to fluid mineral leasing, saleable minerals, and nonenergy minerals would protect GRSG habitat from surface-disturbing activities as well as subsurface activities (e.g., directional drilling), maintain connectivity between leks, and not contribute to fragmentation. These restrictions would decrease the acres available for development and the potential for impacts to GRSG and their habitats associated with surface disturbing activities in PHMA to a greater extent than under Alternatives 1 and 2. Additionally, this alternative would require all states that have PHMA to restrict livestock grazing and place developments outside of the PHMA boundaries. The additional fencing that could be needed to separate public from private lands would increase the potential for increased GRSG collision rates and habitat alterations. Fencing is a potential cause of direct mortality to GRSG by acting as potential movement barriers, predator perches, or travel corridors (Manier et al. 2013). GRSG collision rates with fencing generally increases with low visibility fencing and decreases in areas of greater topographic relief (Manier et al. 2013). Exclusion of grazing on BLM-administered lands may intensify grazing use on private lands, which could degrade GRSG habitat in those areas. Managing PHMA as unavailable for grazing could promote rural subdivisions and thus habitat loss in areas where livestock operators are not able to continue their operations solely on private lands.

Under Alternative 4, leasing would be permitted in HMAs, which would increase the HMA acres affected and potential for cumulative impacts to GRSG, including disturbance and habitat loss and alterations. Applying a 3% disturbance cap at the project scale and within HAF fine scale habitat selection area would limit potential for overall disturbance and habitat alterations, including fragmentation, and would provide protection for both the larger population and individual leks and their surrounding habitat. Including exceptions to the cap and excluding wildfire and agriculture from the calculation would result in an overall greater contribution to cumulative impacts to GRSG habitat compared with Alternative 3. The potential for developments in PHMA and GHMA is underdetermined at the time of this analysis and would likely vary by state. Therefore, cumulative impacts on GRSG habitats from mineral resource development, renewable energy development, ROW development, and travel development is unknown in this analysis, but the 3% disturbance cap would limit the overall disturbance level as described above. Both Alternatives 4 and 5 would include compensatory mitigation that would meet the requirements set by the state wildlife agency or appropriate authority. This would reduce impacts on GRSG habitats but to a lesser degree than Alternative 3. Impacts associated with certain uses, such as livestock grazing or wild horses and burros, would not be subject to compensatory mitigation requirements but would be addressed through compliance with laws, regulations, and policies, such as 43 CFR 4180 for livestock grazing. Further, adaptive management under Alternatives 4 and 5 may result in more favorable outcomes for GRSG because the approach would be coordinated at ecological rather than geopolitical boundaries.

Under Alternative 5, cumulative impacts from permitting leasing in HMAs and applying a 3% disturbance cap (including exceptions to the cap and excluding wildfire and agriculture from the calculation) at the project scale and within HAF fine scale habitat selection area in most states would be similar as to those described for Alternative 4 but would occur over a smaller area given the lower acreage of PHMA under Alternative 5. Cumulative impacts from applying a 5% disturbance cap at the project scale in WY and MT/DAK would be similar to those described for Alternative 1. Habitat impacts from development in PHMA and GHMA as well as from compensatory mitigation would be the same as described for Alternative 4.

Impacts under Alternative 6 would be similar to impacts under Alternatives 4 and 5 except for the designation of ACECs, which may offer additional protection within them.

Under the Proposed RMP Amendment, cumulative impacts from designating GRSG habitat as HMAs would be more restrictive than those described for Alternative 5 and more similar to components of Alternative 3 and Alternative 1. However, unlike under Alternative 1, the HMA areas in the Proposed RMP Amendment are based on updated science and data and more accurately reflect the location of GRSG habitat and, therefore, the HMA areas under the Proposed RMP Amendment would provide more protection to GRSG and GRSG habitat. Cumulative impacts from managing SHMA in WY would be the same as those described under Alternative 5. The designation of Unique HMAs (Little Missouri HMA, South Carter HMA, and Connectivity HMA) in MT would provide greater protections for greater sage-grouse due to the emphasis on improving sagebrush communities and increasing habitat availability for the species—resulting in fewer cumulative impacts than those described under Alternative 5. Cumulative impacts from development in PHMA would be less than those described under Alternative 5 as a result of the higher levels of protection provided by making PHMA exclusion to solar and wind development, reducing the number of exclusions allowed for major rights of way, and making fluid mineral development NSO in PHMA with waivers, exceptions, and modifications. Under the Proposed RMP Amendment, the identification of areas within PHMA (PHMA with limited exceptions) increases protection of GRSG habitat by making the areas exclusion to solar and wind development and NSO with no exceptions. These areas would also be exclusion to major rights of way with limited exceptions to that exclusion. Additionally, the BLM would work with the State of Nevada to incorporate recommended fire and vegetation management from the state. Implementation of management directions (habitat objectives, disturbance caps, adaptive management and mitigation) would reduce impacts from any disturbance to GRSG and their habitats.

4.3 VEGETATION

4.3.1 Nature and Type of Effects

Greater Sage-Grouse Management

GRSG management plans incorporate objectives for maintaining, improving, or restoring vegetation communities, particularly sagebrush and riparian and wetland habitats. In the 2015 GRSG plans there is consistently applied management across all LUPs to preserve and improve vegetation communities. However, anthropogenic disturbances, such as road construction, mineral resource development, and ROW development, would continue. This could influence impacts on vegetation, including removal, fragmentation of vegetation communities, loss of pollinator habitat, and conversion of areas to an earlier seral stage, which could change vegetation community succession and reduce the extent of native plant communities. Remaining vegetation could have reduced vigor or productivity due to mechanical damage, soil compaction, and dust. Soil compaction would inhibit natural revegetation in areas without active reclamation efforts and would reduce plant vigor, making plants more susceptible to disease, drought, or insect attack. Expansion of conifer woodlands, especially pinyon (*Pinus* spp.) and juniper (*Juniperus* spp.), is also associated with increased bare ground and increased erosion potential (Manier et al. 2013). Pinyon-juniper expansion presents a threat to GRSG as it doesn't provide suitable habitat, and mature trees displace shrubs, grasses, and forbs through direct competition for resources. Additionally, fire suppression has significantly contributed to the expansion of pinyon and juniper. The absence of natural fire regimes allows these species to encroach and establish more extensively, as fires historically played a crucial role in maintaining open habitats and controlling tree density.

Disturbance caps would influence the allowable level of disturbance within a GRSG HMA, and these would vary by alternative. In general, a lower level of allowable disturbance would have fewer impacts to vegetation including reduced sagebrush or riparian vegetation fragmentation and reduced vectors for noxious weed or invasive species introduction or spread.

An adaptive management approach is included in the event that habitat or populations continue to decline. In the event a threshold is met, more restrictive measures could be applied. This would help to ensure that actions are taken to limit impacts to habitat (and by proxy, vegetation) in an appropriate time frame to offset impacts.

Minerals Management

Mineral resource development requires construction of roads, well pads, wells, and other infrastructure, and associated noise, traffic, and lights that alter, degrade, and/or entirely displace native ecosystems (Manier et al. 2013). Surface disturbance associated with mineral resource development often removes vegetation, reduces the condition of native vegetation communities and the connectivity of habitat, and encourages the spread of invasive species (NTT 2011). Vegetation removal results in conversion of areas to an earlier seral stage, which could change vegetation community succession and reduce desired plant communities. The remaining vegetation could have reduced vigor or productivity due to mechanical damage, soil compaction, and dust. Habitat impacts would not occur in areas closed to mineral resource leasing or development.

Lands and Realty Management

Permitted activities, such as construction of utility ROWs, involve vegetation removal, which reduces the condition of native vegetation communities and individual native plant species, alters age class distribution, reduces connectivity, and encourages the spread of invasive species. Construction activities could compact soils, which would inhibit natural revegetation in areas without active reclamation efforts and would reduce plant vigor, which would make plants more susceptible to disease, drought, or insect attack. In most cases, reclaimed areas would be ripped and seeded during interim or final reclamation (NTT 2011).

Aboveground and underground ROWs, such as transmission lines or pipelines, would temporarily remove vegetation during construction. Vegetation would be permanently removed for construction of surface ROWs, such as roads and reservoirs. Because aboveground and surface ROWs may extend for many miles, vegetation communities could be fragmented and the potential for weeds to be introduced or to spread may increase. Aboveground site-type ROWs, solar energy projects, and wind energy projects would remove vegetation during the life of the project, often lasting several decades, but areas would be reclaimed after the ROW is decommissioned. ROW corridors would concentrate disturbances in one area, which would cause greater impacts to GRSG and their habitats in this one area but may reduce the likelihood of disturbance in other areas.

ROW exclusion areas would protect vegetation from disturbance and removal. In ROW avoidance areas, the permits would be considered on a case-by-case basis. This flexibility may be advantageous where federal, state, Tribal and private land ownership is mixed, as exclusion areas may result in more widespread development outside of BLM administered lands.

Livestock Grazing Management

Livestock grazing can affect soils, vegetation health, species composition, water, and nutrient availability by consuming vegetation, redistributing nutrients and seeds, trampling soils and vegetation, and disrupting microbial systems (Connelly et al. 2004; NTT 2011; Jones 2000). Grazing effects are not distributed evenly because historic practices, management plans and agreements, and animal behavior all lead to differential use of the range (Manier et al. 2013). In addition, some grass species that evolved with grazing pressure from large herbivorous mammals (such as warm season grasses like blue grama (*Bouteloua gracilis*)) may be less affected by livestock grazing compared to species without herbivore-adapted traits (such as cold season grasses like bluebunch wheatgrass (*Agropyron spicatum),* western wheatgrass *(Pascopyrum smithii),* and Idaho fescue (*Festuca idahoensis*)) (Mack and Thompson 1982). Cold season grass species, which evolved with intense herbivory from large ungulates such as bison, elk, and deer, are prominent in the grass understories of sagebrush habitats. Historically, bison roamed in large herds across expansive areas, and these herds likely covered considerable distances, influencing the structure and composition of grass communities. Despite the large size of these herds, even at low densities per acre, bison populations were substantial, influencing the structure and composition of these grass communities. These cold season grasses, which are adapted to this historic grazing pressure, form key vegetation communities in sagebrush habitats across the biome. Livestock often use riparian and wetland areas for water and shade, which could reduce riparian community condition and hydrologic functionality. Properly managed grazing could also assist with desired vegetation objectives, modify vegetation composition, and structure, and reduce litter and fine fuel loading, which could reduce wildfire size and severity (see **Section 4.4**, Wildland Fire Ecology and Management).

While limited, improper grazing can lead to loss of vegetative cover, reduced water infiltration rates, decreased plant litter, increased bare ground, reduced nutrient cycling, decreased water quality, and increased soil erosion (Manier et al. 2013; Jones 2000). Grazing may also confer competitive advantage on pinyons and junipers through the removal of native grasses and forbs, facilitation of tree regeneration by increased shrub cover, and enhanced seed dispersal (Baker 2011). As described in **Appendix 21**, livestock grazing is managed to meet or make progress toward land health standards, thus reducing the likelihood of these effects.

Wild Horse and Burro Management

Wild horses and burros can directly impact forage, vegetation, soil, and water resources within the planning area. Wild horses and burros consume forage in competition with livestock and wildlife and can trample vegetation. Habitat impacts from wild horses and burros are more pronounced when herd populations exceed established AML levels. Across 3.03 million ha of the western Great Basin, horse-occupied sites exhibited lower grass, shrub, and overall plant cover; higher cover of unpalatable forbs and abundance of cheatgrass; 2.2–10.0 times lower densities of ant mounds; and 2.9–17.4 times greater penetration resistance in soil surfaces, compared to sites from which horses had been removed for 10–14 years (Beever and Aldridge 2011). Wild horse and burro use of BLM land is not authorized through the permitting process and is not managed in the same way as domestic livestock grazing. All herd management areas are managed for appropriate management levels (AML). Priorities for gathering excess wild horses and burros to maintain AML are based on population inventories, resource monitoring objectives, gather schedules, and budgets. Implementing management to protect GRSG generally involves reducing or otherwise restricting land uses and activities, such as wild horse and burro populations, that could reduce vegetation and water availability. By managing wild horse and burro populations to meet AML, the potential for those populations to adversely affect vegetation would be reduced. Limiting development to protect GRSG would also support vegetation habitat for wild horses and burros and limit human and surface disturbance. Reducing wild horse and burro populations in GRSG habitat management areas could assist in reducing impacts to vegetation communities in these areas. However, establishing priority for gather operations in PHMA could put herd management areas that do not contain PHMA at risk for overpopulation, with associated negative affect on vegetation communities.

4.3.2 Proposed RMP Amendment

Greater Sage-Grouse Management

Impacts from designating GRSG habitat as HMAs would be similar to those described for Alternative 1 though the BLM would manage approximately 2,056,000 acres (6%) more PHMA and 4,848,000 (18%) fewer acres of GHMA (**Table 2-15**). Compared to the draft preferred alternative (Alternative 5) the BLM would manage approximately 592,000 (2%) more PHMA and 75,000 (less than 1%) fewer acres of GHMA. The increase in PHMA acreage would result in an increase in associated protections to vegetation by limiting certain resource uses, described further below.

The Proposed RMP Amendment could improve more acres of vegetation for GRSG habitat than under Alternative 1 because the delineations of the HMA areas under the Proposed RMP Amendment are based on updated science and data. 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) and, therefore, would be more effective in providing GRSG habitat protections where they are needed and where they will be most effective. The management of 4,213,000 acres of PHMA with limited exceptions would provide additional protections for vegetation from several resource uses as described further below. Impacts from adaptive management would be as described for Alternative 3.

Minerals Management (including Fluid minerals, Saleable Minerals/Mineral Materials, Non-energy Leasable Minerals, and Locatable Minerals)

Under the Proposed RMP Amendment, impacts to vegetation would be similar to those described for Alternative 5 for saleables, locatables, and fluid mineral objectives and allocations. Fluid mineral development could be more flexible compared with Alternative 1 due to WEMs, though adherence to the WEM criteria would ensure no impacts to GRSG or their habitats within 0.6 miles of leks. Additionally, the Proposed RMP Amendment would provide for off-setting effects through compensatory mitigation in PHMA beyond 0.6 miles (except in WY, where the NSO only applies within 0.6 miles). Protective effects of PHMA would increase under the Proposed RMP Amendment compared with Alternative 1, as PHMA would be expanded. The management of PHMA with limited exceptions as NSO with no waivers, exceptions, and modifications would provide further protections for vegetation in these areas.

Lands and Realty Management

Managing PHMA as avoidance with some exceptions for major and minor ROWs would have impacts as described for Alternative 1. Management of PHMA with limited exceptions as exclusion for major ROWs with some exceptions would result in impacts similar to Alternative 3. Such management would decrease potential impacts from ROW development by excluding new ROW authorizations in PHMA. However, ROW routes, if made longer to bypass the PHMA exclusions, might increase surface disturbance, albeit outside PHMA. Impacts in GHMA would be similar to those under Alternatives 1 and 2, but additional state-specific requirements as described for GRSG in **Section 4.2.1** above would provide additional protections to vegetation.

Managing PHMA as exclusion for renewable energy would have impacts similar to those described for Alternative 1. Managing associated ROWs as exclusion would offer greater protections than Alternative 1. Managing PHMA with limited exceptions would further reduce impacts by not allowing exceptions to these exclusions. GHMA would be open, but the requirement for minimization measures and mitigation in the Proposed RMP Amendment would provide more protections for vegetation.

Livestock Grazing Management

Impacts to vegetation from livestock grazing management under the Proposed RMP Amendment would be the same as those described for Alternative 4 and Alternative 1 (refer to **Appendix 10**). Under the Proposed RMP Amendment, no livestock prioritization in SFAs would occur as under Alternative 1. As a result, these areas would not receive additional priority for grazing management. The BLM would address areas that are not meeting GRSG special use criteria identified in the Sage-grouse Habitat Assessment Framework and other methodology to determine if an area is meeting or making significant progress toward meeting land health standards for BLM special status species and adjust livestock grazing practices where livestock grazing is a significant causal factor in not meeting land health standards for special status species. In processing grazing permits BLM will include an alternative that includes specific thresholds and responses when the special status species standard is not being met due to livestock grazing and reduce the impacts of livestock grazing on vegetation such as those described under Nature and Type of Effects.

Wild Horse and Burro Management

Impacts to vegetation from wild horse and burro management under the Proposed RMP Amendment would be the same as those described for Alternative 5. That is, the BLM would manage wild horses and burros within AML and would reduce the potential for impacts from wild horses and burros on vegetation such as those described under *Nature and Type of Effects*, compared with Alternative 1.

4.3.3 Cumulative Effects

The cumulative effects analysis for vegetation includes consideration of land managed by the BLM, Forest Service, and other federal agencies with adjacent state, Tribal, county, and privately owned lands within the planning area are considered to be the cumulative effects analysis area for vegetation. Ongoing and planned actions in and near GRSG habitat that are considered PHMA or GHMA (including IHMA in ID) would influence vegetation conditions and management effectiveness across the different state plans over a 20-year period.

Vegetation management, including fire and fuels management, is becoming more broadly consistent across federal landownerships, due largely to updated adherence with current federal law, regulation, and policy and increased collaboration between agencies. Past actions have directly or indirectly contributed to increased shift of native plant community size, distribution, and risk of invasion or expansion of invasive species. The BLM completed a programmatic environmental impact statement (PEIS) that evaluates creating and maintaining a system of fuel breaks, fuels reduction and rangeland restoration in the Great Basin region. This landscape scale PEIS 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) to protect and conserve the sagebrush-steppe ecosystem from loss or fragmentation caused by wildfires. However, certain vegetation types, such as pinyon-juniper woodlands, provide important habitat for other species of concern. Large-scale treatments aimed at benefiting GRSG may unintentionally impact these species, potentially leading to adverse impacts.

Reasonably foreseeable actions in the planning area have the potential to impact vegetation. Generally, these are projects that would substantially alter vegetation conditions, including projects which disturb the land's surface, increase the potential for invasive weed spread, or increase the risk of human-caused wildfire. Anticipated projects that could impact vegetation include energy (with the exclusion of Solar in PHMA) and mineral resource exploration and development, lands and realty decisions, livestock grazing, wild horses and burros, timber removal, and travel and transportation decisions that create new routes or roads.

Past and present vegetation management and other actions in the planning area have had differing effects, as described under Nature and Types of Effects, based on type of disturbances. These types of actions include management of wild horses and burros, wild ungulate herds, mineral resource development, wind and solar development, and ROW development in addition to historic and ongoing livestock grazing and wildfire suppression. These habitat impacts vary in degree of disturbance based on state and local regulations throughout the multi-state HMA boundaries, wild horses management, and ranching which have contributed to the introduction of invasive annual grasses that have made changes to the wildfire regime to current conditions. These disturbances have resulted in a landscape with increased pinyon-juniper densities and invasive annual grasses and a greater potential for uncharacteristically large, severe wildfires compared with historical conditions. Climate change trends, including more frequent extreme fire weather, combine with and exacerbate these conditions.

State, Federal, and private land owners in the planning area all recognize the importance of vegetation management including fuels treatments, wildland fire management and management of wildlife habitat. Vegetation and habitat management projects focused on GRSG habitat have occurred throughout the planning area and projects such as hazardous fuels reduction, pinyon-juniper removal, emergency stabilization and rehabilitation (ESR), and invasive species control have impacted vegetative cover and structure, which in turn reduce wildfire risk. Additionally, the BLM would work with the State of Nevada to incorporate the recommended fire and vegetation management from the state. These projects have been and continue to be implemented not only by the BLM but also by other federal and state land management agencies and private landowners. Coordination of these activities during implementation across ownership/jurisdictions boundaries improves their effectiveness for providing habitat benefits. Vegetation management will continue throughout the planning area and new projects will be proposed, regardless of decisions made in this

Proposed RMP Amendment/Final EIS. Implementation of these projects will include completion of the appropriate level of NEPA and compliance with other applicable authorities.

Comparison of Alternatives

Under all alternatives, the BLM would implement or require best management practices and would provide guidance on which treatments and chemicals can be used. Avoiding or limiting surface disturbance on steeper slopes or highly erodible soils would maintain native vegetation stability and resiliency to invasive species spread or invasion. There would be no impacts common to all alternatives from mineral resource management, renewable energy development, infrastructure development, livestock grazing management, or ACEC management.

Alternative 1 management actions refer to the 2015 plan amendments. These include restrictions on development, such as land use and surface-disturbing activities, that could occur within HMAs and would limit impacts to vegetation. All states would include language to maintain and enhance sagebrush habitats with the intent of conserving GRSG populations. In summary, there would not be any significant changes to management that would cause an impact on vegetation beyond current conditions and management practices.

By contrast, under Alternative 2, more areas would be open to oil and gas development and exploration. The consequence of fewer restrictions would likely be greater impacts to vegetation and habitats. Alternative 2 would remove the GHMAs in Utah for wild horse and burro management and this would increase the potential for vegetation loss.

Alternative 3 would include the fewest acres open and the most stringent restrictions for fluid mineral leasing. More restrictions on PHMA would result in fewer open acres that could be used for development. These restrictions would decrease the potential for impacts to vegetation associated with surface disturbing activities (including mineral resource development, renewable energy development, ROW development, and travel development) in PHMA to a greater extent than under Alternative 1. Additionally, this alternative would require that all states have PHMA unavailable to livestock grazing and to place developments outside of the HMA boundaries; this would result in less disturbance within the planning area. Mitigation approaches for direct and indirect impacts would utilize avoidance, minimization, and compensation, with emphasis on avoidance, precluding new developments when possible. In summary, Alternative 3 would have the most direct protections for vegetation and habitat within GRSG management areas but would have the greatest contribution to cumulative effects through a potential increase in fine fuels that could influence large-scale wildfires.

Alternative 4 would be similar to Alternative 1 but would emphasize more avoidance. Fluid mineral leasing would be allowed in HMAs, which would increase potential impacts to vegetation in these areas as described in the *Nature and Types of Effects*. Impacts on vegetation communities from fluid mineral leasing, renewable energy development, and ROW development will vary depending on the location. Like Alternative 3, Alternatives 4 would include consideration of compensatory mitigation where appropriate to meet the requirements set by the state wildlife agency or appropriate authority. Mitigation requirements would reduce impacts on vegetation but to a lesser degree than Alternative 3.

Alternative 5 would be similar to Alternative 4 but would allow more development to occur which would potentially impact vegetation communities. As a result, more compensatory mitigation would be needed to when development is allowed in HMA boundaries. However, no net habitat loss and disturbance limits would not apply to the removal of invasive or encroaching vegetation, where such removal creates habitat.

Therefore, this alternative could cumulatively allow for the improvement of more acres of vegetation for GRSG habitat than Alternative 1.

Impacts under Alternative 6 would be similar to impacts under Alternatives 4 and 5 except for the designation of ACECs, which may offer additional protection to vegetation communities within them.

The Proposed RMP Amendment would reduce contributions to cumulative impacts compared to Alternatives 4 and 5 due to the management of PHMA with limited exceptions coupled with managing for ROW exclusion for wind and solar development in all of PHMA to reduce the incidence of development. State wildlife agencies or appropriate authorities would implement state requirements to restore and maintain GRSG habitat.

4.4 Wildland Fire Ecology and Management

4.4.1 Nature and Type of Effects

Impacts on wildfire management result from changes in wildfire frequency and intensity and the ability to employ wildfire suppression methods, both of which would affect management of wildfire and related costs within the planning area. Surface disturbance caused by development would generally contribute to the modification of the composition and structure of vegetation communities (including increases in noxious weed proliferation) around developed areas. This would then be more likely to fuel high-intensity wildfires, which could increase program costs because of the increased potential for wildfire.

Livestock grazing is the most widespread land use across the sagebrush landscape (Connelly et al. 2004) and it can be used to achieve resource objectives. Livestock grazing can alter an ecosystem's fuel characteristics, particularly fine fuel loads; however, this effect depends on weather conditions and plant community characteristics (Strand et al. 2014). In shrub-steppe, grazing with cattle may not be effective when shrub cover is high enough to serve as the primary carrier of the wildfire (Schachtschneider 2016) nor is it likely to be effective under extreme burning conditions (Strand et al. 2014). Several small-scale studies (Davies et al. 2010, Davies et al. 2016, and Davies et al. 2017) indicate cattle grazing can reduce grass fuels, alter potential wildfire behavior, and protect restoration investments, particularly when used on annual grasses prior to the wildfire season (Strand et al. 2014). Sagebrush grassland grazed at 30 to 50% utilization has been found to have lower % cover of perennial grasses and total herbaceous species, as well as larger gaps in fuels (Davies et al. 2010). At higher wind speeds, targeted grazing at a utilization of 50% reduced flame lengths below 4 feet, allowing direct attack by firefighters (Decker 2018). Burned areas that were grazed at 40% utilization had less cheatgrass and more perennial grasses compared with ungrazed burned areas (Davies et al. 2009). For invasive, annual, grass-dominated landscapes, high-intensity grazing is typically needed to suppress invasive annuals and thereby change wildfire behavior (Mosley and Roselle 2006). By coupling knowledge of fuel characteristics with foraging habits of different livestock, prescriptions of the appropriate intensity can be developed to target specific components of the fuel load, and grazing can be applied effectively to reduce the risk associated with fine fuels. Such management would be consistent with Executive Order 13855, Promoting Active Management of America's Forests, Rangelands, and other Federal Lands to Improve Conditions and Reduce Wildfire Risk.

Wild horse and burro populations present within the planning the area can have similar effects on wildland fire as domestic livestock. Wild horse and burros select to graze similar forage species that domestic livestock do. Grazing is predicted to reduce the occurrence of both small and large-scale wildfires by reducing fuel load and altering the vertical structure of the vegetation. This occurs even at low ungulate densities and is most pronounced at high ignition frequencies (Kramer et al. 2003). Wild horse and burro populations in combination with permitted domestic livestock can reduce fire fuel loads within the planning area.

4.4.2 Proposed RMP Amendment

Impacts on wildland fire management under the Proposed RMP Amendment would be the same as described for Alternative 1. That is, the Proposed RMP Amendment would implement a comprehensive strategy for wildland fire management, including the Fire and Invasives Assessment Tool (FIAT). The FIAT would identify PHMA areas and management strategies to reduce the threats to GRSG from invasive annual grasses, wildfires, and conifer expansion. It would incorporate recent scientific research on resistance and resilience of Great Basin ecosystems as well as interdisciplinary team knowledge. Potential management strategies include proactive measures, such as fuels management and habitat restoration and recovery, and reactive measures, such as fire operations and post-fire rehabilitation. Together, these actions would improve wildland fire management, given the limited resources available, and would target those areas that need the most protection. The likelihood for wildfire would be reduced, and subsequent impacts on vegetation, particularly vegetation that meets GRSG habitat requirements as described under **Section 3.2**, would also be reduced. Providing adequate rest from livestock grazing would improve the likelihood that ESR seedings would stabilize the site, compete effectively against invasive annuals, and successfully establish native vegetation over the long term.

4.4.3 Cumulative Effects

The analysis area for cumulative effects for wildland fire ecology and management includes lands managed by the BLM, Forest Service, and other federal agencies with adjacent state, Tribal, county, and privately owned lands in the planning area. The time frame for the cumulative effects analysis is 20 years.

Vegetation treatments, livestock grazing, increases in population and recreation, and development in the wildland-urban interface have and will continue to affect fuels and wildfires. Alternatives 1, 2, 4, 5, 6, and the Proposed RMP Amendment would each contribute to cumulative effects on wildland fires in similar ways since they would carry forward the vegetation and wildland fire ecology and management decisions from the 2015 GRSG plans. By making all PHMA unavailable for grazing, Alternative 3 would have the greatest contribution to cumulative effects through a potential increase in fine fuels that could influence a large-scale wildfire.

4.5 Fish and Wildlife

4.5.1 Nature and Type of Effects

Minerals Management

Mineral exploration and development could result in impacts on the fish and wildlife species and habitat identified in **Chapter 3**. During minerals management, increased human disturbance activities could result in temporary habitat avoidance or direct impacts on fish and wildlife species, causing mortality or injury. Other direct impacts include the removal or degradation of habitat from vegetation removal and increased potential for the spread of noxious weeds. Continuous (24-hours per day) operations often associated with fluid or locatable minerals exploration and development can result in long-term impacts on wildlife and their habitat from displacement or other noise-related disturbance. Displacement of species could increase competition for resources in adjacent habitats. These activities could remove and fragment habitats due to road development and use, facility construction and placement, and creation of well pads and pipelines. Wildlife may avoid developed areas over the long term, or may adapt and recolonize sites, including after reclamation of temporarily disturbed areas.

Both short term, loud noise (such as from vehicles or construction) and long-term, low-level noise (such as from industrial activities such as oil and gas development) have been documented to cause physiological effects on wildlife species. These include increased heart rate, altered metabolism, and changes in hormones, foraging, anti-predator behavior, reduced reproductive success, density, and community structure (Radle 2007; Barber et al. 2009). In addition, noise can impact wildlife through the disruption of communication and environmental cues (US Department of Transportation, Federal Highway Administration 2004). Determining the effect of noise is complicated because different species and individuals have varying responses, and certain species rely more heavily on acoustic cues than others (Radle 2007; Barber et al. 2009). Impacts would be both short- and long-term, depending on the type and source of noise, and the depending on the species.

Impacts on wild ungulate populations would result from disturbance and/or loss of seasonally important habitat (for example, critical winter, breeding, or rearing habitats). Wild ungulate species could also be impacted by interference with seasonal migration or movement patterns (Kauffman et al. 2022) that decreases the ability of a species to breed or overwinter successfully. If effects are severe enough, this could lead to population declines. Additionally, habitat fragmentation caused by mineral development activities could further disrupt wild ungulate populations, impacting their ability to migrate and access essential resources.

Water pollution from minerals management could also have detrimental effects on fish and amphibian populations, particularly through the degradation of water quality in critical habitats. This can lead to long-term harm to these species, potentially affecting their reproductive success and overall population health.

Restricting surface-disturbing activities during minerals management actions would reduce impacts on wildlife and their habitat. Such management actions include stipulations to protect GRSG habitat, closure of areas to mineral leasing and development, and restrictions within ACECs. Areas closed to fluid mineral leasing and development or managed under NSO stipulations would reduce surface disturbance and associated habitat impacts from fluid mineral development in certain areas. Wildlife on BLM-administered lands may be affected by disturbances from mineral development on adjacent lands.

Lands and Realty Management

Although transmission and power line construction does not generally result in substantial direct habitat loss, it would disturb wildlife species in habitat along the ROW due to the associated human activity, equipment, and noise, and would contribute to habitat fragmentation. In addition, transmission lines provide perches and nest sites for predators such as ravens and raptors, resulting in indirect negative impacts on prey species. Over the long term, ROWs may cause mortality of birds and bats due to collisions with power lines or guy lines. Collocation of transmission lines could reduce impacts by siting new developments in areas that are previously disturbed. Roads associated with energy transmission facilities can also reduce the extent and quality of habitat or serve as inroads for invasive plants to establish, further reducing habitat quality.

In areas managed as ROW exclusion, the BLM would prohibit all development of ROWs, with some exceptions provided; in areas managed as ROW avoidance, the BLM would consider allowing ROWs on a case-by-case basis. This flexibility may be advantageous where federal, state, Tribal, and private landownership areas are mixed and exclusion areas may result in more widespread development off of BLM-administered lands.

Renewable Energy Management

The type of effects on fish and wildlife species from renewable energy development and associated infrastructure (including construction and operation of distribution and transmission lines, substations, and access roads) would largely be similar to the type of effects resulting from ROW management, including habitat removal, alteration, or fragmentation, and direct injury or mortality, disturbance, and displacement. The development of wind energy could cause habitat loss and fragmentation, and both short- and long-term impacts to wildlife habitat. Disturbances during installation of towers, roads, and infrastructure could force wildlife away from preferred habitat. Some smaller prey species will avoid and abandon areas where overhead structures such as power lines and towers are present due to the increased risk of avian predators. Construction of wind turbines throughout the planning area create collision hazards for bats, raptors, and multiple other avian species. Studies have documented deaths of avian and bat species from wind turbines, although the levels of collision and death vary in the scientific research (Cohn 2008; Madders and Whitfield 2006; Frick et al. 2017). Specific wildlife impacts from wind energy development have been shown for some wild ungulate species. Mule deer are displaced from suitable habitat by human activity related to the development and operation of gas wells in western Wyoming (Sawyer et al. 2006). Recent study regarding interactions of a transplanted elk population with an operating wind facility in Oklahoma found no evidence that turbines had a significant impact on elk use of the surrounding area (Walter et al. 2006). Similarly, Johnson et al. (2000) found no effect on pronghorn use of the Phase I and II Foote Creek Rim project in Wyoming.

Solar-specific impacts would be similar to wind disturbances during development that would lead to habitat removal, alteration, fragmentation, and collision risks. Wildlife, such as small mammals, big game, reptiles, and amphibians, would be more vulnerable to habitat fragmentation due to the large geographic range of solar developments (DOE 2021). Additionally, the risk for collision would increase for avian species that migrate over, nest near, or forage in or around solar projects if they are attracted to the solar panels as they resemble large bodies of water.

Livestock Grazing Management

The direct and indirect impacts of livestock grazing on plants, as described in **Section 4.3**, Vegetation, can have indirect impacts on insect pollinators, particularly bees. Trampling can also have negative impacts on pollinator nesting sites, destroying active nests and causing soil compaction which can prevent new nest construction. Livestock may also trample nests of ground-nesting birds (Sabatier et al. 2016).

While limited, improper grazing management can lead to loss of vegetation cover, reduced nesting habitat quality (for ground-nesting species), reduced forage availability, reduced water infiltration rates due to soil compaction, change in vegetation composition, decreased plant litter, increased bare ground, reduced nutrient cycling, decreased water quality, increased soil erosion, and reduced overall habitat quality for wildlife (Manier et al. 2013). Grazing may contribute to the spread of nonnative, invasive plants and noxious weeds in sagebrush ecosystems by reducing cover of native bunchgrass (Reisner et al. 2013). It may increase desertification or worsen the impacts of climate change on rangeland (Beschta et al. 2014). Properly managed grazing may be compatible with wildlife habitat, does not preclude healthy rangelands, and may reduce wildfire in sagebrush ecosystems by reducing fuel loads in certain circumstances (Strand et al. 2014; Svejcar et al. 2014; NTT 2011). As described in **Appendix 21**, livestock grazing is managed to meet or make progress toward land health standards, thus reducing the likelihood of adverse effects.

Structural range improvements, such as fences represent potential predator perches and wildlife movement barriers (especially woven-wire fences), restricting movement and increasing predation pressure (Coates et al. 2016). Additional range improvements for water availability would include troughs that can create drowning risks for wildlife if not properly constructed with adequate escape ramps that are maintained. Generalist predators can be abundant in anthropogenic-influenced areas, including areas developed for minerals, livestock grazing, and other uses, where they can reduce prey populations. Common ravens (*Corvus corax*) prey on eggs and young of numerous other wildlife species, including GRSG. Ravens have been documented to prey on other special status species in the western US, including desert tortoises (*Gopherus agassizii*; Boarman 1992), least terns (*Sterna antililarum*; Avery et al. 1995), and western snowy plovers (*Charadrius alexandrines nivosus*; Strong et al. 2021).

Wild Horse and Burro Management

Wild horse and burro grazing may alter habitat conditions for fish and wildlife species, including reduced total vegetation and grass abundance and cover, lowered sagebrush canopy cover, increased shrub canopy fragmentation, lowered species richness, increased compaction in surface soil horizons, and increased dominance of unpalatable forbs (Manier et al. 2013). Wild horses and burros also compete for forage and water and have been documented aggressively defending water sources from native ungulates (Perry et al. 2015; Crist et al. 2019). In addition, the grazing and congregating of herd populations over AML can degrade riparian areas, decrease water quantity and quality, and increase soil erosion. These effects can reduce habitat quality for fish and wildlife species. Effects on habitats may also be more pronounced during periods of drought or vegetation stress (NTT 2011).

Fences used to manage livestock distribution represent a potential source of movement barriers and increased predation, as described in *Livestock Grazing*, above. In addition, water must be available year-round in herd management areas and wild horse territories, in compliance with the Wild and Free-Roaming Horses and Burros Act of 1971. This can lead to riparian areas receiving year-long use by wild horses and could modify riparian areas with additional fencing and troughs to accommodate year-long wild horse use. The range improvements would increase potential perch sites for avian predators and increase potential drowning hazards (water troughs). Artificial water sources of water may also increase the risk of West Nile virus in GRSG (Naugle et al. 2004). Moreover, there would be less water available for fish and wildlife in these areas. Conversely, range improvements are typically developed consistent with program guidance such as bird ladders to reduce drownings and maintain adequate water flow to maintain the spring source (BLM 2014).

Predation Management

Predation management would have similar effects as those described in **Section 4.2** for GRSG and would ultimately benefit wildlife species that overlap with GRSG habitats because there would be less predation pressure in these areas. Conversely, predator management may also adversely affect predatory wildlife populations that are the source of threats to GRSG.

ACEC Designation

ACECS are special management areas that are designed to protect important values such as fish and wildlife resources and habitat through restrictions on uses and surface disturbing activities. Management of the ACEC is designed to focus on the resource or natural hazard of concern, however this differs from area to area. Currently there are existing ACECs in Oregon that include GRSG as an important value (See **Section 4.11.1**, *ACECs and Research Natural Areas).* There is also considerable overlap of existing ACECs and GRSG habitat, which provides secondary protection for GRSG as well as other wildlife species. ACEC designation may be a useful tool for the BLM to effectively manage habitat not only for GRSG but for other wildlife species by restricting land use operation and disturbances in these areas.

4.5.2 Proposed RMP Amendment

Habitat Management Area Designation

Under the Proposed RMP Amendment, the BLM would manage approximately 2,056,000 acres (6%) more PHMA and 4,848,000 (18%) fewer acres of GHMA compared to Alternative 1 (**Table 2-15**). Compared to Alternative 5, the BLM would manage approximately 592,000 (2%) more PHMA and 75,000 (less than 1%) fewer acres of GHMA. This would lead to increased protection for other wildlife whose ranges overlap with PHMA but less protection for those whose ranges overlap with GHMA. However, PHMA would cover a larger area under the Proposed RMP Amendment compared with Alternative 1. Additionally, the management of PHMA with limited exceptions would provide additional protections for fish and wildlife and their habitats from several resource uses as described further below.

Minerals Management (including Fluid minerals, Saleable Minerals/Mineral Materials, Non-energy Leasable Minerals, and Locatable Minerals)

Impacts on fish and wildlife would be similar to those described for Alternative 5 for saleables, locatables, and fluid mineral objectives and allocations. Additionally, managing PHMA with limited exceptions as NSO with no waivers, exceptions, and modifications; closed to saleable minerals with fewer exceptions for new free use permits and expansion of existing pits; and closed to nonenergy leasable minerals including expansions, would provide further protections for fish and wildlife and their habitats in these areas. Additional impacts from minerals management are described under *Nature and Types of Effects.*

Lands and Realty

Under the Proposed RMP Amendment, avoidance criteria for major ROWs would be more stringent than those under Alternative 5. Further, the management of PHMA with limited exceptions as major ROWs exclusion with exceptions would provide additional protection for fish and wildlife and their habitats from these uses, similar to those described for Alternative 3, where all PHMA would be excluded from new ROW authorizations. This would decrease the probability of habitat degradation and fragmentation compared with Alternative 1.

Renewable Energy Management

Impacts from renewable energy management under the Proposed RMP Amendment would be similar to those described under Alternative 3, where PHMA would be exclusion areas. This would minimize the potential habitat impacts from wind and solar development to PHMA to a greater degree than avoidance areas because development would not be allowed under any condition. Habitat impacts to IHMA, which would be managed as ROW avoidance, would be minimized but to a lesser degree than exclusion areas because development would be considered on a case-by-case basis.

Mitigation and Adaptive Management

Impacts on wildlife from mitigation and adaptive management under the Proposed RMP Amendment would be similar to those described under Alternative 4. However, under the Proposed RMP Amendment, improved direction would be made for mitigation and adaptive management to improve implementation, which could reduce the likelihood of impacts on fish and wildlife species compared with Alternative 1.

Application of Habitat Objectives

Impacts on fish and wildlife from application of habitat objectives under the Proposed RMP Amendment would be the same as those described for Alternatives 3, 4, 5, and 6 (refer to **Appendix 10**).

Livestock Grazing Management

Impacts on fish and wildlife from livestock grazing management under the Proposed RMP Amendment would be the similar to those described under Alternative 4. However, under the Proposed RMP Amendment, OR would include an additional objective to avoid direct adverse impacts from livestock management in limited GRSG habitat, potentially reducing impacts to other wildlife species that overlap GRSG range, as discussed under *Nature and Types of Effects*. Additionally, NV/CA would make clarifying direction to improve implementation, which would reduce the likelihood of impacts compared with Alternative 1.

Wild Horse and Burro Management

Impacts to habitats from wild horse and burro management under the Proposed RMP Amendment would be the same as those described for Alternative 1.

ACEC Designation

The Proposed RMP Amendment would not result in any impacts from ACEC designation since it does not include management for ACECs.

4.5.3 Cumulative Effects

The cumulative impact analysis area includes all BLM-administered lands within the range of GRSG as well as other federally managed lands, and adjacent state, Tribal, county, and privately owned lands. The larger analysis area is necessary because some wildlife and special status species, including migratory birds, and big game move across this larger landscape and animals and plants depend on ecosystems that extend over larger areas. The time frame for the analysis of cumulative effects is 20 years.

Mineral exploration and development such as for fluid minerals (oil, gas, and geothermal), locatable minerals, leasable minerals, and mineral materials have and will continue to affect fish, wildlife and special status species. Other development like residential and industrial development, associated roads and ROWs (including pipelines, electrical transmission lines, infrastructure ROWs, and large renewable energy projects, such as solar and wind development projects), vegetation treatments, fire and fuels management, livestock grazing, wild horse and burro management (which includes gathers, fertility treatments, and removal of excess wild horses and burros from designated herd management areas), recreation, travel management, and GRSG goals, objectives, and planning efforts that are also likely to continue to affect fish, wildlife, and special status species.

Many of the actions described above have and will likely continue to alter habitat conditions, which then cause or favor other habitat changes. For example, wildland fire removes wildlife and special status species habitat features, and affected areas are more susceptible to weed invasion, soil erosion, and sedimentation of waterways, all of which further degrade habitats. In general, resource use activities, such as energy, mineral, and other developments have cumulatively impacted fish, wildlife, and special status species by causing habitat removal, fragmentation, weed spread, and disturbance from noise and increased human presence. Dispersed, organized, and concentrated recreation also promotes the spread of invasives and pollutants into the environment, habitat degradation from OHV use, and associated noise from an increase in visitors to BLM-administered lands. Land planning efforts and vegetation, habitat, and fuels treatments have offset some of these impacts by improving habitat connectivity, resistance, and resilience. Planning efforts for GRSG would also constrain certain uses such as mineral development, ROW authorizations, and grazing, and contribute to restoration of shrubland habitats. Additionally, planning efforts to protect aquatic species exist that constrain certain uses within 100 meters of riparian areas, fens, wetlands, and water impoundments. As such, these planning efforts would reduce cumulative impacts on wildlife species associated with these habitat types.

Reasonably foreseeable vegetation treatments (**Appendix 14**) would improve habitat conditions for some wildlife and special status species such as small mammals, big game, birds, and invertebrates, such as insects and pollinators. These projects include hazardous fuels reduction, pinyon-juniper removal, emergency stabilization and rehabilitation, and invasive species control. Removing encroaching conifers would help maintain the extent of sagebrush habitat by reducing the potential for conversion to pinyon-juniper woodlands. These activities would improve the habitats' resistance to potential future disturbances, assisting in long-term habitat maintenance. Vegetation treatments would cause short-term impacts, such as noise disturbance, displacement of individuals, surface disturbance, erosion, and sedimentation. Mitigation measures such as the timing of treatments would be implemented to minimize the impacts on migratory birds. For other wildlife and special status species, short-term displacement could occur during vegetation treatments; however, these effects would be temporary and minor. Long-term impacts would potentially be enhanced habitat conditions and a reduced risk of catastrophic wildfire. Restoration activities would improve habitat conditions for sagebrush-dependent wildlife by increasing the availability of features used for nesting and shelter. Pinyon and juniper removal could reduce nesting and roosting opportunities for raptors, other migratory birds, and other arboreal species, however, the removal could have beneficial components for small mammal and bird species that occupy sagebrush habitats. Removing predator perches and nesting sites would benefit species that are vulnerable to avian predation. Opening the understory would allow sagebrush and perennial grasses to grow.

Climate change could cause an increase or decrease in temperatures and precipitation, as described further in **Section 3.2.12**, which would affect soil conditions, vegetative health, and water flows and temperature. Such changes would alter habitat conditions, potentially creating conditions that could favor certain species or communities, weeds, or pests. Future climate conditions will likely impact GRSG planning efforts to restore habitat by reducing sagebrush ecosystem resistance and resiliency in some areas of PHMA.

Under all the alternatives, there is at least one goal or objective in place focused on improvement of GRSG habitat and populations; if implemented across all management actions, achievement of this goal or objective would also reduce impacts to fish, wildlife, and special status species by helping to offset effects from activities which degrade habitat.

Comparison of Alternatives

Management under Alternative 1 includes restrictions on development, such as NSO and CSU stipulations on fluid minerals, locatable minerals, and other surface disturbing activities would be focused outside of PHMA, exclusion areas for some renewable energy development, and mitigation to reduce the total net impact on fish, wildlife, and special status species (3 or 5% disturbance cap, depending on the state). In summary, there would not be any significant changes to management that would cause an impact on fish and wildlife beyond current conditions and management practices. Therefore, this alternative would have some incremental contribution to cumulative impacts on wildlife species. This is because impacts, such as habitat alterations and disturbance, would not necessarily be dispersed, and concentrated areas of development could reduce habitat connectivity and functionality.

Conversely, under Alternative 2, there would be more areas open to fluid mineral leasing, thus posing greater impacts on fish, wildlife, and special status species. This is because Alternative 2 allows for more flexibility in the management of activities that can impact wildlife and their habitat.

Alternative 3 would include the fewest acres open and the most stringent restrictions for fluid mineral leasing. Alternative 3 would also provide the most protection for fish, wildlife, and special status species habitats within GRSG management areas because of increased restrictions, and in some cases the prohibition of surface disturbing activities (including mineral development, renewable energy development, ROW development, and travel development). In summary, Alternative 3 would provide the most protection and reduce the contribution of surface disturbances, but the lack of active vegetation management would have long-term detrimental cumulative impacts to wildlife and special status species to the greatest extent of all the alternatives. These protections would result in increased wildlife habitat connectivity and functionality.

Under Alternatives 4 and 5, mineral development would be allowed in HMA boundaries, which would increase potential impacts to fish, wildlife, and special status species in these areas as described in the *Nature and Types of Effects*. Like Alternative 3, both Alternatives 4, and 5 would require compensatory mitigation that would meet the requirements set by the BLM but may also be affected by state wildlife agencies or appropriate authority mitigation programs. This would offset impacts on fish, wildlife, and special status species but to a lesser degree than Alternative 3.

Impacts under Alternative 6 would be similar to impacts under Alternatives 4 and 5 except for the designation of ACECs, which may offer additional protection to fish and wildlife within them.

Under the Proposed RMP Amendment, management of PHMA with limited exceptions would reduce the contribution to cumulative impacts compared with Alternatives 1, 2, 4, 5, and 6. Management of PHMA as exclusion for renewable energy would also reduce the contribution to cumulative impacts.

4.6 Special Status Species

In general, impacts on special status fish and wildlife species would be similar to those discussed under **Section 22.15**, Fish and Wildlife, and **Section 4.2**, Greater Sage-Grouse, while impacts on special status plant species would be similar to those discussed under **Section 22.13**, Vegetation. However, impacts on special status species may be greater than impacts on common species because population viability is already uncertain for special status species. A detailed analysis of impacts on federally listed and proposed species and designated and proposed critical habitat will be prepared in the biological assessment for this Proposed RMPA/Final EIS. The biological assessment is under development and will be included with the Final RMPA/EIS.

Those species more closely associated with sagebrush communities or whose ranges are largely coincident with PHMA and GHMA (e.g., Brewer's sparrow and to a lesser extent white-tailed prairie dog, black-footed ferret, pygmy rabbit, western burrowing owl, ferruginous hawk, Holmgren lupine, Beatley's buckwheat, and squalid milkvetch) would benefit from conservation measures designed to protect GRSG and sagebrush habitat.

Conversely, excluding or avoiding development in GRSG habitats most likely outside of PHMA and IHMA, in GHMA inclusions, may lead to increased development activity in other vegetation types (e.g., pinyon-juniper, mountain shrub, and aspen/spruce/fir). Special status species associated with these habitat types, such as pinyon jay, northern goshawk, Canada lynx, Columbian sharp-tailed grouse, sand cholla, Reese River phacelia, Eastwood milkweed, and BLM-sensitive bat species, may be adversely influenced to varying degrees, depending on alternative and development scenarios.

4.7 WILD HORSES AND BURROS

4.7.1 Nature and Type of Effects

Impacts under all alternatives would be limited to any future changes that may result in AML and/or acreage adjustment as well as reconsideration of herd management area designations that are based on achievement of GRSG habitat objectives for improving GRSG habitat conditions. Wild horse and burro grazing can have impacts on soils, vegetation health, species composition, water, and nutrient availability. These impacts can be more pronounced when wild horse and burro populations exceed AML levels. Actions taken by the BLM such as wild horse and burro gathers, and implementation of fertility or birth control treatments can be used to manage their population levels. A growing body of research suggests that natural predation may also play a role in managing feral horse and burro populations. Andreasen et al. (2021) found that cougars in the Great Basin, for example, preyed successfully on horses of all age classes, with some female cougars relying heavily on horses year-round. Although cougar predation at landscape scales is unlikely to limit feral horse population growth, it could still serve as an important ecological factor in certain contexts. Similarly, Lundgren et al. (2022) discovered that cougar predation can create trophic cascades involving feral equids and vegetation. The impacts from wild horse and burro management on these resources are discussed in their respective sections.

Most herd management areas 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. All herd management areas are managed to achieve and maintain the AML. Initially, the AMLs 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. Priorities for gathering excess wild horses and burros to achieve and maintain AML are based on population inventories, resource monitoring objectives, gather schedules, holding space availability, and budget. Gathers can be conducted in emergency situations when the health of the population is at risk due to lack of forage or water. In some situations, wildfire may be considered as reasoning for an emergency gather. Across all alternatives, use of contraceptives and other population growth suppression to manage wild horse and burro numbers could be implemented to assist in the achievement and maintenance of AML. Currently, based on the BLM's population estimates, the wild horse and burro populations within 177 of the HMAs is 274% higher than the higher limit of the set AML (BLM 2024a).

Implementing management for the protection of GRSG generally involves reducing or otherwise restricting land uses and activities to levels that are more consistent with the protection of GRSG and their habitat. Ground disturbing activities such as mineral extraction, recreation, or construction activities in ROWs all may remove vegetation and thus reduce forage availability, reduce the ability of wild horses and burros to move freely across herd management areas, or cause general disturbance of an individual band of wild horses or burros (refer to **Table 3-2**). **Table 3-2** displays the total number of herd management areas, and their associated AMLs, administered by BLM by state. **Table 3-3** shows acres of herd management areas within GRSG HMAs. 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. These land uses and activities typically reduce forage and water availability or otherwise unintentionally disturb wild horse and burro populations, which may necessitate the need to adjust the established AML to meet GRSG habitat objectives.

Impacts on wild horses and burros and the ability of herd management areas to support AMLs may occur within herd management areas where management options are restricted for the protection of GRSG. Impacts from range improvement restrictions would generally vary based on type of range improvement affected; restrictions on fences would improve wild horse and burro habitat by allowing free range, while limitations on projects that could enhance forage and water availability would not help to support the established AML. For instance, a herd management area within the planning area may not have open water, and thus wild horses and burros are supported exclusively through water developments.

4.7.2 Proposed RMP Amendment

Impacts to GRSG and their habitats from wild horse and burro management under the Proposed RMP Amendment would be similar to those described for Alternative 1. That is, the Proposed RMP Amendment would require a 3% disturbance cap on human surface-disturbing activities in PHMA. It would incorporate RDFs consistent with applicable law in PHMA, GHMA, and IHMA and would also require all human disturbances to result in a net conservation gain for GRSG and their habitat. Lek buffers would also be required.

Collectively, these GRSG conservation management actions would increase mitigation requirements for land use authorizations. This would result in more complex project designs, could exclude infrastructure placement in the most cost-effective locations, and would result in overall greater development costs. A corresponding effect could be a reduction in the number of authorization applications received for activities in PHMA and longer, more complicated review periods for those that are proposed in PHMA.

Protections afforded to GRSG and their PHMA or GHMA habitats would benefit wild horses and burros where herd management areas overlap these areas. This is because habitat conditions and forage would be improved, there would be less impact from human disturbances, and wildfire would be strategically managed in habitats. Temporary or long-term management changes to wild horses and burros may be necessary to achieve and maintain the desired habitat condition. Examples are reducing AMLs, designations, removals, movement patterns, and forage access. Alternative 1 would require more intensive management, particularly in the boundaries of SFAs.

4.7.3 Cumulative Effects

The cumulative impacts analysis area for wild horses and burros and herd management areas includes lands administered by the BLM, Forest Service, and other federal agencies, as well as adjacent state, Tribal, county, and privately owned lands surrounding the planning area. This includes all herd management areas that overlap with the planning area. The temporal limit of this analysis would be the life of this plan, or approximately 20 years.

Impacts to wild horses and burros managed for AML inside herd management areas are typically caused by the same activities which impact vegetation and water resources. Current and reasonably foreseeable actions in and near GRSG habitat that are considered PHMA (and IHMA in ID) or GHMA would influence the availability of resources for wild horses and burros across the different states analyzed in this EIS. Past, present, and reasonably foreseeable actions which limit the creation or maintenance of range improvements or remove or modify forage would combine cumulatively with the actions outlined in this plan to impact wild horses and burros over the short and long term. Generally, cumulative impacts on wild horses and burros from current and reasonably foreseeable actions are similar to those described under **Section 4.3.1**, Wild Horses and Burros.

Past, present, and reasonably foreseeable actions within the cumulative impact analysis area that have affected and will continue to affect wild horses and burros include mineral exploration and development of fluid minerals, locatable minerals, leasable minerals, and mineral materials. Additionally, ground disturbing development like residential and industrial construction (including renewable energy development), associated roads and ROWs, vegetation treatments, fire and fuels management, recreation, travel management, and GRSG goals, objectives, and planning efforts are also likely to continue to affect wild horses and burros.

Comparison of Alternatives

Management under Alternative 1 would be the 2015 Plan amendments. Development, including fluid and locatable minerals development, and other surface disturbing activities would be focused outside of PHMA and other exclusion areas. Under Alternative 1, there would not be any significant changes that would lead to additional impacts on wild horses and burros and herd management areas beyond current conditions and management practices. This alternative would have some incremental contribution to cumulative impacts on wild horses and burros where herd management area do not overlap with PHMA.

Under Alternative 2, there would be more areas open to energy and mineral development and other ground disturbing activities, leading to a greater contribution to the cumulative impacts described above when compared with Alternative 1.

Alternative 3, all wild horses and burros would be removed from existing PHMA and proposed ACECs—resulting in short term disturbances from round-up activities. Alternative 3 would also make the fewest acres available for fluid mineral leasing and other ground disturbing activities, therefore protecting vegetation where those restrictions are implemented. However, Alternative 3 would also make the greatest number of acres of livestock grazing unavailable, in some cases, this may contribute to the cumulative impacts on wild horses and burros when combined with other actions, as limitations on livestock grazing could limit the availability of watering sources used by wild horse and burros.

Under Alternatives 4, 5, 6, and the Proposed RMP Amendment, energy and mineral development would be allowed in HMA boundaries, which would increase potential impacts to forage and other resources used by wild horses and burros as described in **Section 4.7.1**, Wild Horses and Burros. Impacts on forage and habitat conditions inside of herd management areas from mineral development, renewable energy development, and ROW development would vary depending on the location of the proposed development but as shown on **Map 3.22** (**Appendix 1**), herd management areas are most prevalent in Wyoming, Oregon, and Nevada. The contribution to cumulative effects among these alternatives would be greatest under Alternative 5, then decreasing with Alternative 4, 6, and the Proposed RMP Amendment.

4.8 LIVESTOCK GRAZING

4.8.1 Nature and Type of Effects

Impacts on livestock grazing are generally the result of activities that affect forage levels, areas available for grazing, the class or kind of livestock, the timing of use, the interval between grazing periods, intensity of grazing, placement and management of range improvements, and livestock handling techniques in grazing allotments.

Greater Sage-Grouse Management

Protecting GRSG habitat can directly affect livestock grazing if management requires limitations on areas open to grazing or available AUMs, modification of grazing strategies, or limitations on maintenance or construction of range improvements. This could increase time and cost to permittees and lessees or impact the ability of permittees and lessees to fully use permitted AUMs. The impacts of additional direct costs on permittees and operators are discussed in **Section 4.12**, Social and Economic Conditions.

Minerals Management (including Fluid minerals, Saleable Minerals/Mineral Materials, Non-energy Leasable Minerals, and Locatable Minerals)

Energy and mineral development can directly impact livestock grazing. During the exploration and testing phase of mineral development, the footprint of disturbance is usually small and localized; therefore, minimal acres available for livestock grazing would be directly impacted. During the exploration phase, development and human presence can lead to impacts on livestock dispersal and unauthorized grazing use could occur, increasing time and cost to permittees and lessees. Outside of the exploration and testing phase, surface-disturbing mineral development directly affects areas of grazing in the short-term during construction of well pads, roads, pipelines, and other associated facilities. Potential impacts include an increased potential for the introduction and proliferation of invasive plants that are often unpalatable. Other potential impacts are changes in available forage, reduced forage palatability because of dust on vegetation, limits on livestock movement, harassment, and temporary displacement of livestock.

Improving roads for mineral development can facilitate livestock management if it improves operators' ability to maintain infrastructure or improve grazing distribution. Development may also provide other indirect benefits including but not limited to access to locations for supplement placement. Properly implemented Best Management Practices (BMPs) and reclamation mitigation measures could help to maintain rangeland health and forage levels for livestock. Reducing mineral development in GRSG habitat could reduce potential impacts on grazing.

Renewable Energy Management

Wind and solar energy development could directly impact livestock through limitations on use of the portions of developed areas. Solar energy development typically leads to removal of livestock grazing within the footprint of the developed site. ROWs used to gain access to developed sites could remove forage permanently. The BLM would notify permittees at least 2 years in advance of any proposed reduction in authorized use in the allotment, including complete removal of grazing within a portion of or the entirety of an allotment.

Lands and Realty Management

Areas managed as ROW avoidance or exclusion could hinder or prevent obtaining access to an allotment or installing a structural range improvement. Restrictions on ROWs may indirectly benefit livestock grazing by reducing construction impacts (such as dust, displacement, and introduction of invasive plants) from development of other types of ROWs in the long term. Restrictions on ROWs may indirectly impact livestock grazing by reducing construction impacts from development of these ROWs (such as dust, displacement, and introduction of invasive plants) in the long term. Lands and realty actions taken to protect GRSG habitat would involve avoiding or excluding ROWs (e.g., for power lines, pipelines, and other structures) or land transfers in GRSG habitat. They may also slightly decrease disturbance in these areas. If development is relocated to areas outside of GRSG habitat, but still within a grazing allotment, these areas may see an increase in construction-related disturbance or displacement of livestock.

Livestock Grazing Management

Changes in livestock grazing management could impact grazing opportunities in a variety of ways. For example, implementing livestock grazing management requirements to benefit GRSG could affect livestock grazing by changing required management actions. Management requirements could increase short-term and long-term costs to permittees and lessees and decrease AUMs, particularly when they require one or more of the following:

- Removal or modification of structural and nonstructural range improvements
- Modification of a grazing strategy and terms and conditions of permits, including but not limited to:
- Changes to the kind or class of livestock grazed
- Change in season-of-use
- Timing or duration of grazing use
- Changes to the pattern of rest-rotation within allotments and pastures
- Changes to area of use

These management requirements could result in direct and indirect economic impacts on individuals, companies, and the local community. For example, if a ranch is dependent seasonally on forage on public lands, reducing or eliminating AUMs on public lands would affect the entire ranching operation by reducing the total amount of available forage (Torell et al. 2002).

Some management changes may require a short-term output of cost for permittees and lessees but could result in long-term benefits. For example, construction of structural range improvements such as fencing or water developments, or use of nonstructural and non-ground disturbing range improvements such as mineral blocks to improve livestock distribution and allow use of a larger portion of the rangeland would generally enhance rangeland health in the long term. These management changes would also have short-term costs which may be borne by the BLM, permittees or lessees, or other partners. Constructing off-site water sources and fencing riparian vegetation and spring sources could keep livestock away from sensitive riparian areas and provide a cleaner more reliable source of water for livestock. Water developments and fencing could increase costs for permittees and lessees should they be fully or partially responsible for the cost of construction. Other requirements could increase annual operating costs. Examples of this are increased time feeding animals on base property, more complex pasture rotations or increased stockmanship such as herding or fence riding, which would require increased labor and fuels costs for moving animals.

When lands are devoted to another public purpose excluding grazing, the agency may compensate the permittee or lessee for the range improvement projects constructed under a range improvement permit or cooperative agreement, in accordance with 43 CFR Part 4120.3-6(c) (1995).

Wild Horse and Burro Management

When livestock and wild horses or burros occupy the same area, their needs for water and forage may be competitive. In extreme circumstances, wild horses and burros could outcompete livestock temporarily and could preclude livestock access to certain water sources. Livestock and wild horse and burro conflicts could include fence damage. Prioritizing wild horse and burro gathers in herd management areas and herd areas in priority GRSG habitat to meet established AMLs would reduce forage competition between wild horses and burros and livestock.

4.8.2 Proposed RMP Amendment

Greater Sage-Grouse Management

Rangewide Environmental Consequences

Under the Proposed RMP Amendment, requiring compensatory mitigation for activities described in **Table 2-4** to be in place when an exception is granted would reduce the likelihood of reduced available forage for livestock compared with Alternative 1. Further, the disturbance cap would apply to both existing and proposed infrastructure authorizations, subject to valid existing rights, while wildfire and agriculture would not be included in the disturbance cap calculation. This could lead to more development and increased impacts on livestock grazing operations, forage, and increased human-livestock conflicts compared with Alternative 1. No exceptions to the 3% disturbance cap would be allowed at the HAF fine scale habitat selection area, which would limit the removal of forage or disturbance to livestock at this scale, compared with Alternative 1.

State-Specific Environmental Consequences

Under the Proposed RMP Amendment, Wyoming and Montana would have a 5% disturbance cap with a 3% disturbance cap scale applied at the HAF fine scale habitat selection area. This action would reduce potential development which would reduce the impacts to livestock grazing. Wildfire and agriculture would be included in the disturbance calculations for Wyoming and Montana in the Proposed RMP Amendment which would reduce the contribution of other human-made surface disturbance activities and overall would help to maintain forage available for livestock.

Minerals Management (including Fluid minerals, Saleable Minerals/Mineral Materials, Non-energy Leasable Minerals, and Locatable Minerals)

Increasing the acres subject to NSO under the Proposed RMP Amendment would reduce the HMA acres affected and potential impacts on livestock grazing operations and forage. Prioritizing projects that avoid, minimize, reduce, rectify, and/or adequately compensate for direct and indirect impacts to PHMA/IHMAs, along with technical COAs, would also reduce impacts on livestock grazing operations and forage compared with Alternative 1. The addition of PHMA with limited exceptions managed as NSO with no waivers, exceptions, or modifications, closed to saleable and closed to non-energy leasables would further reduce impacts to livestock grazing and forage.

Renewable Energy Management

Managing PHMA in all states as ROW exclusion areas for wind and solar energy development would reduce impacts on livestock grazing from disturbance associated with renewable energy development compared with Alternative 1. Managing PHMA with limited exceptions as exclusion with no exceptions would provide further protection to livestock grazing and available forage. Managing GHMA as avoidance areas for wind and solar energy development in all states would decrease the potential for impacts associated with renewable energy development but to a lesser extent than in exclusion areas.

Lands and Realty Management

Managing PHMA in all states and IHMAs as ROW avoidance areas but allowing for exceptions and opening GHMA to ROW development would increase the potential for impacts on livestock grazing and forage compared with Alternative 1. However, management of PHMA with limited exceptions as exclusion for major ROWs would provide additional protection for livestock grazing and forage from these uses, similar to those described for Alternative 3.

Livestock Grazing Management

Rangewide Environmental Consequences

Impacts to livestock grazing under the Proposed RMP Amendment would be similar to those described under Alternatives 4 and 5.

State-Specific Environmental Consequences

In Oregon, requiring avoidance of direct adverse impacts in limited GRSG habitat from range improvements would impose further requirements on operators and could constrain the location of range improvements. There would be additional impacts to livestock grazing associated with key RNAs (refer to **Appendix 17** for a full description of the effects of the alternatives on livestock grazing in these areas). Specifically, the BLM would include additional livestock grazing management objectives and actions to minimize or reduce impacts to GRSG and habitat compared with Alternative 1. This could lead to the prohibition of range improvement construction as well as adjustments to existing AUMs to meet these management objectives. Additionally, where land health standards for GRSG habitat are not met and existing livestock grazing is a significant causal factor, adjustments to livestock grazing practices would be made at the authorization, allotment, or activity plan level.

Wild Horse and Burro Management

Impacts to livestock grazing from wild horse and burro management would be the same as described under Alternative 5. That is, management of wild horse and burro populations to be within established AMLs could reduce forage competition between wild horse and burro populations and domestic livestock in some areas compared with Alternative 1.

4.8.3 Cumulative Effects

The cumulative impacts analysis area for livestock grazing includes lands administered by the BLM, Forest Service, and other federal agencies as well as adjacent state, Tribal, county, and privately owned lands surrounding the planning area. Impacts to permittees' base property and changes to surface owned by other agencies but administered by the BLM could impact livestock grazing across a larger landscape than the planning area. Ongoing and future activities in and near the cumulative impacts analysis area could influence livestock grazing and forage conditions within the planning area.

Current and reasonably foreseeable actions in and near GRSG habitat that are considered PHMA (and IHMA in ID) or GHMA would influence grazing operations and livestock grazing permitting across the different states analyzed in this EIS. The temporal limit of this analysis would be the life of this plan, and the life of grazing decisions made as a result of the actions made through the record of decision.

Past, present, and reasonably foreseeable actions which modify or prohibit livestock use, limit the creation or maintenance of range improvements, or remove or modify forage would combine cumulatively with the actions outlined in this plan to impact livestock over the short and long term. Generally, cumulative impacts on livestock grazing from current and reasonably foreseeable actions are similar to those described under **Section 4.7.1**, Livestock Grazing.

Past, present, and reasonably foreseeable actions within the cumulative impact analysis area that have affected and will continue to affect livestock grazing operations and livestock forage include mineral exploration and development of fluid minerals, locatable minerals, leasable minerals, and mineral materials. Additionally, ground disturbing development like residential and industrial construction (including renewable energy development), associated roads and ROWS, vegetation treatments, fire and fuels management, wild horse and burro management, recreation, travel management, and GRSG goals, objectives, and planning efforts are also likely to continue to affect livestock grazing.

Vegetation management, including fire and fuels management, is becoming more broadly consistent across federal landownerships. The cumulative effects of historical activities have directly or indirectly contributed impacts on livestock forage, such as increased shift of native plant community size, distribution, and risk of invasion or expansion of invasive species. As a response to these shifts in vegetation communities, the BLM has completed a PEIS that evaluates creating and maintaining a system of fuel breaks, as well as conducting fuels reduction and rangeland restoration activities in the Great Basin region. This landscape scale PEIS analyzes potential effects of reducing fuel loading and restoring rangeland productivity within Idaho, Oregon, Nevada, northern California, and Utah in order to protect and conserve the sagebrush-steppe ecosystem from loss or fragmentation as a result of wildfires. Similar vegetation management projects may be implemented by other federal and state land management agencies, as well as private landowners, including hazardous fuels reduction, pinyon-juniper removal, emergency stabilization and rehabilitation (ESR), and invasive species control, all of which could impact the availability of forage for livestock.

Comparison of Alternatives

Alternative 1 management actions are on the 2015 plan amendments. This includes restrictions on development, such as land use and surface-disturbing activities, that would occur within HMAs and would limit impacts to livestock grazing and forage. All states would include language to maintain and enhance sagebrush habitats with the intent of conserving GRSG populations. In summary, there would not be any significant changes to management that would cause an impact on livestock grazing operations beyond current conditions and management practices.

Under Alternative 2, there would be more areas open to oil and gas development and exploration and thus more potential for surface disturbance and removal of forage for livestock. Alternative 2 would remove GHMAs in Utah for wild horse and burro management, which would increase the potential for reductions in forage quality and quantity. Additionally, development could lead to exclusion of livestock from the development footprint, reducing the available area for livestock grazing.

Alternative 3 would make all PHMA unavailable to livestock grazing. The BLM may have to construct and maintain a large amount of fencing, particularly in areas with mixed surface ownership, to effectively make grazing unavailable. Exclusion of grazing on BLM-administered lands may intensity grazing use on private lands or cause operators to reduce the scale of their operations on private lands. This alternative would have the greatest cumulative adverse effects on livestock grazing than any of the other action alternatives.

Under Alternatives 4, 5, 6, and the Proposed RMP Amendment, mineral development would be allowed in HMA boundaries, which would increase potential impacts to forage in these areas as described in **Section 4.4.1**, Livestock Grazing. Impacts on forage conditions and livestock grazing operations from mineral development, renewable energy development, and ROW development will vary by location.

4.9 LANDS AND REALTY (INCLUDING WIND AND SOLAR)

4.9.1 Nature and Type of Effects

The effects on the lands and realty program are typically the result of management that excludes or avoids ROWs in certain areas, authorizes of leases or permits, or requires stipulations on land use activities.

Within a BLM ROW exclusion area, the authorization of new ROWs is not allowed under any conditions. A ROW avoidance area may be available for ROW location but may require special stipulations such as resource surveys and reports, construction and reclamation engineering, long-term monitoring, special design features, special siting requirements, Standards for Boundary Evidence risk assessment certificates, and timing limitations.

Management that restricts ROW development in a certain area will likely eventually increase the concentration of ROW development in adjacent areas where restrictions are not present. Increased ROW density can limit new siting options in non-restricted areas, decrease service reliability to rural areas, increase conflict among facilities, and intensify impacts on other resources and uses.

Co-locating infrastructure in existing ROWs, corridors, or disturbed areas reduces land use conflicts, limits disturbance to the smallest footprint, and limits impacts on GRSG and their habitats. Where restrictions are applied, habitat impacts would be mitigated where exceptions were allowed for co-location of new ROWs within existing ROWs. Co-location policies also clarify the preferred locations for utilities and potentially simplify processing on BLM-administered lands. Co-locating can also limit options for infrastructure development and could reduce network redundancy and potentially affect service reliability in some areas and add mileage and construction costs to the transmission line.

4.9.2 Proposed RMP Amendment

Under the Proposed RMP Amendment, lands in PHMA would be managed as ROW exclusion areas for utility-scale wind and solar. Major ROWs in PHMA would be managed as ROW avoidance, and minor ROWs in PHMA would be managed as avoidance as per direction in the 2015 GRSG plan amendment (with State-Specific Differences identified for Colorado, Idaho, Montana/Dakotas, Oregon, and Wyoming). Designated corridors would remain open to consideration of new major ROW development. Within areas of PHMA with limited exceptions, lands would be managed as exclusion without exception for utility scale wind and solar, and exclusion for major ROWs but designated corridors would remain open to consideration of new major ROW development. PHMA with limited exception would remain avoidance for minor ROWs. GHMA would be open for major and minor ROWs but with applicable state minimization measures from 2015 and 2019, and compensatory mitigation to maintain habitats supporting GRSG populations consistent with state agency designations (e.g., restoration, connectivity), and to preclude negative impacts to any adjacent PHMA. Impacts would be similar to those in the current plan (Alternative 1) and Alternative 2, but additional state-specific requirements outline in **Section 4.2**, Greater-Sage-Grouse, would provide additional protections for GRSG. GHMA would be open with applicable state mitigation requirements from 2015 and 2019 GRSG amendments. ROW exclusion and avoidance areas could result in less development of state and private lands where ROW infrastructure, such as a transmission line, would be needed across adjacent BLM-administered lands. The proposed RMP amendment would respect valid existing rights, despite new restrictions or exclusions described in this amendment.

4.9.3 Cumulative Effects

Cumulative impacts on lands and realty would be the result of past, present, and reasonably foreseeable actions that restrict ROW authorizations within the planning area. The spatial scale of the project for lands and realty is the planning area and the temporal scale is 20 years. Many of the states in the planning area are heavily dependent on extractive industries that require ROWs to operate and provide end users with products. These industries include oil and gas development, renewable energy generation, power transmission, and fiber optics. Any criteria that cause a change in ROW management action may have a direct effect on proposed projects in the planning area.

As populations continue to grow and shift geographically, there will be an increased demand for ROW authorizations that would occur under all of the alternatives. Each of the alternatives contains restrictions, stipulations, and limitations; when coupled with present and reasonably foreseeable actions longer planning and approval processes could result. This could lead to delays for future projects including transmission lines, mineral developments, and telecommunication sites that occupy HMAs across the planning area.

In addition to the direct impacts of ROW decisions, these actions can influence adjacent and nonfederal lands by extending habitat fragmentation beyond the immediate project area. This fragmentation, combined with other development pressures, can exacerbate cumulative impacts on GRSG populations by increasing human activity, reducing contiguous habitat, and promoting the spread of invasive species, which in turn degrades habitat and increases the frequency of wildfire events.

However, renewable energy projects, like wind and solar, offer significant benefits by reducing carbon emissions and mitigating climate change, which is a threat to GRSG through habitat impacts and disease spread (e.g., West Nile virus). While there are localized impacts to GRSG and their habitats, the long-term environmental benefits of renewable energy contribute to ecosystem resilience and GRSG conservation.

Comparison of Alternatives

Under Alternatives 1 and 2, project planning would be the most complex as a variety of land management actions, stipulations, and restrictions for ROWs are present. This could lead to increased project costs, longer timelines, or abandonment of proposed projects. Abandonment and delays of existing and planned projects could lead to increased costs and lower levels of service for consumers due to supply constraints and increased project costs. Alternative 3 would make all PHMA ROW exclusion, which may prevent development of adjacent private lands where a ROW would need to cross public lands. As such, it would have the greatest contribution to cumulative impacts on lands and realty authorizations. Alternatives 4 and 5 apply to entire planning area which could provide for a consistent project planning approach that is not dependent on individual state plan restrictions found in Alternatives 1, 2, and 3. This could streamline the planning process for projects, including those that span large areas and differing land ownership types by reducing state-by-state restrictions on ROWs. This may allow for a less time-consuming planning, permitting, and approval process. The Proposed RMP Amendment would result in similar cumulative impacts as those discussed under Alternatives 4 and 5 but with more stringent requirements for meeting the ROW avoidance exceptions. Additionally, the Proposed RMP Amendment would manage PHMA with limited exceptions, imposing even stricter protections by excluding major ROWs with exceptions and excluding utility-scale solar and wind projects without exceptions. These exclusions could prevent the development of adjacent private lands where a ROW would need to cross public lands.

A planning process to update the Solar Energy Development Programmatic EIS (BLM and USDE 2012) is currently underway to identify areas of BLM-administered lands available for, or excluded from, solar energy development. That planning process would defer to the allocation decision for solar energy decisions regarding GRSG to those in this Proposed RMP Amendment/Final EIS. Decisions made based on the ongoing Solar PEIS revision may change the availability of lands for solar energy development outside of GRSG habitat. However, given the ample lands available for solar energy development in each state, none of the management actions in the GRSG EIS alternatives would constrain the availability of lands estimated to be needed to meet the demand for solar energy development on public lands through 2045 (see **Appendix 12** for further discussion).

Additionally, each state in the planning area has developed conservation plans for state and private lands not under the jurisdiction of federal plans. Of these plans, only the Wyoming, Montana, and Oregon plans are regulatory in nature, with the state of Nevada also requiring mitigation.

4.10 Mineral Resources

4.10.1 Fluid Minerals (Including Geothermal)

Nature and Type of Effects

Closing areas within GRSG habitat to fluid mineral leasing would directly impact the fluid minerals program by prohibiting the development of those resources on federal mineral estate (see **Section 4.12**, Social and Economic Conditions (Including Environmental Justice)) for associated economic impacts. Fluid mineral operations might be limited in their choice of project locations and might develop in areas that are more challenging to access or result in less efficient development because more ideal areas could be closed to leasing. Operators may choose not to develop within the area at all. Under more restrictive alternatives, restrictions on BLM and federally administered lands might push development onto non-federal and private land and have indirect effects on GRSG and federal fluid minerals.

Management actions that prohibit or restrict surface occupancy or disturbance (such as TLs, NSO, CSU, and limitations on the density of surface disturbance) overlying federal fluid mineral resources would also directly impact the development of those resources by placing limitations on the siting, design, and operations of fluid mineral development projects. This might force operators to use more costly development methods than they otherwise might have used. The application of widespread TLs could result in equipment shortages and other development inefficiencies because of bottlenecks during the limited time period in which certain activities would be allowed. Restrictions on oil and gas leasing on federal lands and minerals could also result in impacts on adjacent nonfederal minerals, especially in areas where the BLM-administered lands are interspersed with non-federal lands. In these areas, BLM decisions that manage federal minerals as closed to oil and gas leasing, or manage BLM-administered lands as ROW avoidance or exclusion areas could result in a reduction in oil and gas activity on adjacent nonfederal minerals if it is no longer economical or feasible to develop minerals due to limitations on expanding operations into federal minerals, or if pipelines, roads, or transmission lines are needed on federal lands to access the nonfederal minerals.

In areas where NSO stipulations are applied, federal fluid minerals could be leased, but the leaseholder/operator would have to use offsite methods such as directional or horizontal drilling to access and develop the mineral resource. The reach of directional and horizontal drilling is limited, meaning some minerals may be inaccessible in areas where an NSO stipulation covers a large area, where no leasing is allowed on surrounding lands. Directional and horizontal drilling is not effective in developing certain types of fluid mineral accumulations, in geologic formations where directional or horizontal drilling is ineffective areas which have NSO stipulations are applied may not be able to be economically developed. Recent advancements in drilling technology have significantly reduced surface disturbance and fragmentation impacts associated with fluid mineral development in some areas. For example, in Wyoming, directional drilling has increased by a factor of 8 and horizontal drilling by a factor of 40 over the past decade (Applegate and Owens, 2014). Modern fields can now often be developed using a single pad per section with multiple directional or horizontal wells, minimizing the need for additional surface infrastructure. These improvements, including horizontal laterals that now extend two to three miles, have greatly reduced the overall footprint of development. Application of controlled surface use (CSU) stipulations allow some use and occupancy of the surface. CSU stipulation allows the BLM to require special operational constraints beyond those specified in 43 CFR Part 3101.1-2, or to require protective measures (restrictions on noise levels) to protect GRSG. A CSU stipulation can influence the location and level of operations within the subject area.

TL stipulations may be necessary to protect GRSG and their habitats from impacts of development. These stipulations are necessary if habitat impacts cannot be mitigated within the standard 60-day suspension of operation period afforded by regulation. Areas where TL stipulations are applied would be temporarily closed to fluid mineral exploration and development, surface-disturbing activities, and intensive human activity during identified time frames based on seasons or GRSG breeding times. While some operational activities, such as production and maintenance, would be allowed at all times, construction, drilling, completions, and other operations considered to be intensive in nature would not be allowed during the restricted time frame. Most activities can be initiated and completed outside of the dates specified in the TL stipulation.

Applying COAs, which include RDFs and conservation measures, to existing leases would directly impact fluid mineral operations. These RDFs and conservation measures would include standards such as noise restrictions, height limitations on structures, design requirements, water development standards, remote monitoring requirements, and reclamation standards. Application of these requirements through COAs could impact fluid mineral operations by increasing costs if it resulted in the application of additional requirements or use of more expensive technology than would otherwise have been used by operators. Impacts of these COAs would be mitigated where exceptions limit their application. This would occur where a COA was not applicable or where site-specific consideration merited slight variation. When considering exploration and development on areas leased for fluid mineral resources in PHMAs (and IHMA in ID), including geothermal, application of the RMP lease stipulations, minimization measures, and RDFs/BMPs as APD COAs will be considered through completion of the environmental record of review (43 CFR Part 3162.5 and 36 CFR Part 228.108), including appropriate documentation of compliance with NEPA.

Placing limits on geophysical exploration could reduce the availability of data on fluid mineral resources and could increase costs and risks of fluid mineral development if the limits required use of more expensive technology or did not allow detailed characterization of some areas. TLs on geophysical exploration would delay exploration and development activities and could cause equipment shortages because much of the exploration would need to occur during the same time period.

Requiring master development plans and unitization could cause direct impacts on fluid minerals through increased costs of fluid mineral extraction resulting from delays in the permit approval process until additional site-specific planning efforts are completed. Unitization typically has been initiated at the operator's discretion and can increase development efficiency.

Management actions creating ROW exclusion or avoidance areas could indirectly prevent or increase the cost of fluid mineral extraction by limiting the available means for transporting fluid minerals to processing facilities and markets. New natural gas pipelines could not be built in an ROW exclusion area. Habitat impacts would be mitigated where exceptions were allowed for collocation of new ROWs within existing ROWs. Identification of ROW avoidance areas, while not creating absolute barriers to use of the area for access roads or pipelines, or for locating surface facilities on federal lands for the purpose of accessing private minerals, could make permissible facilities infeasible for technical or economic reasons. Some other potential management actions or BMPs could also affect costs that would make a project infeasible, such as ROW collocating requirements applied to a new pipeline along an existing road that follows a long, indirect, or topographically difficult route. ROW exclusion and avoidance areas will limit natural gas line construction which would lead to more flaring of gas, which has resource waste and air quality implications. This would hamper the ability to get natural gas to domestic and export markets.

Proposed RMP Amendment

Rangewide Environmental Consequences

Under the Proposed RMP Amendment, impacts to fluid minerals would be similar to those described for Alternative 5 for fluid mineral objectives and allocations. In addition, management of PHMA with limited exceptions would be as NSO with no waivers, exceptions and modifications which would further limit the potential for fluid mineral development in these areas. Requiring coordination with project proponents to promote measurable conservation objectives could add constraints to fluid mineral development but would allow project proponents input. Overall, the Proposed RMP Amendment would have more restrictions on fluid mineral development compared to Alternative 1. GHMA would be open rangewide, but with the state variations as noted below.

State-Specific Environmental Consequences

Exceptions in PHMA vary in CO, WY, MT/DK, OR, and NV/CA. For areas already leased, WY allows for exceptions to NSO within 0.6 miles if the development will not impact GRSG habitats and GRSG behavior. MT would not allow exceptions within 0.6 miles of an active lek, and CO would extend the NSO to 1.0 mile protecting these breeding habitats. In ID, OR, and NV/CA the exceptions would apply to areas beyond 3.1 miles of active leks. These state variations would allow for some additional fluid mineral developments in certain instances and locations.

The oil and gas lease stipulations summarized in **Appendix 2** would be applied in MT/DK; these stipulations would add restrictions to oil and gas developments as described in in *Nature and Types of Effects*. Applying a 5% disturbance cap at the project scale in MT/DK and WY, and a 3% disturbance cap at the HAF fine scale area would limit fluid mineral developments in certain areas, although it could allow for more potential fluid mineral development rangewide. Compensatory mitigation must be in place when an exception is granted, as described under Alternative 4. To grant an activity based on compensatory mitigation in Colorado, the compensation project must be planned, funded, and approved in coordination with the State of Colorado which could include additional requirements. Impacts from the NSO in WY would be the same as described for Alternative 5, meaning similar protections would apply.

Impacts from consistency in stipulations in MT/DK HMAs and from closing the Upper Missouri River Breaks National Monument to fluid mineral leasing and development would be the same as those described for Alternative 3. This means that closing PHMA to fluid mineral leasing would eliminate the potential for fluid mineral developments more than under Alternative 1, though valid, existing leases may still be developed.

In GHMA OR would retain a NSO designation, and UT would be NSO near leks and apply seasonal limitations. MT/DK would apply a NSO within 0.6 miles of active leks and crucial winter GRSG ranges, and UMRBNM would be closed. WY would apply NSO within 0.25 miles of active leks (this would also apply in SHMA). CO and NV/CA would apply CSUs and seasonal limitations around leks. These state-specific variations would add constraints to fluid mineral developments when compared to Alternative 1 and are similar to those analyzed in Alternative 5.

Cumulative Effects

The cumulative impact analysis area used to analyze cumulative impacts on fluid mineral resources is the planning area, regardless of mineral ownership. The cumulative impact analysis area includes all lands and mineral estate within the range of GRSG including other federally managed lands, and adjacent state, Tribal, county, and privately owned lands. The time frame for cumulative environmental consequences for future actions is 20 years. Ongoing, planned and expected future actions in and near the cumulative impact analysis area would influence conditions surrounding fluid mineral development and the development of supporting infrastructure in the cumulative impacts analysis area. The closures, restrictions, and stipulations considered in the alternatives and discussed in the context of the decision area for analyzing direct and indirect impacts, are analyzed here in the context of the entire planning area to assess their contribution to cumulative impacts on fluid mineral resources.

Mineral leasing, exploration, and development are occurring and will continue to occur throughout the planning area. These include activities associated with fluid minerals (oil, gas, and geothermal), locatable minerals, leasable minerals, and mineral materials. Impacts associated with mineral exploration and development in GRSG habitat relate to surface and subsurface disturbance from exploration and development actions and infrastructure constructed to support these activities. The surface and subsurface disturbance from these activities contribute to habitat removal, alteration, and fragmentation, changes in GRSG use patterns, and the potential for invasive plant introduction.

Past, present, and reasonably foreseeable development trends for fluid minerals and locatable minerals in the planning area are included in the RFD updates for those resources, **Table 14-1** lists many projects, plans and actions that could or are likely to impact fluid mineral exploration, leasing, and development. Past, present, and reasonably foreseeable actions and conditions in the cumulative impact analysis area that have affected and will likely continue to affect fluid mineral leasing and development include, past, present, and continued mineral exploration, development, leasing, and management decisions on BLM-administered lands as well as on other federal, state, and Tribal lands.

State laws, regulations, and permitting for fluid mineral development activities intended to prevent or reduce environmental or public health impacts would likely confer incidental protection to GRSG and could reduce levels of fluid mineral development. Similarly, policy and land use plan decisions by the BLM, other federal agencies, and state agencies, that would apply closures, restrictions, or stipulations on fluid mineral leasing and development intended to protect other resources, could result in reductions in the availability of fluid minerals for development. The level of development of oil and gas resources is in large part dependent on global resource prices which can be impacted by a variety of factors such as the cost of development, changes in demand, geopolitical instability, new technology, and the availability of alternative energy sources including geothermal development. The cumulative impact analysis area for fluid minerals includes all lands within the range of GRSG including other federally managed lands, and adjacent state, Tribal, county, and privately owned lands, however due to the global nature of the oil and gas markets certain actions, projects or trends that are further removed can also contribute to cumulative impacts on oil and gas. Areas with a high potential rating, and areas with existing and historical developments are more likely to be the focus of future development interest. Past, present, and reasonably foreseeable actions and conditions within the cumulative impact analysis area that have affected and will likely continue to affect fluid minerals are existing and planned fluid mineral development projects outside the decision area, changes to BLM policy or requirements; changes to land use plan allocations; GRSG plans developed by individual states, especially state plans that have regulatory authority (Wyoming, Montana, Nevada, and Oregon); other multi-state plans and actions conducted by the BLM or other federal agencies, such as the westwide energy corridors plan, and the designations of special management areas such as wilderness areas or national monuments. Reductions in fluid mineral development in the planning area may occur because of restrictions applied by any of these plans or actions, or by plans and actions not known at this time. These reductions would not vary by alternative and would have cumulative impacts on fluid minerals similar to those of the management actions being considered in this Proposed RMP Amendment/Final EIS.

Comparison of Alternatives

Under all alternatives, the current trends for oil and gas development activities in the planning area are expected to continue, however the locations and intensity of development would likely experience changes in some areas due to the impacts of the alternatives. The management actions proposed under this Proposed RMPA/Final EIS would cumulatively impact fluid mineral development through surface use restrictions (e.g., closures, and NSO, CSU, and TL stipulations) that ultimately would decrease the amount of oil and gas development in the planning area during the planning period. Closures and surface use restrictions, such as NSO stipulations, could also cause an operator to move to nearby private, tribal, or state land if similar resources are available and recoverable with no such restrictions. However, many state plans or state fluid mineral regulations require actions to avoid, minimize, or mitigate impacts from land uses on GRSG, which would likely result in some restrictions on fluid mineral development within GRSG habitat. Surface use restrictions could also prevent or restrict the development of some infrastructure necessary for fluid mineral development. The application of disturbance caps or limitations proposed under this Proposed RMPA/Final EIS could cumulatively impact fluid mineral development through limitations on additional development in some areas.

Alternative 1 reflects the HMA boundaries from the 2015 amendments. Most states are NSO (in PHMA and IHMA) and/or have seasonal restrictions. PHMA is also subject to density and disturbance limits. Colorado closes PHMA within 1 mile of leks to fluid mineral leasing.

In Alternative 2, PHMA management would be the same as Alternative 1, except Colorado changed the area within 1 mile of an active lek from closed to NSO for both PHMA and GHMA. In GHMA, management would be the same as Alternative 1, except Colorado changed the closure areas to NSO.

Under Alternative 3, management would focus on maximum protection of GRSG. Alternative 3 would conserve and manage GRSG habitats to support persistent, healthy populations, consistent with the BLM's sensitive species policy and in coordination with state wildlife agencies. In areas with large, contiguous areas of BLM-administered lands, conservation and management should maintain existing connectivity between GRSG populations. This effect would be limited in areas with BLM-administered lands interspersed with lands managed by other agencies or individuals. With all of PHMA closed to new fluid mineral leasing, this alternative would be the most restrictive and limit development of fluid mineral resources more than other alternatives.

Cumulative impacts on fluid minerals would be greater under Alternative 4 compared with Alternatives 1 and 2 due to the acreage that would be managed as PHMA, but impacts would be less than Alternative 3. For those HMAs open to leasing under Alternative 4, the BLM would evaluate parcels identified in EOIs and determine which to analyze for potential inclusion in a lease sale. This evaluation process will follow the BLM's policies for lease sales. The amount of fluid mineral acreage available for leasing under this alternative is similar to Alternative 1. However, areas that would be leased under Alternative 4 would depend on received EOIs and evaluated based on fluid mineral and GRSG habitat criteria. Areas in proximity to existing production and areas where mitigation efforts could minimize habitat impacts will have higher priority review and therefore will be more likely to be leased and developed.

Alternative 5 would have similar cumulative impacts as Alternative 4, though impacts would be less due to less acreage being managed as PHMA under Alternative 5. Under Alternative 6, ACECs would be added to the proposed management. ACECs would be managed as open to leasing subject to NSO stipulations with an exception/modification to allow occupancy if there are drainage concerns from adjacent development and if it can be demonstrated that no direct or indirect impacts on GRSG or their habitats will occur. Compared to Alternative 5, Alternative 6 would apply NSO on additional acres, resulting in a decrease in fluid mineral leasing and development. Under the Proposed RMP Amendment, PHMA would be open to leasing subject to NSO with exceptions/modifications.

Cumulative impacts would be greater under the Proposed RMP Amendment compared to Alternatives 1, 2, 4, and 5 but less than Alternative 3 due to the management of PHMA with limited exceptions which would likely result in a decrease in fluid mineral development in these areas.

4.10.2 Nonenergy Solid Leasable Minerals

Nature and Type of Effects

Closing an area to nonenergy solid mineral leasing would directly impact nonenergy solid leasable minerals to the extent such minerals are known to exist by removing the possibility of any such mineral resources in that area from being accessed and extracted.

Management actions creating ROW exclusion or avoidance areas would directly and indirectly impact nonenergy solid leasable mineral extraction by limiting the available means for accessing mineral resources and transporting nonenergy solid leasable minerals to processing facilities and markets. For example, solution mining of trona requires essential infrastructure like wells, pipelines, and roads. While these can affect GRSG habitat, construction timing and methods are coordinated with state and federal agencies to minimize impacts. Nonenergy solid leasable mineral operations may be moved to private lands where access is easier, thereby resulting in a loss of federal royalty income if the federal minerals could not be accessed from the private lands, but also reducing the number of operations on federal mineral estate. However, while access from private lands may be possible in some cases, it is not always feasible or economical. In areas with mixed land ownership, such as the checkerboard pattern, developing resources often requires ROWs over federal land, making reliance on private access impractical. ROW avoidance areas could allow for limited ROW development, so impacts of avoidance areas would be less severe than those of ROW exclusion areas. Habitat impacts would be mitigated where exceptions were allowed for collocation of new ROWs within existing ROWs.

Application of RDFs, including such standards as noise restrictions, height limitations on structures, design requirements, water development standards, remote monitoring requirements, and reclamation standards, would place additional requirements on exploration and development.

Proposed RMP Amendment

Rangewide Environmental Consequences

Closure of PHMA but allowing for expansion of existing leases would reduce restrictions on nonenergy leasable mineral development in PHMA compared with Alternative 1. By not allowing expansion of existing leases in PHMA with limited exceptions, the Proposed RMP Amendment would limit nonenergy leasable mineral extraction and could increase costs for some operators who would have to find new sites to develop in order to expand operations.

State-Specific Environmental Consequences

In WY, expansion of existing operations would be permitted but subject to CSUs and TL to minimize disturbance to GRSG. In PHMA with limited exceptions, WY would be closed except in cases of human health and safety. In CO, PHMA would have TL for construction, drilling or completions within 4 miles from occupied leks from March 1 to July 15 to conserve breeding birds and habitats. GHMA (and SHMA in WY) would be open but state-specific minimization measures would be applied to conserve GRSG and their habitats. The addition of the state-specific minimization measures could further constrain nonenergy leasable mineral development in GHMA. NV/CA would allow project level considerations that demonstrate no impact to GRSG in PHMA, which may allow for additional development in certain instances. In ID IHMA would be open in Known Phosphate Leasing Areas (KPLAs) subject to RDFs and buffers, IHMA outside KPLAs, open subject to disturbance thresholds, RDFs and buffers.

Cumulative Effects

Past, present, and reasonably foreseeable actions and conditions within the cumulative impact analysis area that have affected and will likely continue to affect nonenergy leasable minerals are existing and planned nonenergy leasable development projects outside the decision area. Cumulative impacts on nonenergy leasable mineral development focuses on the impacts of conservation measures to protect GRSG. Management actions in the form of surface use restrictions such as closing areas to new leasing of nonenergy leasable minerals, prohibitions on surface mining, or creating ROW exclusion or avoidance areas, would impact nonenergy solid leasable mineral extraction by limiting the available means for accessing mineral resources and transporting nonenergy solid leasable minerals to processing facilities and markets. Additional management actions that would cause impacts on nonenergy leasable minerals are defined by results from application of RDFs, including such standards as noise restrictions, height limitations on structures, design requirements, water development standards, remote monitoring requirements, reclamation standards, and additional requirements on exploration and development. Closures and surface use restrictions could also cause an operator to move to nearby private, Tribal, or state land if similar resources are available with fewer such restrictions, however many states apply management actions to protect GRSG.

Comparison of Alternatives

Under Alternative 1 most of the PHMA and IHMA in the planning area is closed to new leasing of nonenergy leasable minerals but states can consider expansion of existing leases. Idaho keeps known phosphate leasing areas open to leasing, and Wyoming keeps the Known Sodium Leasing Area open to exploration and consideration for leasing and development but closes it to prospecting permits. In some Wyoming field offices sodium leasing will be considered on a case-by-case basis and would be subject to conditional requirements. Wyoming and Montana have restrictions based on density and disturbance limits. Applying lek buffer distances when approving actions could also restrict development of infrastructure related to nonenergy solid leasable mineral development, as could application of RDFs. There is no specific allocation for GHMA but most states have minimization measures.

Under Alternative 2, PHMA all states would apply the same management and expect the same resulting impacts on nonenergy leasable minerals as described under Alternative 1. The only change is that Nevada would add exception criteria to the closure in PHMA, described under the Nevada Environmental Consequences section. Individual states would have different mitigation measures that could influence the cumulative impacts under Alternative 2 but impacts on nonenergy leasable minerals would be similar to Alternative 1.

Under Alternative 3, more acres would be affected by closures, all PHMA would be closed to leasing, and fringe leases to expand existing mines would not be permitted in areas managed as closed. This would increase the level of cumulative impacts on nonenergy leasable minerals by reducing the amount of the planning area available for leasing and development of these resources, thus preventing development of known reserves and undiscovered deposits in PHMA which would reduce the availability of important minerals such as phosphate and sodium for use.

Under Alternative 4 nonenergy leasable minerals would be managed the same as under Alternative 1, all states are closed to leasing nonenergy leasable minerals in PHMA but can consider expansion of existing leases. Wyoming has seasonal restrictions, and Wyoming and Montana are subject to density and disturbance limits. IHMA (Idaho) is open in known phosphate lease areas, and Wyoming keeps the Known Sodium Leasing Area open to exploration and consideration for leasing and development but closes it to prospecting permits. In some Wyoming field offices sodium leasing will be considered on a case-by-case basis and would be subject to conditional requirements. The impacts would be the same as described under Alternative 1, above.

Alternative 5 and the Proposed RMP Amendment would have the management and same impacts as Alternative 4. However, under the Proposed RMP Amendment PMHA with limited exceptions would be closed to new leases including fringe acreage leasing, this would prevent expansion of existing operations in these areas which could reduce the availability of some nonenergy leasable minerals. Alternative 6 would have the same as Alternative 5 except the ACECs would be closed to new leasing and to fringe leasing expansion associated with existing operations. Impacts would be the same as described under Alternative 1 except that any existing operations within ACECs could not expand on federal mineral estate and no new operations would be possible in ACECs, which could reduce the availability of some nonenergy leasable minerals.

4.10.3 Coal

Nature and Type of Effects

Closing an area to new coal leasing would directly impact coal production. This would be the result of removing the possibility of coal resources in that area from being accessed and extracted. In some cases, mining operations may move to nearby private lands, thereby reducing the number of operations on federal mineral estate. Indirect impacts include loss of coal production for public use and for generating sales and tax revenues and federal royalties from production, as well as higher cost of location of surface facilities and adverse financial impact on lessee to accessing a portion of mineral estate from nearby private land.

Reduced access to existing coal leases such as NSO or equivalent on all or parts of new leases, ROW exclusions on lands needed for road and utility access, and restrictions on amount or location of surface disturbing activities on new or existing leases would impact coal production. Indirect impacts include reduced coal production for public use and for generating lease sales and tax revenues and federal royalties from production. In areas with reduced access, applying NSO stipulations would restrict the ability of coal resources to be developed or extracted. To avoid these restrictions, operators may relocate, which would reduce coal development on federal mineral estate and resulting royalties.

Management actions creating ROW exclusion or avoidance areas could indirectly impact coal extraction by limiting the available means for accessing coal resources and transporting coal to processing facilities and markets. Coal operations may be moved to nearby state or Tribal lands where access is easier, thereby reducing the number of operations on federal mineral estate. ROW avoidance areas could allow for limited ROW development, so impacts of avoidance areas would be less severe than those of ROW exclusion areas. Habitat impacts would be mitigated where exceptions were allowed for collocation of new ROWs within existing ROWs. Habitat impacts would be mitigated where the area needed for coal processing and transportation infrastructure is included in the lease boundary. Indirect impacts include reduced coal production for public use and for generating lease sales and tax revenues and federal royalties from production.

The checkerboard land pattern, where alternating sections of land are privately and federally owned, poses potential challenges for large-scale mining operations, which rely on accessing both private and federal lands. Restrictions like ROW exclusions or NSO stipulations can indirectly impact these operations, leading to economic impacts, including reduced federal royalties, which can also affect state income.

Measures such as seasonal closures, burial requirements for electric distribution lines, noise abatement, visual screening, and specialized fencing would reduce development in otherwise permissible areas (fewer leases, fewer or smaller expansions of existing mines), particular for marginal coal resource areas or during periods of low market prices for coal. Indirect impacts include reduced production of coal for public use and for generating lease sale and tax revenues and federal royalties from production as well as adverse financial impact on lessee (especially for restrictions on existing leases).

Proposed RMP Amendment

Rangewide Environmental Consequences

Impacts under the Proposed RMP Amendment would be the same as under Alternative 4. That is, under the Proposed RMP Amendment, the consideration of PHMA as essential habitat for unsuitability evaluation in Colorado, Montana/Dakotas, Utah, and Wyoming states that PHMA would be removed, as some areas of PHMA do not meet essential habitat criteria. Almost all essential habitat is likely to overlap with PHMA so the impacts would be approximately the same as described under Alternative 1. Coordination with the appropriate State agency and the determination of essential habitat for maintaining GRSG as per the suitability criteria at 43 CFR Part 3461.5(o)(1) will consider site-specific information associated with lease nomination areas as part of the unsuitability process. The Proposed RMP Amendment will not modify any existing suitability and unsuitable determinations. The management under the Proposed RMP Amendment would apply rangewide, but the planning area in Idaho, Nevada, California, and Oregon does not have coal mineral in deposits with a reasonably foreseeable possibility of development so no impacts on coal would occur in these states.

Cumulative Effects

Past, present, and reasonably foreseeable actions and conditions within the cumulative impact analysis area that have affected and will likely continue to affect coal are existing and planned coal development projects outside the decision area and federal coal policy decisions.

Closing an area to new coal leasing would directly impact coal production. This would be the result of removing the possibility of coal resources in that area from being accessed and extracted.

Comparison of Alternatives

Under Alternative 1, Colorado, Montana, North Dakota, South Dakota, Utah, and Wyoming manage PHMA as "essential habitat" for unsuitability evaluation. This would contribute to cumulative impacts on coal resources by preventing the development of federal coal resources in PHMA outside of existing leases.

Under Alternative 2 all states would apply the same management as under Alternative 1, except Utah where determination of essential habitat for maintaining GRSG for purposes of the suitability criteria set forth at 43 CFR 3461.5(o)(1) would be done in coordination with the State. Management and impacts on coal resources would be approximately the same as described under Alternative 1. Idaho, Nevada, California, and Oregon did not address coal due to absence of coal mineral in deposits with a reasonably foreseeable possibility of development, and no change in cumulative impacts is expected in these states.

Under Alternative 3, all areas managed for GRSG would be PHMA. All essential habitat would be identified as part of future unsuitability criteria. Compared to Alternative 1 where all PHMA would be considered as "essential habitat" for unsuitability evaluation, this change in management might give flexibility to consider leasing in small areas that were included in PHMA but do not meet the criteria for essential habitat, such as important connectivity areas. Impacts of this management change would likely be minimal because the amount of PHMA that does not meet essential habitat criteria is small. Impacts of this alternative would otherwise be the same as described under Alternative 1.

Under Alternative 4 the consideration of PHMA as essential habitat for unsuitability evaluation in Colorado, Montana, North Dakota, South Dakota, Utah, and Wyoming would be removed as some areas of PHMA may not meet essential habitat criteria. However almost all essential habitat is likely to overlap with PHMA so the impacts would be approximately the same as described under Alternative 1.

The proposed management and cumulative impacts under Alternatives 5, 6, and the Proposed RMP Amendment would be the same as under Alternative 4.

4.10.4 Locatable Minerals

Nature and Type of Effects

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. 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 FLPMA. 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 lands are withdrawn by the Secretary, the only locatable mineral resources that may be developed on withdrawn lands during the term of the withdrawal are those associated with mining claims that the BLM has determined to be valid; consequently, production of locatable mineral resources on federal mineral estate may decrease during the term of the withdrawal if such resources are situated on lands where there are no valid mining claims. If minerals of interest are not known to occur on the lands within the withdrawal, then the withdrawal would not have an effect, even where there are no mining claims.

Even where there are valid claims existing as of the effective date of the withdrawal or preceding segregation, production of locatable mineral resources may also be reduced by a withdrawal due to the additional administrative and financial requirements associated with exploration and mining on withdrawn lands. This BLM verification process can take several years in some cases. Operators are also required by regulation to pay the cost for the BLM's verification of mining claim validity. The additional regulatory process and cost could delay or curtail mineral exploration and development on withdrawn lands during the term of the withdrawal, assuming minerals of interest occur within the withdrawn lands. Alternative 3 also includes ACECs as a conservation measure. Designating areas as ACECs in an RMP could impact production of locatable mineral resources because such designations would impose additional administrative and financial requirements certain exploration operators. Operators are required to file a plan of operations for any surface disturbing activities greater than casual use in those areas, regardless of the acreage involved, in accordance with 43 CFR Part 3809.11(c)(3). The requirement for plans of operations within ACECs may result in longer timeframes and additional costs to developers for those exploration operations occurring on fewer than five acres that would otherwise have been allowed under a notice.

Under all alternatives, the BLM would request that locatable mineral operations apply design features to locatable minerals operations to benefit GRSG. These measures could be voluntarily implemented by the operator and would become enforceable if incorporated in the plan of operations approval. To the extent a design feature or best management practice to benefit GRSG is required to comply with applicable state or federal law or is otherwise required to prevent unnecessary or undue degradation as defined in 43 CFR Part 3809, the BLM may require the operator to incorporate the design feature or best management practice in its plan of operations.

Where disturbance caps are applied, surface disturbance from locatable operations would be counted towards the disturbance cap, but the BLM may not prevent, unduly restrict, operations in areas where the disturbance cap was exceeded.

Proposed RMP Amendment

Rangewide Environmental Consequences

Under the Proposed RMP Amendment, no areas would be recommended for withdrawal. All public domain lands would be open unless currently withdrawn. This would result in no effects on locatable minerals.

Cumulative Effects

Past, present, and reasonably foreseeable actions and conditions within the cumulative impact analysis area that have affected and will likely continue to affect locatable minerals are existing and planned locatable mineral operations and withdrawal decisions, both of which occur outside of the RMP process. The Secretary proposes and makes withdrawals not through BLM land use planning but according to a separate process pursuant to section 204 of FLPMA. In areas withdrawn from location and entry under the Mining Law, production of mineral resources is generally lower compared with similarly mineralized areas that are not withdrawn; thus a withdrawal potentially decreases production of locatable mineral resources on federal mineral estate. Locatable mineral resources are associated with the geological formations or units they are found within, which are typically localized and do not encompass large areas. Withdrawals may impact the availability of certain mineral resources over a large area, or they may, not impact any minerals of interest. An assessment of locatable mineral occurrence potential is important to provide context associated with the impacts of any particular withdrawal.

BLM authorization of locatable mineral resources within areas withdrawn from location and entry under the Mining Law is also subject to additional processing and cost considerations as compared to mining operations on lands that are not withdrawn. The BLM will not approve a plan of operations or allow notice-level operations to proceed on withdrawn lands until a mineral validity examination report has been completed that confirms that every mining claim on which operations are proposed was existing and valid at the date of withdrawal and remains valid. If the BLM determines that some or all of the mining claims on which operations are proposed are invalid, it will disapprove the proposed operations, and the mineral resources would not be developed. Mineral validity examination reports can take several years to complete and can cost hundreds of thousands of dollars. Withdrawals and other actions that increase the costs of locatable mineral development would cumulatively impact locatable mineral development as these actions ultimately could decrease the amount of locatable mineral resources produced in the planning area during the planning period.

Comparison of Alternatives

Alternative 1 recommended the withdrawal of all SFAs, from location and entry under the United States mining laws. This recommendation already occurred in the 2015 Plans and had no impact.

No recommendations for the withdrawal of SFAs from location and entry under the United States mining laws are made under Alternative 2, except in Montana which did not remove the recommendation for withdrawal of SFAs language as described in Alternative 1.

Under Alternative 3, the PHMA would be recommended for withdrawal from location and entry under the United States mining laws. Recommending areas for withdrawal from location and entry under the U.S. mining laws does not restrict any activities and therefore, such recommendation does not have any impacts. A withdrawal is initiated and considered not through land use planning but through a separate process outlined in section 204 of FLPMA. Only the Secretary may withdraw lands through a Public Land Order. If the Secretary were to withdraw the lands as recommended in Alternative 3, there would be limited opportunities for locatable mineral development in the decision area. Alternative 3 would designate parts of the planning area as ACECs. Pursuant to 43 CFR Part 3809.11(c)(3), in ACECs operators must file a plan of operations for all operations causing surface disturbance greater than casual use. Processing plans of operations is more time-consuming than processing an exploration notice. Additionally, designation of an ACEC would increase costs to those operators who would otherwise conduct exploration under a notice, and potentially reduce development of locatable mineral resources on BLM-administered mineral estate in the planning area that would have resulted from exploration that could have been done under a notice. The requirement for a plan of operations for all locatable mineral activities causing surface disturbance greater than casual use would likely result in less impact on locatable minerals than a withdrawal.

Alternatives 4, 5, and the Proposed RMP Amendment would not recommend any areas for withdrawal from locatable mineral entry. This alternative would not contribute to cumulative impacts on locatable minerals because recommendations for withdrawal have no impact.

Alternative 6 would designate parts of the planning area as ACECs. Pursuant to 43 CFR Part 3809.11(c)(3), in ACECs operators must file a plan of operations for all operations causing surface disturbance greater than casual use. Processing plans of operations is more time-consuming than processing an exploration notice. Additionally, designation of an ACEC would increase costs to those operators who would otherwise conduct exploration under a notice, and potentially reduce development of locatable mineral resources on BLM-administered mineral estate in the planning area that would have resulted from exploration that could have been done under a notice. The requirement for a plan of operations for all locatable mineral activities causing surface disturbance greater than casual use would likely result in less impact on locatable minerals than a withdrawal.

4.10.5 Mineral Materials

Nature and Type of Effects

The predominant mining method for mineral materials is surface mining; therefore, any restrictions on surface-disturbing activities effectively close the subject areas to mineral material mining unless an exception is provided. Demand for mineral materials is generated primarily from road maintenance needs, as well as commercial projects and public use. Closing areas to mineral material disposal would directly impact mineral materials by removing the possibility of mineral resources in that area from being accessed and extracted for use. In areas closed to mineral material disposal users would have to transport materials needed for road maintenance and other uses from farther away resulting in increased costs associated with transportation of the material and make projects more expensive to pursue in some areas which would cause cancelled projects and poorer road conditions in some areas. Where areas are closed to mineral material disposal, new pits could be relocated to nearby areas open to disposal if feasible. If demand for mineral materials could not be met by pits operated on federal lands, pits could be moved onto private or state lands where resources exist, this would generally increase costs associated with road construction and maintenance and other uses conducted by state, county and local governments which are able to develop federal mineral materials free of charge under free use permits. Closing an area to mineral material sales but not to new free use permits would remove this impact of increased costs from road maintenance and other mineral material uses by state, county, and local governments and non-profit organizations which are eligible for free use permits, but would still result in impacts on commercial and private users. Another effect is the potential for mineral materials mining to shift from the BLM to state or private lands. In that case, the impacts of mining could be shifted to areas where such impacts would be a nuisance to farmers and residential areas. Management which proposes closing existing mineral materials pits would exacerbate these impacts by causing more immediate relocation of sources and reductions in mineral materials production. In areas where closed but with an exception for expansion of existing pits impacts on both private users and state, county and local governments would likely be reduced in the short term as these users could continue using existing sources, but if resources at and around existing locations are exhausted as is likely at some locations in the longer term unless resources at and around the site are exhausted.

Applying TLs and seasonal travel restrictions could delay extraction of mineral material resources. County road districts and other users would be required to schedule their projects around the TL, which could result in the need to stockpile materials off-site and handle materials twice, thereby increasing costs.

Management prohibiting or restricting the construction of new roads and limiting reroutes and upgrades could make accessing mineral material deposits more costly or infeasible.

Managing areas as ROW avoidance or exclusion would decrease new construction of infrastructure and thereby decrease demand for mineral materials in those areas. This could result in a decrease in the amount of material extracted, and the number or size of mineral material pits on federal mineral estate. New mineral material pits may not be able to be developed in areas managed as ROW avoidance or exclusion because new infrastructure to these pits could not be constructed in exclusion areas and would be difficult to construct in avoidance areas. In many cases access to a mineral material development is included as part of the permitted operational area and as a result would not need a separate ROW permit. In most cases areas managed as ROW exclusion would also be managed as closed to mineral material development.

In ROW avoidance areas the BLM may manage and maintain existing routes. Some route improvements could be made for fuel breaks and to allow for quicker wildfire suppression response in GRSG habitat. In these situations, there will be a demand material for road maintenance and improvement (via Free Use Permit to the BLM) from pits in GRSG HMAs.

Closing areas to fluid mineral leasing would preclude oil and gas development in those areas which would reduce demand for mineral materials for use constructing well pads and roads. Application of NSO stipulations could have the same effect if the stipulations prevented oil and gas development.

Proposed RMP Amendment

Rangewide Environmental Consequences

Under the Proposed RMP Amendment, PHMA would be closed, but open for new free use permits and open for the expansion of existing pits, management in PHMA with limited exceptions would add restrictions on where new free use permits and expansions of existing pits could be developed, increasing the potential for reduced development or increased costs associated with developing mineral materials in these areas.

State-Specific Environmental Consequences

In PHMA and PHMA with limited exception, OR and WY would be open for new free use permits if the BLM can verify the area proposed for development is not habitat and would not adversely impact any adjoining GRSG habitat. This may allow for some additional saleable mineral development in certain instances. IHMA in ID would be open as would SHMA in WY. The impacts would be similar to Alternative 5.

In ID PHMA, the exception for new saleable mineral free use permits or expansion of existing permits would be less restrictive than Alternative 5, which may allow for additional saleable mineral development. Lek buffers would be reduced in IHMA and further reduced in GHMA, resulting in similar effects to those described for Minerals Management under Alternative 1.

In MT/DK PHMA and PHMA with limited exceptions would be closed to new large-scale mineral material sales but open to small-scale sales actions (less than 20 cubic yards), free use permits, and expansion of existing pits, subject to certain criteria. The allowance for small scale sales under this alternative would allow for slightly more development than under Alternative 5 but due to the limitation the on size of these sales the impacts would be effectively the same as under Alternative 5.

Cumulative Effects

Past, present, and reasonably foreseeable actions and conditions within the cumulative impact analysis area that have affected and will likely continue to affect mineral materials are existing and planned mineral material development projects outside the decision area. The predominant mining method for mineral materials is surface mining; therefore, restrictions on surface-disturbing activities would effectively close or limit mineral material mining in the subject areas unless an exception is provided. Demand for mineral materials is generated primarily from road maintenance needs, commercial projects, and public use. Closing areas to mineral material disposal would directly impact mineral materials by removing the possibility of mineral resources in that area from being accessed and extracted for use under new contracts. Where areas are closed to mineral material disposal, new mines could relocate to nearby areas open to disposal if feasible. If demand for mineral materials could not be met by pits operated on federal lands, pits could be moved onto private, state, or Tribal lands where resources exist, this would generally increase costs associated with road construction and maintenance conducted by state, county and local governments which are able to develop federal mineral materials free of charge under free use permits. Closing an area to mineral material sales but not to new free use permits would remove this impact on road maintenance and other uses by state, county, and local governments, but would still result in impacts on commercial and private users.

Comparison of Alternatives

Under Alternative 1, mineral material development would be restricted in PHMA and IHMA (variable by state). Mineral material disposal from the 47 existing community pits in GRSG habitat would be subject to timing restrictions. These timing restrictions could impact some operations by preventing use of the pit at certain times of the year which would result in additional costs due to transporting materials from further away or stockpiling material in advance, and therefore reduce overall development of federal mineral materials in the planning area.

Under Alternative 2 proposed management and impacts would be similar to those described under Alternative 1, except in Idaho which would manage PHMA and IHMA as closed to new mineral material sales, but open for new free use permits and expansion of existing pits, and Nevada which would allow certain exceptions to the closures. Compared to Alternative 1 these changes would allow more material use which would reduce the contribution to cumulative impacts on mineral materials.

Under Alternative 3, all areas managed for GRSG would be PHMA and mineral minerals would be closed to disposal in all PHMA. This would result in the termination and closure of all existing BLM mineral material sales, free use permits and community pits; and prevent the development and use of mineral material resources across the entire decision area. Compared to Alternative 1 this would result in a greater contribution to cumulative impacts on mineral materials in the cumulative impacts area.

Under Alternative 4, proposed management and impacts on mineral material development would be the same as described under Alternative 1, except in Idaho which would implement the same management as other states and manage PHMA and IHMA as closed to new mineral material sales, but open for new free use permits and expansion of existing pits. Compared to Alternative 1 these changes would allow more material use which would reduce the contribution to cumulative impacts on mineral materials.

Under Alternative 5, proposed management and cumulative impacts on mineral material development would be the same as described under Alternative 4. Under Alternative 6, proposed management and impacts on mineral material development would be the same as described under Alternative 4, except that ACECs would also be considered under this alternative. Under Alternative 6, ACECs would be closed to new all new mineral material sales and operations, except for free-use permits issued in order to support maintenance needs for existing local roads to ensure public safety.

Under the Proposed RMP Amendment proposed management and cumulative impacts on mineral material development would be the same as described under Alternative 4, except that within PHMA with limited exceptions the Proposed RMP Amendment would add additional criteria including a maximum size to the approval of new free use permits and expansions of existing pits. This could reduce the availability of mineral materials in and around these areas.

4.10.6 Oil Shale and Tar Sands

Nature and Type of Effects

Certain management actions and allocation-based decisions could impact the feasibility, amount, and type of development associated with oil shale and tar sands. Depending on the alternative selected, areas within some GRSG habitat management areas would be subject to surface disturbance thresholds, timing restrictions, and other GRSG protection measures. Managing public lands as ROW exclusion or avoidance areas could impact road and facility construction to access and develop those leases.

Proposed RMP Amendment

Rangewide Environmental Consequences

Colorado, Idaho, Utah, and Wyoming contain significant oil shale resources overlapping the planning area. Colorado, Idaho, and Wyoming manage these resources as fluid leasable minerals so management and impacts would be same as described under the Fluid Minerals section above.

Under the Proposed RMP Amendment, proposed management and impacts on oil shale and tar sands development would be the same as described under Alternative 1. Specifically, Colorado, Idaho, Utah, and Wyoming contain significant oil shale resources overlapping the planning area. Colorado, Idaho, and Wyoming manage these resources the same as fluid leasable minerals so management and impacts would be the same as described under Fluid Minerals for Alternative 1. The Proposed RMP Amendment impacts in

Utah are described below. Tar sands resources overlapping the planning area only exist in Utah; management and impacts on tar sands in Utah are described below.

In Utah, the BLM anticipates differing effects for oil shale and tar sands from these other states. The Proposed RMP Amendment does not change existing leasing allocation decisions for oil shale and tar sands in Utah because the ROD for the Allocation of Oil Shale and Tar Sands Resources on BLM-administered lands in Colorado, Utah, and Wyoming closed all mapped occupied GRSG habitat on BLM-administered lands to oil shale and tar sands leasing and development with the exceptions of the pending lease application in the Asphalt Ridge Special Tar Sands Area and the White River Oil Shale Research, Development, and Demonstration site and Preference Lease Right Area (BLM 2013c). Within these two areas, leasing and development would be allowed to occur. Depending on the alternative selected, GRSG habitat that overlaps the above-mentioned areas may be subject to the changes in surface disturbance thresholds, and mitigation requirements. Additionally, managing surrounding lands as ROW exclusion or avoidance areas could impact road and facility construction to access and develop those leases.

Under the Proposed RMP Amendment, no disturbance cap would be applied to anthropogenic disturbance in GHMA. The existing and pending leases would be in GHMA under the Proposed RMP Amendment, so oil shale and tar sands development could continue to occur subject to stipulations and other restrictions applied in the Vernal RMP (White River Oil Shale Preference Right Lease Area) and site-specific NEPA analyses. In GHMA, oil shale and tar sands development, as well as associated ROWs, would be subject to lek buffers and mitigation requirements, which could impact oil shale and tar sands and ROW development by restricting new surface development or requiring habitat compensation efforts.

Cumulative Effects

Analysis of the cumulative impacts on oil shale and tar sands focuses on the impacts of conservation measures to protect GRSG. These impacts could result from closure of an area to oil shale and tar sand development. In Utah, the ROD for the Oil Shale and Tar Sands Programmatic EIS (BLM 2013c) closed all of the federal mineral estate in mapped occupied GRSG habitat in Utah to oil shale and tar sands leasing except for the portion of the White River Oil Shale Research, Development, and Demonstration Preference Right Leasing Area overlapping habitat and the tar sands lease in the Asphalt Ridge Special Tar Sands Area. Management placing limitations on surface disturbing activities including the application of a disturbance cap would limit surface activities in these areas which could result in a reduction of production from oil shale and tar sands in these areas, contributing to cumulative impacts on these resources.

Under all alternatives, oil shale and tar sands development could continue to occur on federal mineral estate in Utah outside of HMAs in areas designated as open by the Oil Shale and Tar Sands Programmatic EIS. Oil shale and tar sands development could also continue to occur on state, private, and Tribal mineral estate.

4.11 ACECs and Research Natural Areas

4.11.1 Greater Sage-Grouse ACECs

General Description

ACEC designations highlight areas where special management attention is needed to protect important historical, cultural, and scenic values, or fish and wildlife or other natural resources. For the detailed analysis of effects of the alternatives and the Proposed RMP Amendment on the ACECs identified for designation under Alternatives 3 and 6, refer to **Appendix 5**, Evaluation of Areas of Critical Environmental Concern for Greater Sage-Grouse Habitat. Nature and Type of Effects

Management actions that protect resources (such as surface-disturbance restrictions and management for desired habitats) would help maintain and improve the relevant and important values within ACECs. Management actions that create the potential for resource degradation could impact the relevant and important values for which an ACEC is designated.

Improperly managed livestock grazing could impact ACEC values, depending on what the values are for each ACEC, by increasing the potential for soil erosion, increasing annual grasses, reducing perennial native vegetation, and affecting the plant communities that are the values for which the ACEC was designated. Wild horses and burros, have the capability of overutilizing vegetation, causing degradation of soil and vegetative resources as described for livestock grazing. Closing ACECs to livestock grazing could help protect relevant and important values by eliminating soil and vegetation disturbance associated with livestock grazing. However, properly managed grazing can be compatible with GRSG. Additionally, closing ACECs to all grazing may also increase the risk for wildfire due to increased fuel loads. As described in **Appendix 21**, livestock grazing is managed to meet or make progress toward land health standards, thus reducing the likelihood of adverse effects.

Energy and mineral development could impact ACEC values by increasing soil erosion potential and by removing or disrupting unique vegetation. Where GRSG habitat exists, energy and mineral development could degrade and fragment habitat. Construction, operation, and maintenance could disturb GRSG populations. The protections and limitations needed to maintain the relevant and important values of each ACEC are included in the plans that manage those ACECs. Additionally, closing ACECs to fluid mineral leasing or applying NSO stipulations would help protect relevant and important values in unleased areas.

Identifying ACECs as ROW exclusion or avoidance areas would protect relevant and important values by reducing or eliminating impacts from development requiring a ROW permit. Such developments include utilities, access roads, and renewable energy projects. Impacts from ROW development on GRSG habitat include compaction, erosion, and potentially habitat fragmentation.

HMA allocations provide a comprehensive management framework, covering a diverse array of management actions and restrictions in Alternatives 1-6 and the Proposed RMP Amendment, effectively capturing GRSG habitat and all of ACEC proposed for protection in Alternatives 3 and 6. ACEC designation adds a layer of specificity, enabling a more targeted approach to address unique relevant and important values that might not be fully covered by broader allocations. ACEC designation emphasizes and prioritizes specific concerns within designated areas, offering a mechanism to address nuances that may not be sufficiently addressed by an overarching HMA framework. Refer to **Appendix 5** for a detailed analysis of effects of the alternatives and the Proposed RMP Amendment on the ACECs identified for designation under Alternatives 3 and 6.

4.11.2 Research Natural Areas (Oregon Only)

Refer to **Appendix 17**, Proposed RMP Amendment and Analysis for key Research Natural Areas in Oregon for the analysis of effects of the alternatives on the key Research Natural Areas (RNAs) addressed in Oregon by this RMP Amendment.

4.11.3 Nature and Type of Effects

Any alternative closing all or portions of RNAs to livestock grazing could provide ungrazed comparison areas for research. In these areas, as well as the RNAs with properly management grazing, natural processes (such as plant growth and recovery, freeze-thaw periods, and microbial activity in the soil surface that results in recovery from these habitat impacts and maintains site stability and health) will predominate (BLM 2020c, p. 4-40) and all RNAs remain available for nonmanipulative research and data gathering on relatively unaltered plant communities. Additionally, RNAs could provide opportunities for understanding how ecosystems respond to climate change.

The consequences of excluding livestock grazing from all or portions of RNAs may result in other habitat impacts such as an escalation in fine fuels, potentially heightening susceptibility to wildfires, which in turn could pose a threat to relevant and important values.

Management to protect GRSG under the various alternatives would likely provide additional protections for existing ACECs and, at a minimum, would provide complementary management. This would be particularly true in ACECs where GRSG conservation was identified as a value.

For the detailed analysis of key RNAs, refer to **Appendix 17**, Proposed RMP Amendment and Analysis for Key Research Natural Areas in Oregon. This appendix provides excerpts and background information from the 2015 (and 2019) BLM Oregon GRSG EIS and plan amendment efforts, as well as newer information about the BLM Oregon key RNAs relevant to this current planning and analysis process.

4.12 Social and Economic Conditions (Including Environmental Justice)

4.12.1 Nature and Type of Effects

There are different types of social and economic impacts that could occur from BLM decisions outlined under the alternatives. Impacts could be associated with market conditions or nonmarket and social conditions. Effects on social and economic conditions and environmental justice populations could be temporary or long term. Communities and groups could be directly impacted or indirectly impacted. Lastly, impacts on economic contributions, social conditions, and environmental justice populations could vary across different geographical regions. These differences in types of social, economic, and environmental justice impacts are discussed in the following subsections with how they relate to potential changes from BLM decisions that change each resource.

Fluid Minerals (Oil and Gas) Management

BLM decisions regarding changes in restrictions and stipulations on fluid mineral leasing for the protection of GRSG could affect local economies and social conditions within communities throughout the planning area by inhibiting new oil and gas development or by making it more difficult to sustain current levels of fluid mineral activity in the future (See **Section 4.10.1**, Fluid Minerals).

Some market impacts from changes in oil and gas operations include changes in jobs, income, economic output, and tax revenue that result from drilling and completion expenditures as well as oil and gas production revenue. Direct market impacts are the changes in economic contributions that occur to the oil and gas industry, such as displaced fluid mineral jobs. Secondary market impacts include changes in jobs, income, and economic output that occur in industries other than fluid mineral industries, such as job reductions in manufacturing industries that supply the equipment needed for mineral extractions or economic output reductions in the retail sector due to reduced personal expenditures of mineral employees. Changes in oil and gas activity also can impact revenue streams to federal, state, and local government through reduced revenues from royalties, rents, bonus bids, severance taxes, ad valorum taxes, other local and state taxes and fees, and sales and use taxes.

Another secondary market impact could stem from changes in the provision of public services and infrastructure as a result of changes in spending by the government sector. Declines in production will reduce revenue streams to state and local governments and likely lead to budget shortfalls, which will create challenges to provide existing levels, quality, or quantity of public services as well as maintaining existing infrastructure. These public services and infrastructure that are funded by mineral revenue, such as education, road maintenance, parks and recreation, policy and fire management, as well as social services, provide lots of value to local communities because they help support and ensure safeguards are in place for those who might not have the resources themselves. These public services are especially important to small rural communities that have limited alternatives for these services.

Closely interconnected with the impacts on market and economic activity are impacts on nonmarket and social conditions.[1] These impacts on social and nonmarket conditions due to changes in fluid mineral development are impacts that cannot be measured through market mechanisms, and they include direct changes to the lifestyles and culture of those who rely on the mining industry for employment and income. Secondary nonmarket or social impacts on the surrounding communities from potential changes in oil and gas development and production could include changes in access to clean air, health and safety from changes in air quality and GHG emissions, and visitor and viewer enjoyment from changes in air quality (Su and Lee 2022). Communities could face adverse impacts on these resources under alternatives and in areas where fluid mineral leasing would be managed as CSU, if there is an increase in mineral development (see **Section 4.13**, Air Resources and Climate).

Potential changes in oil and gas development could impact surrounding communities through changes in preservation of non-use values. Non-use values include those placed on protected open spaces and GRSG and other wildlife for future use, for the use of future generations, or for merely its existence, which would especially impact communities of interest who value protection of GRSG. The non-use values also include those placed on preserving the economics and culture of historical mining towns for potential future enjoyment, for the use of future generations or for merely its existence; these non-use values would especially impact those communities of interest who value mineral development.

Economic and social impacts from changes in fluid minerals due to BLM management decisions would vary substantially across regions, depending on how reliant the regions are on the oil and gas and mineral sectors compared with the reliance on other sectors. The regions in the analysis areas that historically have relied on the mineral industry for employment and labor income and that have had large volumes of oil and gas production on federal lands are most of the analysis area in Colorado, eastern Montana, southern Nevada, southwestern North Dakota, northwestern South Dakota, central and northeastern Utah, and most of the analysis area in Wyoming (see **Figures A-1 to A-10** in **Appendix 13**). Changes to economic and social conditions from changes in the oil and gas industry as described above would impact the communities in these regions more than other regions in the analysis areas (see **Section 3.11**, Social and Economic Conditions and **Appendix 13**, Socioeconomic Baseline Report).

Restrictions on oil and gas leasing on federal lands and minerals could also extend to affect economic and social conditions due to potential changes in oil and gas activity on adjacent nonfederal lands and minerals, especially in areas where the BLM-administered lands are not contiguous. In these areas, BLM decisions that manage federal land and minerals as closed to oil and gas leasing or manage BLM-administered lands as ROW avoidance or exclusion areas could result in a reduction in oil and gas activity on adjacent nonfederal minerals if it is no longer economical or feasible to develop minerals due to limitations on expanding operations across federal and nonfederal minerals or if pipelines and transmission lines are needed on federal lands to access the nonfederal minerals (see **Section 4.10.1**, Fluid Minerals [Including Geothermal]), for more information on impacts on oil and gas activity on nonfederal minerals and land due to BLM decisions on BLM-administered

[1] Impacts on other social conditions that are not considered in this effort, such as impacts on social conditions due to changes in visual resources, will be considered during the implementation level NEPA analysis.

land). If there is a reduction in oil and gas activity on nonfederal minerals and land, there could be further impacts on economic and social conditions, similar to those described above, including reductions in jobs, labor income, economic output, tax revenue, and impacts on social cohesion, way of life, and culture for those communities that rely on mineral development for economic opportunities. If there is a reduction in oil and gas activity on state lands due to BLM decisions on nearby federal lands and minerals, there could be impacts on access and quality of public services, such as education, which is funded by revenue collected from mineral production on state trust lands in states across the analysis area.

Many market and nonmarket impacts from changes in oil and gas operations are likely to occur gradually over the long term, with some impacts beginning in the near-term. This is due to the fact that management changes would generally be applied to new leases. Impacts would be concentrated in regions with economies that are dependent on mineral activities. In these regions, economic impacts would likely last until the displaced mining workforce can train and find jobs in other industries. Once the displaced employees find employment in other industries, there will likely be a return of social cohesion and culture across local communities. If displaced workers are unable to find sufficient employment opportunities in other industries, then the impacts could continue. Communities that experience significant out migration due to workers searching for other employment opportunities may not recover the shared culture and sense of community that was enjoyed during more prosperous times.

Nonenergy Leasable Minerals Management

Many of the market impacts associated with potential changes in nonenergy leasable minerals due to changes in restrictions and stipulations on leasable minerals would be similar to the market impacts associated with changes in oil and gas operations (See **Section 4.10.2**, Nonenergy Leasable Minerals, for the impacts of changes in restrictions and stipulations on nonenergy leasable minerals extractions). These include changes in direct and secondary jobs, income, and economic output, tax revenue, and public services and infrastructure that result from changes in nonenergy leasable extraction expenditures expenditure and associated public revenues.

Additional economic and social impacts from potential changes in nonenergy leasable mineral extraction due to an increase in restrictions could occur from secondary impacts on prices and availability of household products, especially those products made from trona, which is a nonenergy leasable mineral largely found in southwest Wyoming (90% of trona comes from this region; see **Section 3.9.2**, Nonenergy Leasable Minerals). Restrictions on mineral leasing on BLM-administered lands could increase costs associated with mineral extraction by requiring operators to find other nonfederal lands for their operations, if other nearby lands are available and hold the desired subsurface minerals. However, there is limited ability to shift large scale operations to other nonfederal lands because nonenergy leasable minerals are not abundantly available. Additionally, access to nonfederal lands for extracting nonenergy leasable minerals may not be feasible or economical, especially in areas with mixed land ownership, such as the checkerboard pattern, where developing resources often requires ROWs over federal land. The increase in costs associated with greater restrictions on mineral leasing on BLM-administered lands will likely be passed onto consumers in the form of higher prices for household products containing trona, such as glass, baking soda, and lithium batteries, in the short term. These household products are considered consumer staples and the demand for consumer staples tend to be inelastic, which means consumers are limited in their abilities to react or adjust their purchase quantities when there are fluctuations in price (Anderson et al. 1997). Impacts on prices of consumer staples tend to affect populations with lower income more than other populations due to the limited disposable income that is available to absorb the increases in prices. Restrictions on mineral leasing will likely not result in immediate closures of mines, and many current mines have stores of trona built up that could be used to sustain production in the short term. As restrictions on nonenergy leasing continue in the long term or if it is not possible to find nearby lands outside of GRSG HMAs with nonenergy leasable materials, there could be impacts on the availability of household products made from trona due to the potential continued constraints on nonenergy leasable mineral extractions. These secondary impacts on product prices and availability can be just as important for local economies as the direct impacts, especially in areas where trona extraction plays a large role in the economy, such as in Wyoming, as well as in rural areas and areas with large low-income populations (see **Section 4.10.2**, Nonenergy Leasable Minerals).

Nonmarket and social impacts from changes in nonenergy leasable mineral extraction due to the BLM management decisions are the same as those from changes in oil and gas operations.[2] These impacts include direct changes to lifestyles and culture, especially for those who rely on the mining industry for employment and income and those in the mineral communities of interest. Secondary nonmarket or social impacts on the surrounding communities from changes in nonenergy leasable minerals due to fewer restrictions could include changes in access to and clean air, health and safety from changes in air quality and GHG emissions, and visitor and viewer enjoyment from changes in air quality. Additionally, potential changes in nonenergy leasable minerals could impact surrounding communities through changes in preservation of non-use values. Non-use values include those placed on protected open spaces and GRSG and other wildlife for future use, for the use of future generations, or for merely its existence, which would especially impact communities of interest who value protection of GRSG. The non-use values also include those placed on preserving the economics and culture of historical mining towns for potential future enjoyment, for the use of future generations or for merely its existence; these non-use values would especially impact those communities of interest who value mineral development.

Economic and social impacts from changes in nonenergy leasable minerals would have larger impacts in regions that are reliant on leasable mineral sectors compared with the reliance of other sectors. These regions that have historically had higher percentages of employment and labor income than the state and have had nonenergy leasable mineral production on federal lands are Rio Blanco County in northwestern Colorado, Caribou County in southeastern Idaho, Carbon and Emery counties in central Utah, and Sweetwater County in southwestern Wyoming (see **Figures A-1 to A-10** in **Appendix 13** and **Section 3.11**, Social and Economic Conditions and **Appendix 13**, Socioeconomic Baseline Report).

Similar to impacts from changes in oil and gas operations, market and nonmarket impacts from changes in nonenergy leasable mineral extractions are likely to occur over the long term. This could result in some mining operations closing if they were unable to expand or moving future operations to other locations. These impacts are likely to last until the displaced mining workforce is able to gain employment with other companies or in other industries. If the workers are required to leave the area to find employment, then the social and economic impacts in the regions that were dependent on mining could last longer.

Locatable Minerals Management

The implications of potential withdrawals from locatable mineral entry for the protection of GRSG are explained in detail in **Section 4.10.4**, Locatable Minerals. Many of the market impacts associated with potential changes in locatable mineral extraction would be similar to the market impacts associated with leasable mineral extractions. These include changes in direct and secondary jobs, income, and economic output, tax revenue, and public services and infrastructure that result from changes in locatable extraction

[2] Impacts on social conditions due to changes in other resources that are not considered in this effort, such as impacts on social conditions due to changes in visual resources, will be considered during the implementation level NEPA analysis.

expenditures and associated public revenues. If the Secretary were to withdraw lands pursuant to the separate process outlined in Section 204 of FLPMA, existing mining claims within the withdrawal area would not be withdrawn, even if they are within GRSG HMAs. BLM decisions on protection for GRSG would impact existing claims through the requirements of future validity examinations, which would increase costs to the claimants and could delay timing of development (see **Section 3.9.4**, Locatable Minerals, **Section 3.11**, Social and Economic Conditions (Including Environmental Justice), and **Appendix 13**, Socioeconomic Baseline Report).

Nonmarket and social impacts from changes in locatable mineral extraction due to the BLM decisions are the same as those associated with changes in leasable mineral extractions. These impacts include direct changes to lifestyles and culture, especially for those who rely on the mining industry for employment and income and those in the mineral communities of interest. Secondary nonmarket or social impacts on the surrounding communities from changes in locatable minerals due to fewer restrictions could include changes in access to clean air, health and safety from changes in air quality and GHG emissions, and visitor and viewer enjoyment from changes in air quality. Potential changes in locatable mineral extraction could impact surrounding communities through changes in preservation of non-use values. Non-use values include those placed on protected open spaces and GRSG and other wildlife for future use, for the use of future generations, or for merely its existence, which would especially impact communities of interest who value protection of GRSG. The non-use values also include those placed on preserving the economics and culture of historical mining towns for potential future enjoyment, for the use of future generations or for merely its existence. Non-use values would especially impact those communities of interest who value mineral development.

Economic and social impacts from changes in locatable minerals would have larger impacts in regions that are reliant on locatable mineral sectors than other areas. Counties in the analysis areas in Nevada and Wyoming, where there are higher potential for locatable minerals, would likely face larger impacts on economic and social conditions due to the large number of existing open claims in the states (see **Figures A-1 to A-10** in **Appendix 13** and **Section 3.11**, Social and Economic Conditions and **Appendix 13**, Socioeconomic Baseline Report).

Similar to impacts from changes in leasable minerals, market and nonmarket impacts from changes in locatable mineral extractions are likely to occur over the long term. This could result in some mining companies closing or moving operations to other locations. The economic and social impacts would likely last until the displaced mining workforce is able to gain employment with other companies or in other industries. If the workers are required to leave the area to find employment, the social and economic impacts in the regions that were dependent on mining could last longer.

Mineral Materials Management

Market impacts associated with potential changes in mineral materials extraction due to BLM management decisions on lands closed to mineral materials disposal largely relate to changes in costs to those who extract mineral materials due to reduced access to free resources (see **Section 4.10.5**, Mineral Materials for impacts on mineral materials extraction due to the BLM management decisions for the protection of GRSG). In areas where federal sources of mineral materials are closed to noncommercial disposal, those who extract mineral materials would likely need to relocate to nearby areas open to disposal on federal lands. If nearby areas on federal lands are not available, extraction would need to relocate to nearby private or state lands where resources exist. This change in location of extraction would increase costs due to the need to transport the minerals from the new location to where they are needed. The further away the mineral materials pits are from where they are needed, the higher the cost and the more potential for increases in noise, dust, and truck traffic from transporting mineral materials. The increase in cost could cause delays or cancelations in projects that use mineral materials, such as road maintenance and construction of infrastructure. Delays and cancelations in construction and maintenance projects would impact the surrounding communities who rely on the roads and infrastructures (see **Section 3.10.5**, Mineral Materials, **Section 3.12**, Social and Economic Conditions and **Appendix 13**, Socioeconomic Baseline Report for more information on current conditions of mineral materials).

Secondary impacts from BLM decisions on lands closed to mineral materials could occur from changes in the ability to use mineral materials 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.

A change in access to mineral materials due to the BLM decisions would likely have impacts on nonmarket and social conditions for the surrounding communities. These impacts include access to clean air, health, and safety from changes in air quality and GHG emissions, and reduced visitor and viewer enjoyment from changes in air quality under alternatives with lands that are not closed to mineral materials disposal and extraction. In areas where the BLM lands are closed to mineral materials disposal, and there is a shift of the mineral materials extraction to state or private lands, the sites of extraction could be closer to local residents and there could be more potential for interaction between local residents and communities and mining operations. This shift in location of mining activities could impact qualify of life in the nearby communities by resulting in an increase in noise, dust, and traffic. The magnitude of the impacts on the nearby communities depends on the local characteristics, and further analysis would need to be conducted during the implementation level NEPA to determine the location and intensity of impacts.

Economic and social impacts from changes in public access to mineral materials would have larger impacts in regions that have higher numbers of new or existing free-use permits issued or quantity of extractions under the free-use permit. Regions include counties in the analysis areas in Colorado, Idaho, Montana, Nevada, and Wyoming (see **Figures A-1 to A-10** in **Appendix 13** and **Section 3.12**, Social and Economic Conditions) and **Appendix 13**, Socioeconomic Baseline Report).

Market and nonmarket impacts from changes in public access of mineral materials are likely to be short term. The economic and social impacts, such as increased costs, would likely occur for near-term infrastructure construction or maintenance projects, which could range from a season to several years. Those with free-use permits would likely be able to locate other sources of mineral materials, given the wide-spread availability of the resource. Resources might be available in nearby BLM lands outside of HMAs, allowing for continued use of free-use permits. In other areas, users would need to purchase the extracted mineral materials, which could lead to impacts for as long as the minerals are needed.

Renewable Energy (Geothermal, Wind, and Solar) Management

BLM decisions regarding changes in restrictions and stipulations on renewable energy, including geothermal, wind and solar energy, for the protection of GRSG could affect local economies by restricting the siting of new renewable energy projects (See **Section 4.9**, Lands and Realty and **Section 4.10**, Mineral Resources). Changes in the land closed to leasing for geothermal development and the land open to leasing but with stipulations could impact the local jobs, income, economic output, and tax revenue that results from changes in well drilling and completion expenditures as well as production of geothermal energy and associated public revenues. Direct market impacts from changes in geothermal development include changes in economic activity that occur in industries related to renewable energy, such as water well drilling and related structures and electric power generation. Secondary market impacts include changes in economic contributions that occur in industries other than the renewable energy sector as well as changes in public services and infrastructure due to reduced tax revenues, including state tax revenues on wind, solar, and geothermal production and nameplate capacity. For wind and solar, changes in land managed as ROW avoidance and exclusions areas could result in operators choosing other locations for wind or solar facilities, however, choosing an alternative location might not be possible or feasible or it could be very costly if there is not available transmission, as ROW avoidance and exclusion areas also applies to transmission line projects. Potential secondary impacts could include impacts on economic conditions due to restrictions on siting of renewable energy facilities and transmission on federal lands that would also impact siting on nonfederal lands, especially in areas where the BLM-administered lands are not contiguous. These potential secondary impacts on economic conditions could include reductions in lease rents for renewable energy on state lands, which could impact disbursements to local governments and public services that rely on these funds.

In addition to impacts on economic conditions from changes in potential renewable energy development due to BLM decisions, there could be impacts on social and nonmarket conditions from the BLM decisions regarding renewable energy ROW. While renewable energy projects, such as wind and solar, generally provide positive environmental benefits, including reductions in greenhouse gas emissions and improvements in air quality, there may still be localized concerns regarding access to clean air, health, and safety, and visitor and viewer enjoyment from changes in air quality, during construction and operation phases, under alternatives with fewer restrictions on development. Way of life, culture, and visitor and viewer enjoyment could be affected if there is an increase in renewable energy development due to less restrictions, especially for those communities of interest that value open spaces and historical agricultural areas.

BLM decisions that encourage co-locating infrastructure in existing ROWs and corridors could reduce adverse impacts on visitor and viewer enjoyment, way of life, and culture for those who value open spaces by limiting the surface disturbance to a consolidated area. However consolidating infrastructure could lead to impacts on economic conditions due to increased risk of multiple system failures, issues with service reliability, and potential increased construction cost for additional transmission line length to reroute the transmission lines to existing corridors.

Economic impacts from changes in renewable energy development due to BLM management decisions could vary across regions, depending on the quality of the renewable resource and the potential for renewable energy. The counties in the Nevada analysis area would be most impacted by BLM management decisions that change geothermal development and production due to the high potential for future development (see **Appendix 12**, Reasonably Foreseeable Development Scenario). The states that have operating wind and solar projects in the analysis areas are Nevada, Oregon, Utah, and Wyoming (see **Figures A-1 to A-10** in **Appendix 13**). Changes in economic activity stemming from changes in renewable energy development would impact these regions more than other regions in the planning area (see **Section 3.11**, Social and Economic Conditions (Including Environmental Justice) and **Appendix 13**, Socioeconomic Baseline Report). Counties in the analysis areas in Idaho, North Dakota, South Dakota, and Wyoming that collect taxes on wind, solar, or geothermal production and nameplate capacity would also be more impacted by potential changes in renewable energy activities than other areas due to the potential loss in tax revenue.

Impacts on economic conditions, such as increased construction costs, due to changes in lands available for ROW for wind and solar development would likely be short term, and the impacts would be diminished upon completion of the wind or solar facilities or transmission lines. If the changes in lands available for wind or solar ROW development prevent any solar or wind projects in nearby areas due to lack of available transmission lines, the impacts would likely be longer-term. Economic impacts from changes in potential geothermal development are likely to occur over the long term, as displace workers look for employment elsewhere or in other industries.

Livestock Grazing Management

Impacts on local economies and social conditions associated with changes in livestock grazing can occur due to BLM decisions that directly or indirectly reduce availability of areas for grazing, forage levels (including decisions that may shift mineral, renewable energy, or ROW developments to areas where there would be a greater level of disturbance or removal of forage for livestock), timing of use and intervals between grazing periods, placement and management of range improvements and water developments. These management decisions could impact economic and social conditions through increased costs and a reduction in the number of livestock produced that partially graze on BLM lands, which would result in a reduction in the economic value of livestock produced (See **Section 4.8**, Livestock Grazing for more detail on impacts on livestock grazing).

Impacts on economic conditions due to a change in the economic value of livestock produced that partially graze on BLM lands include changes in jobs, income, and economic output. Direct market impacts are the changes in economic contributions that occur to industries associated with livestock production, such as reduced labor income for workers in these industries. Secondary market impacts include changes in jobs, income, and economic output that occur in industries other than livestock production industries, such as job reductions in manufacturing industries that supply the equipment needed for livestock grazing or ranching or economic output reductions in the retail sector due to reduced personal expenditures of workers in livestock production industries. Changes in livestock grazing due to BLM decisions could also impact the local and regional economic resilience and stability for ranching and farming communities, especially if these communities also are susceptible to boom and bust economic cycles due to a reliance on mineral development for economics.

Impacts on economic conditions associated with changes in livestock grazing also occur due to BLM decisions that limit maintenance or construction of range improvements or water developments. These limitations could increase time and cost to permittees and lessees or impact the ability of permittees and lessees to fully use permitted AUMs. Another secondary market impact is associated with changes in prices and availability of meat products due to rangewide restrictions on livestock grazing. An increase in restrictions on livestock grazing or a reduction in available forage on BLM-administered lands would likely require many ranchers and farmers to use private lands to provide forage for their livestock, which could result in increases in costs to ranchers and farmers. An increase in cost for forage could lead to ranchers passing on the costs to consumers in the form of an increase in price of meat and animal products, or an increase in cost could result in closures of ranches and farms that are unable to operate with the higher costs, especially as margins for meat producers have tightened recently (Casey 2023). If there are a large number of ranch closures, there could be impacts on availability of meat and animal products to the local and regional communities. As restrictions continue, there will likely be greater impacts on prices and availability of meat and animal products. The level of impacts would depend on the level to which any proposed management resulted in changes to the overall availability of public land forage and livestock operators' ability to adapt production practices and mitigate increased production costs. While changes to the market are seen more at a regional or national scale, secondary impacts on prices and availability of meat can be a large concern for certain local economies, especially in rural areas and areas with large low-income populations (see the subsection on *Environmental Justice* and see **Section 4.8**, Livestock Grazing).

Changes in livestock grazing on public lands can also impact other market mechanisms such as property values. Research has demonstrated that in most cases BLM-administered land grazing permits increase ranch property value beyond the additional price of forage provided because federal permits are perceived as adding semi-private open space to the property (see for example Rimbey et al. 2007). Restrictions to grazing on BLM-administered lands could affect property values for ranches that serve as base property for affect grazing permits. The extent of any impact could vary depending on the extent of restrictions of grazing on BLM-administered and USFS lands, whether a grazing permit is not renewed in its entirety, and the land management decisions in the selected alternative. Premium to property values associated with a federal grazing permit is a result of amenity perception rather than ownership since federal grazing permits authorize the grazing of livestock on public lands but do not convey any right, title, or interest of the lands to the permit holder.

Closely interconnected with the impacts on market and economic activity associated with livestock grazing are impacts on nonmarket and social conditions. These impacts on social and nonmarket conditions due to changes in livestock grazing include direct changes to the lifestyles, culture, and sense of place of those who rely on access to forage on federal land for their farming and ranching operations. Many rural communities have expressed concerns that ranching operations could go out of business if there were more restrictions on livestock grazing on BLM-administered lands. Ranch closures would affect the well-being of the local population and community as well as lead to less social cohesion across the communities and impact the quality of infrastructure and public services. Many ranch owners as well as local residents in communities that rely on ranching and farming place a high value on living in a rural area, with easy access to open spaces and western ranch scenery. Ranch owners value the ability to work outdoors, work with their hands, and to care for animals. Many Ranch owners get a sense of pride with sustainable ranching operations and maintaining rangeland health. Many community members in areas with a lot of grazing on BLM-administered lands value the social cohesion and the friendliness and cordiality that often comes with other members of the community. Reductions in available forage for livestock grazing on BLM-administered lands that could result in ranch closures would reduce access and quality of these resources and values that make up the lifestyle in many communities across the analysis area.

Reductions in BLM lands available for livestock grazing would likely require ranching operators to acquire leases or permits for forage from non-federal lands or purchase additional feed to continue livestock production. Purchased feed and forage from non-federal lands tend to be more costly, so the increase in input costs could put economic strain on some ranches. Due to the increased costs, some ranches might decide to sell all or part of their land to create ranchettes or for development activities, which could create land fragments with more fencing. Additional land fragmentation in GRSG habitat could have an adverse impact on GRSG populations. Selling and fragmenting longstanding ranches could affect social conditions and nonmarket values, such as social cohesion and loss of quality of nonmarket values associated with open space, and it could result in unexperienced or out-of-state buyers taking ownership of the land, which could further reduce social cohesion or lead to land degradation due to improper grazing techniques from the unexperienced buyers (Gosnell and Travis 2005).

Economic and social impacts from changes in livestock grazing due to BLM decisions would vary substantially across regions, depending on how many permits within BLM-administered allotments would be affected, the availability of alternative forage in the area, how reliant the region is on the agriculture industry compared with the reliance on other industries, and the type of ranches in the area (see **Section 3.11**, Social and Economic Conditions and **Appendix 13**, Socioeconomic Baseline Report). Changes to economic and social conditions from changes in livestock grazing would more heavily impact the communities in regions that rely on grazing on federal lands and in regions that have a large quantity of small and midsize family farms and ranches where the operators' primary occupation is farming or ranching.[3] Small and midsize ranches tend to have fewer resources and flexibility to adjust business operations due to changes in livestock grazing on federal lands than other types of ranches. These ranches could be more sensitive to changes in cost, leading to more closures or more decisions to sell their private lands, which could lead to more land fragmentation, as discussed above. These small and midsize ranches are located across most of the analysis area in each state of the planning area (see **Section 3.11**, Social and Economic Conditions and **Appendix 13**, Socioeconomic Baseline Report).

Changes in livestock grazing from BLM decisions are likely to have long term impacts on market and nonmarket conditions, especially in rural areas that rely on the agriculture industry due to the limited alternative resources and opportunities for employment in these areas.

Wild Horse and Burro Management

Some stakeholders value the existence of wild horses due to their symbolism in of the American west and value the opportunity to view wild horses and burros on the range. Removal of wild horses could therefore impact social values associated with the existence of wild horses, and the ability to view and enjoy wild horses and burros.

Wild horses and burros can provide recreation opportunities (in terms of viewing), which in turn can result in visitor spending and associated economic contributions. One example is the opportunities provided for wild horse and burro viewing along scenic byways.

The level of impacts of management would depend on the degree to which wild horses and burros would remain part of the landscape on BLM-administered lands, and the level to which the ability to continue to view wild horses and burros would be impacted. The timeline for implementation of any management changes, if approved, would be impacted by congressional budget appropriations and the associated wild horse and burro management including gathers, storage capacity, and adoption rate. Impacts to values associated with wild horses and burros would be likely occur over time.

Greater Sage Grouse Conservation

Economists and policy makers have long recognized that rare, threatened, and endangered species have nonmarket values composed of use and non-use values as well as economic values, including those associated with active use through viewing, fishing, or hunting and those associated with existence, option, and bequest values. Studies published in peer-reviewed scientific journals for bird species with similar characteristics find average stated willingness-to-pay between $19 and $77 per household per year in order to restore a self-sustaining population or prevent regional extinction (see **Appendix 13**, Socioeconomic Baseline Report). Since GRSG protection is a public good available to all households regardless of where they are located, if similar per-household values apply, then the aggregate regional nonuse value as well as impacts on access to these values if changes were made from BLM decisions could be substantial. The BLM did not quantify the aggregate value because of several factors, including uncertainty associated with the comparability of the existing studies to the GRSG context and the documented difference between stated and actual willingness-to-pay.

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[3] Small family ranches are those with annual gross cash farm income less than $350,000 and midsize family ranches are those with annual gross cash farm income of at least $350,000 but less than $1 million. See **Section 3.11**, Social and Economic Conditions (Including Environmental Justice) and **Appendix 13**, Socioeconomic Baseline Report for more information on the types of ranches in the analysis area).

There are many resource and social values of GRSG ecosystems that could be impacted by BLM decisions. Non-market values associated with populations of GRSG, including use value associated with wildlife viewing as well as non-use value generally correspond to the degree of habitat protection associated with each alternative. The more restrictive an alternative is on habitat disturbance, the more it will favor non-market values associated with the GRSG and their habitat. The specific level of habitat protection associated with maximizing non-market value has not been determined. Additional social impacts from BLM management decisions on GRSG conservation include impacts on Tribal interests and cultural resources, especially subsistence, from changes in GRSG populations. Habitat conservation could negatively impact road realignment projects near Tribal reservations and plans to expand reservation boundaries because the reservation is surrounded by PHMA.

Environmental Justice

Environmental justice populations could be disproportionately and adversely impacted directly and indirectly through changes in several resources due to BLM decisions.

Environmental justice populations could be directly disproportionately and adversely impacted by BLM decisions on GRSG through disturbance of cultural resources such as locations or landscapes associated with trust or treaty assets, traditional beliefs, sacred sites, resource gathering areas, hunting and fishing areas, ancestral sites, and human remains. Under alternatives with fewer stipulations and restrictions on resource use and less protection of GRSG populations, ground disturbance would likely impact these cultural resources. These ground disturbing activities that impact cultural resources in the planning area include mineral exploration and development, renewable energy development, construction of road or pipelines, and other surface disturbing activities. Cultural resources are especially important to those who identify as American Indian and Alaska Native for spiritual, traditional, and cultural activities, so BLM decisions that result in disturbance or alter visual qualities of these cultural resources could disproportionately impact American Indian and Alaska Native populations. These impacts on environmental justice populations are likely to be stronger in areas that were identified as containing environmental justice populations and areas that have more surface disturbing activities, such as mining and livestock grazing, and the impacts are likely to be long term and last until the end of the surface disturbing activity. See **Section 4.17**, Tribal Interests and **Section 4.16**, Cultural Resources.

BLM decisions that impact conservation of GRSG habitats and access to the cultural values of GRSG through fewer restrictions on surface disturbing activities would adversely and disproportionately impact environmental justice populations. Subsistence resource availability could be reduced from decisions and activities that impact wildlife habitats such as mineral development. Under alternatives with fewer restrictions on surface disturbing activities and less protection of GRSG habitats, changes to availability of subsistence resources and uses would adversely and disproportionately impact environmental justice populations. Subsistence is an important use of BLM-administered lands for American Indian and Alaska Native populations and some low-income populations across the analysis area. Decreased subsistence resource availability would adversely affect sociocultural systems due to the importance of subsistence in the cultural identity of American Indian and Alaska Native populations, social organization, social cohesion, transmission of cultural values, and community and individual well-being. Decreases in subsistence resource availability would reduce opportunities for engaging in subsistence activities potentially increasing social problems. Due to the importance to American Indian and Alaska Native populations of subsistence hunting, environmental justice populations would be disproportionately impacted from reduced access to big game habitats. Additionally, low-income populations would bear disproportionate effects of reductions in access to subsistence resources because they are more likely to lack the resources to purchase an equivalent quality of food or to travel greater distances to find it. See **Section 4.5**, Fish and Wildlife, and **Section 4.17**, Tribal Interests and **Section 4.16**, Cultural Resources.

Environmental justice populations could be indirectly disproportionately and adversely impacted through regional or national market changes in prices and availability of meat and household products due to rangewide restrictions on grazing or restrictions on mineral development. Restrictions in grazing or mineral development on BLM-administered lands could increase the costs of producing meat and household products, which could then be passed onto consumers through higher prices. Meat and household products are considered consumer staples, and consumption of these products is usually consistent across seasons, so they tend to have inelastic demands, which means consumers of these products have limited ability to adjust consumption as prices increase. If restrictions continue, there could be impacts on availability of meat and household products. Increases in prices and decreases in availability of food and household products tend to disproportionately impact low-income households and individuals, because low-income populations have more limited alternatives for food and household products than the general public and because food and household product purchases make up a higher percentage of disposable income for low-income households. These impacts on environmental justice populations are likely to be stronger in areas that were identified as containing environmental justice populations. The impacts on environmental justice populations from price and availability of food and household products through BLM management decisions on greater restrictions are likely to occur over the long term, based on implementation of changes to GRSG management. See subsections in this section on *Nonenergy Leasable Minerals* and *Livestock Grazing* as well as **Section 4.10.2**, Nonenergy Leasable Minerals, and **Section 4.8**, Livestock Grazing.

BLM decisions that impact nonmarket and social conditions from changes in air quality through increased exposure to particulate matter (PM), increased risk of wildfire smoke, and increased fugitive dust emissions, under alternatives with fewer restrictions on mineral extraction and surface disturbing activities, could disproportionately impact environmental justice populations. Environmental justice populations often face greater vulnerabilities to particulate matter pollution, wildfires, and fugitive dust from surface disturbance (Davies et al. 2018). Increased exposure to particulate matter can cause a variety of health problems, including respiratory infections, heart disease, or cancer. Because environmental justice populations are often located near sources of PM pollution, they are more likely to be exposed to higher levels of particulate matter pollution (Tabuchi and Popovich 2021). See **Section 4.13**, Air Resources and Climate.

BLM decisions that impact nonmarket and social conditions from changes in GHG emissions could disproportionately impact environmental justice populations, under alternatives with fewer restrictions on surface disturbing activities and in areas where fluid mineral leasing would be managed as CSU, if there is an increase in mineral development and activities. Environmental justice populations are often located in areas that are vulnerable to impacts from climate change, such as areas that are prone to drought or flooding (Cho 2020). If mineral exploration and development and other surface disturbing activities are not managed in a way that minimizes GHG emissions, environmental justice populations could be adversely and disproportionately impacted due to GHG emissions that could have a negative impact on the climate (Cho 2020). Vegetation disturbance could reduce the ability to absorb carbon dioxide and lead to decreased carbon sequestration around communities, including environmental justice populations. The decrease in carbon sequestration could contribute to climate change impacts, which could disproportionately and adversely impact environmental justice populations. See **Section 4.13**, Air Resources and Climate.

Impacts on economic conditions may occur across the area (as discussed in the *Fluid Minerals (Oil and Gas), Renewable Energy (Geothermal, Wind, and Solar),* and *Livestock Grazing* subsections, above). Additional screening and consideration of environmental justice populations and analysis of any disproportionate and adverse 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. Depending on conditions at that time, communities with environmental justice concern may change.

4.12.2 Proposed RMP Amendment

All impacts would be the same as described for Alternative 5 except for the impacts described below.

Fluid Minerals (Oil and Gas) Management

Rangewide Environmental Consequences

The number of wells anticipated to be drilled and completed over the planning period, under the Proposed RMP Amendment, would be the same as under Alternative 5 in all states except for Wyoming, so the market impacts on jobs, labor, income, economic output from oil and gas development and operations would also be the same as described under Alternative 5 for these states (see **Table 4-8**, below). Under the Proposed RMP Amendment, compared with Alternative 1, oil and gas production revenue and well development expenditures are expected to decrease in Wyoming (see **Section 4.10**, Mineral Resources for a discussion on impacts on oil and gas activity). On annual average, oil and gas production revenue and well development expenditures in the Wyoming analysis area is expected to result in about 1,400 fewer total jobs (about 600 fewer direct jobs), about $110 million less in total labor income (about $64 million less in direct labor income), and about $717 million less in economic output (about $559 million less in direct economic output), than under Alternative 1, throughout the state. Additional details for state-specific direct, indirect, and induced impacts are included in **Appendix 18**.

Table 4-8. Average Annual Economic Contributions from Oil and Gas, Under the Proposed RMP Amendment

State[1]	Type of Impact[2]	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
	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
	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
	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
	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
	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
	Total	551	573	46,571,864	47,955,782	466,716,295	471,407,239
South Dakota	Direct	89	89	7,090,932	7,090,932	34,541,446	34,541,446
	Total	238	264	14,081,147	15,735,559	61,206,393	66,872,391
Utah	Direct	2,368	2,368	162,438,183	162,438,183	1,619,804,067	1,619,804,067
	Total	5,204	7,059	309,658,031	453,626,368	2,125,280,538	2,450,509,848
Wyoming	Direct	11,089	11,089	1,085,144,628	1,085,144,628	10,691,456,750	10,691,456,750
	Total	24,865	24,886	1,908,227,615	1,909,712,421	13,474,139,017	13,478,773,144

State[1]	Type of Impact[2]	Employment		Labor Income		Economic Output	
		Analysis Area	State	Analysis Area	State	Analysis Area	State
Total Planning Area (Low Colorado Scenario)	Direct	22,720	22,720	2,407,832,421	2,407,832,421	18,290,445,070	18,290,445,070
	Total	55,083	61,717	4,322,658,396	4,915,108,461	24,506,707,178	25,861,130,327
Total Planning Area (High Colorado Scenario)	Direct	29,137	29,137	3,179,881,256	3,179,881,256	22,174,524,682	22,174,524,682
	Total	72,726	83,463	5,774,526,641	6,759,888,606	30,474,089,534	32,720,307,858

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.
[1] There were no oil and gas developments projected for California and Oregon.
[2] Total impacts include direct, indirect, and induced impacts.

The decrease in projected oil and gas activity in Wyoming, under the Proposed RMP Amendment, would result in reductions in tax revenues by about $69 million in royalty revenue, $25 million in state severance tax revenue, $26 million in ad valorem tax revenue, and $208,000 in and gas conservation tax revenue, compared with Alternative 1. Additionally, a reduction in oil and gas activity, in Wyoming, under the Proposed RMP Amendment, could lead to a decrease in revenue from rents, bonus bids, and sales and use taxes, compared with 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, including education. There could be impacts from BLM decisions on lifestyles and culture for those in mineral development communities of interest, especially for those individuals who rely on oil and gas extraction for employment.

The reduction in the acreage available for fluid mineral leasing in Wyoming could reduce the development-related impacts on nonmarket and social conditions associate with changes in air and GHG emissions, compared with Alternative 1.

Renewable Energy (Geothermal, Wind, and Solar) Management

Rangewide Environmental Consequences

Under the Proposed RMP Amendment, PHMA would be an exclusion area for utility scale wind and solar energy testing and development. Lands encompassing major ROWs and utility-scale wind and solar in PHMA would be managed as ROW avoidance areas with more stringent criteria. Impacts on economic and social conditions due to BLM decisions on PHMA, under the Proposed RMP Amendment, would be the same as under Alternative 4.

The number of geothermal plants developed would be the same as under Alternative 1 in all states (see **Appendix 12**, Reasonably Foreseeable Development Scenario, for more detail), so the impacts on jobs, labor, income, and economic output from geothermal development would also be the same as described under Alternative 1 (see **Table 18-6** in **Appendix 18** for direct, indirect, and induced impacts by state). Utility scale wind and solar projects in PHMA would be managed as ROW exclusion areas, under the Proposed RMP Amendment (see **Appendix 12**, 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, relocating wind and solar operations might not be possible or feasible, if access to transmission lines is limited, due to the high costs associated with building transmission lines and because ROW avoidance and exclusion areas would impact transmission lines as well. As noted under Alternative 1, if additional lines of transmission are needed, this could result in impacts on economic contributions of wind and solar.

4.12.3 Cumulative Effects

The following discussion analyzes the cumulative impacts on social and economic conditions as well as impacts on environmental justice concerns. This analysis considers the past, present, and reasonably foreseeable actions that may impact these conditions. The cumulative effects analysis covers a 20-year timeframe, corresponding to the duration of the Greater Sage-Grouse Resource Management Plan. The spatial scope encompasses the rangewide planning area.

Economic Interest and Conditions

Planning and implementation decisions within planning areas that overlap the analysis area in this current effort could also affect future development. The BLM decisions in the federal resource management and land use plans throughout the planning area could contribute to cumulative impacts on the local and regional economies and the social conditions of local communities. These decisions could lead to changes in employment, income, tax revenue, and economic output on top of the impacts discussed in **Section 4.11**, Social and Economic Conditions (Including Environmental Justice), as well as impacts on nonmarket and social conditions. The combined impact from these efforts could cause strain on the local economies, especially those that are reliant on industries that would be more likely impacted such as mining and agriculture industries as well as industries related to renewable energy development.

The state GRSG conservation plans and efforts could lead to cumulative impacts on economic contributions. The requirements in the state GRSG conservation plans would likely vary from state to state, which would increase costs for operators as they navigate the differing restrictions and requirements. The type of state GRSG conservation plan could lead to cumulative impacts. Some conservation plans are regulatory in nature, such as the plans in Wyoming, Montana, and Oregon as well as Nevada's mitigation requirement, while the other plans are voluntary compliance. This difference could cause some confusion and conflict or create barriers to entry of markets in different areas for operators.

In May 2024, the BLM published the final rule for Conservation and Landscape Health (the Public Lands Rule), which promotes restoration of public lands and water, supports informed decision-making, and protects healthy landscapes. The Public Lands Rule creates frameworks for tools that promote investment in restoration and mitigation that can help offset the impacts on the environment from development on public lands. The management actions considered in this effort are consistent with the Public Lands Rule. The Public Lands Rule is not expected to impact oil and gas operations, so there will likely not be cumulative impacts on economic conditions due to changes oil and gas activity from the Public Lands Rule. Additionally, the Public Lands Rule is not expected to contribute to cumulative impacts on economic conditions from changes in livestock grazing. The Public Lands Rule allows opportunities for grazing permittees to hold conservation leases to improve land health, and these leases could generally be compatible with grazing allotments meeting land health standards.

Past, present, and reasonably foreseeable mineral leasing, exploration, and development will likely contribute to cumulative impacts on employment opportunities and fiscal revenues in local and regional economies that have historically been reliant on mineral extraction. Even in areas with a small percentage of employment in the mining sector, there could be impacts to the local economy, because mining often provides high-wage employment opportunities that are not easy to replace or find alternatives (see **Section 3.11**, Social and Economic Conditions and the Socioeconomic Baseline report). Updates to the federal oil and gas regulatory framework, including changes in minimum bid requirements and royalty and rental rates included in the Inflation Reduction Act, could affect future levels oil of gas activity on federal lands. These higher rates will increase the cost to develop federal oil and gas resources leased on or after August 16, 2022, but there is insufficient information to determine how these changes will impact federal oil and gas development given how dynamic and complex the global oil market is. Competitive federal leases are anticipated to remain competitive with leases on private and state lands which already impose higher rental and royalty rates, and operators' decisions related to exploration and extraction will continue to be based on global market conditions and trends, and individual firms' strategic goals and profit margins (US Department of the Interior 2021).

In areas that have historically relied on fossil fuels as an economic driver for employment, income, economic output, and fiscal revenue streams, as demand continues to shift to lower carbon energy sources, the continued decline in production of higher carbon energy sources such as coal could have compounding, cumulative impacts in communities that could also be impacted by GRSG BLM management decisions that would restrict mineral development, including oil and gas, nonenergy leasable minerals, locatable minerals, and mineral materials. Since 2012, coal mining jobs across the US have decreased by over 48,000 (Sachs 2023). Counties in the analysis areas that have oil and gas production on federal lands and have seen a decline in coal extraction over the last five years include Moffat and Rio Blanco counties in Colorado; Rosebud County in Montana, Carbon and Sevier counties in Utah; and Campbell, Converse, Lincoln, and Sweetwater counties in Wyoming. These regions are more likely to see compounding cumulative impacts from the transition away from coal combined with impacts due to BLM decisions on oil and gas leasing. For BLM decisions on nonenergy leasable minerals, the counties that are likely to face cumulative impacts combined with the decline in coal due to their reliance on nonenergy leasable minerals are Rio Blanco County in Colorado, Carbon County in Utah, and Lincoln and Sweetwater counties Wyoming. Lastly, regions in Colorado, Montana, Utah, and Wyoming could also face cumulative impacts due to the decline in coal extraction. For locatable minerals, the level of cumulative impacts and locations of impacts depend on whether the Secretary actually withdraws the recommended areas from location and entry under the Mining Law of 1872 pursuant to the separate process outlined in section 204 of FLPMA (see the Socioeconomic Baseline Report and **Section 3.11**, Social and Economic Conditions (including Environmental Justice). The decrease in economic conditions from the decline in the coal industry would put additional strain on these regions and make it more difficult for local governments to support and sustain the public services that are important to the communities (see the Socioeconomic Baseline Report and **Section 3.11**, Social and Economic Conditions).

Past, present, and reasonably foreseeable nonenergy mineral leasing, exploration, and development will likely contribute to the impacts on local and regional economies. Management actions in other planning efforts in the form of surface use restrictions such as closing areas to new nonenergy leasable mineral, prohibitions on surface mining, or creating ROW exclusion or avoidance areas, could impact local economics due to potential changes in nonenergy solid leasable mineral extraction by limiting the available means for accessing mineral resources and transporting nonenergy solid leasable minerals to processing facilities and markets.

Past, present, and reasonably foreseeable locatable mineral extraction will likely contribute to the impacts on local and regional economies. Any actions (including any future withdrawals) that increase the costs of locatable mineral development would cumulatively impact locatable mineral development and the local economies, through changes in employment, labor income, output, and tax revenue, as these actions ultimately could decrease the amount of locatable mineral availability and development in the planning area during the planning period.

Past, present, and reasonably foreseeable mineral materials extraction will likely contribute to the impacts on local and regional economies. The predominant mining method for mineral materials is surface mining; therefore, restrictions on surface-disturbing activities would effectively close or limit mineral material mining in the subject areas unless an exception is provided. If feasible mineral materials extraction could relocate to nearby areas; however, this would likely result in increased costs associated with transportation or fees, if operations are moved to private or state lands. This increase in cost could result in cumulative impacts on the local economies.

Past, present, and reasonably foreseeable ROWs will likely contribute to the impacts on local and regional economies. These projects include development of pipelines and electricity transmission and distribution infrastructure as well as development of wind and solar. The BLM is working on a Solar Programmatic EIS to take steps to update its 2012 Western Solar Plan, which could have cumulative impacts on economic contributions. The on-going revisions on the Solar Programmatic EIS consider removing the slope requirement which may allow for more land available to ROW authorization. In May 2024, the BLM published the final rule for Rights-of-Way, Leasing, and Operations for Renewable Energy, which promotes wind and solar development through reduced acreage rents and capacity fees and improved BLM application processes. This rule could have cumulative impacts on economic contributions associated with renewable energy development. As there continues to be an increased diversification of energy sources, there will likely be an increase in demand for renewable development on public lands. This increase is likely to be more pronounced in certain areas and states, such as California, Nevada, Utah, and Wyoming, where there has historically been interest in renewable energy development and there will likely continue to be development. Labor income for employment in industries associated with renewable energy development and operations tends to be lower than labor income for employment mining industries. This means that as economies transition to more renewable energy, there could continue to be cumulative impacts from lower wages (see **Section 4.8**, Lands and Realty).

The BLM will continue to issue livestock permits on land that is available to livestock grazing. These permits could contribute to the impacts on local and regional economies. Livestock grazing and operations can be affected by BLM decisions on vegetation management and surface disturbing activities such as mineral exploration and ROW development as well as changing environmental conditions. These cumulative impacts on livestock grazing can affect costs incurred by ranchers and farmers, which would have cumulative impacts on the regional economies through changes in jobs, income, and economic output.

In many states, such as in Colorado, Idaho, Montana, Nevada, North Dakota, Oregon, South Dakota, Utah, and Wyoming, farming and ranching can provide economic stability for communities that are susceptible to boom and bust cycles due to historical dependence on mining industries that have fluctuated over time. In these regions, there could be cumulative impacts on the change in economic resilience and stability from BLM decisions that impact both grazing and mineral development, which are important sectors for these communities.

Nonmarket and Social Conditions

The BLM decisions in the federal resource management and land use plans throughout the planning area could contribute to cumulative impacts on the local and regional economies and the social conditions of local communities. These management decisions could lead to changes in social conditions and access to nonmarket values on top of the impacts discussed in **Section 4.11**, Social and Economic Conditions. These impacts include changes in access to and cost of products and resources, values from open spaces, values from wildlife species including GRSG. Potential impacts also could include changes in way of life and culture, social cohesion, and preservation of ecosystem services, such as services provided from GRSG and GRSG habitats.

The Public Lands Rule, published in May 2024, promotes restoration of public lands and water, supports informed decision-making, and protects healthy landscapes through creating frameworks for tools that allow opportunities to invest in restoration and offsetting impacts on the environment from development on public lands. Through use of these tools, the Public Lands Rule could contribute to impacts on social conditions and access and quality of nonmarket values through increased access to clean air and healthy, open spaces, and ecosystem services.

Past, present, and reasonably foreseeable vegetation, and wildfire fuels management that impact GRSG habitat will likely contribute to the impacts on communities through changes in access to nonmarket values. Potential for severe wildfire could result in damage to GRSG habitat, which could result in cumulative impacts on access to nonmarket values associated with GRSG and GRSG habitat, such as values from cultural and subsistence resources and nonuse values. The risk of wildfires could be higher under Alternative 3 due to the reduction lands available for livestock grazing, which would remove permitted livestock grazing on a large portion of the landscape (see **Section 4.4** for further analysis on the impacts of grazing on wildfires).

Environmental Justice

The BLM decisions in the federal resource management and land use plans throughout the planning area could contribute to impacts on environmental justice communities, if the BLM decisions lead to changes in water or air quality of the surrounding communities, access to subsistence resources or use, access to cultural resources, among others; however, these impacts would depend on site-specific conditions and analysis.

Execution of state GRSG conservation plans, which could impact access to resources or subsistence activities on nonfederal lands, could lead to cumulative impacts on environmental justice communities.

GRSG planning efforts could contribute to cumulative impacts by placing more constraints on mineral development in areas where GRSG habitats overlap with big game high priority habitats, which could reduce health impacts from oil and gas production and development. These could lead to disproportionate impacts on environmental justice communities, because environmental justice communities, such as low-income households, tend to live closer to mineral developments (Proville et al. 2022); however, specific impacts on environmental justice populations would likely depend on other site-specific factors that will be examined more at the implementation-level NEPA analysis.

Climate change could lead to impacts on many resources and could contribute to adverse and disproportionate impacts on environmental justice populations. These impacts from climate change include increases risk and severity of wildfires, which can lead to damage and destruction of property, cultural resources, and impact public health and safety, increases in drought and reductions in forage for livestock, increases in risk of flooding, changes in subsistence resource access due to changes in climate and invasive species, and reductions in water supply. These impacts would likely have adverse and disproportionate impacts on environmental justice populations due to the limited resources available to mitigate impacts and because environmental justice populations are often located in areas that are vulnerable to impacts from climate change, such as areas that are prone to drought or flooding (Cho 2020); however, specific impacts on environmental justice populations would likely depend on other site-specific factors that will be examined more at the implementation-level NEPA analysis.

Comparison of Alternatives

Contributions to cumulative impacts from BLM management decisions are discussed below for each alternative.

Alternative 1 management actions would be based on the 2015 plan amendments. This includes restrictions on development that would occur within HMAs. All states would include language to maintain and enhance sagebrush habitats with the intent of conserving GRSG populations. Anticipated levels of economic activities associated with mineral exploration and development, renewable energy development, and livestock grazing on BLM-administered lands would continue from current conditions, and they would continue to support jobs, labor income, economic output, and tax revenue, which would continue to support public services. In areas where mineral development is open subject to stipulations, there would continue to be impacts on air quality and GHG emissions, which could disproportionately and adversely impact environmental justice populations. Additionally, there would continue to be impacts on GRSG and subsistence resources, which could impact access to nonmarket use and non-use values and could adversely and disproportionately impact environmental justice populations, especially those who value subsistence resources.

Under Alternative 2, there would be more areas open to fluid mineral leasing, which could result in an increase in supported jobs, labor income, and economic output, compared to Alternative 1. However, due to the increase in areas open to fluid mineral leasing there would be the potential for more surface disturbance, which could reduce access to values associated with GRSG and GRSG habitat. In areas that are open to mineral development, there could be greater impacts on air and water quality, than under Alternative 1, and these impacts could disproportionately and adversely impact environmental justice populations.

Alternative 3 would close all areas in PHMA to mineral development, ROW development, and livestock grazing. Alternative 3 would be the most restrictive on economic activities across all alternatives. The restrictions could lead to large cumulative, combined impacts on local economies and communities, especially those areas that rely on mining and agriculture for employment such as Caribou County in Idaho; Big Horn and Fallon counties in Montana; Pershing County in Nevada; and Big Horn, Converse, Crook, and Sublette counties in Wyoming. These impacts could include cumulative impacts on jobs, labor income, economic output, tax revenue, public services, and economic stability. Additionally, the impacts could include social cohesion, and access to nonmarket values associated with historical mining and agricultural communities as detailed in the direct and indirect impacts discussion. The impacts from restrictions could extend to nonfederal lands and minerals in areas where the BLM-administered lands are not contiguous, which could further lead to cumulative impacts economic and social conditions, especially for those rural communities that rely on mining for economic opportunities.

Alternatives 1, 2, 4, 5, 6, and the Proposed RMP Amendment would support higher levels of economic activity in natural resource-dependent economies across the planning area relative to Alternative 3. Management actions that lead to a change oil and gas activity, under alternatives 4, 5, 6, and the Proposed RMP Amendment, could result in the same economic conditions as Alternative 1 in some areas (Montana, Nevada, North Dakota, South Dakota, and Utah), could support an increase in jobs, labor income, economic output, and tax revenue in some areas (Colorado and Idaho), or could lead to a reduction in jobs, labor income, economic output, and tax revenue in other areas (Wyoming). The management actions under Alternatives 4, 5, 6 and the Proposed RMP Amendment could affect social conditions and quality of life in some communities. However, due to the increase in areas open to mineral development there would be the potential for more surface disturbance, which could reduce access to values associated with GRSG and GRSG habitat. In areas that are open to mineral development, there could be greater impacts on air and water quality than under Alternative 1, and these impacts could disproportionately and adversely impact environmental justice populations.

Table 4-9. Types of Effects Resulting from Reasonably Foreseeable Actions

Reasonably Foreseeable Scenarios	Examples from Appendix 14 (Reasonably Foreseeable Actions)	SE Indicator Discussion
Transition from fossil fuel development	Closure of coal powered power plants and coal mines	Loss of jobs and revenue
	Implementation of Inflation Reduction Act	Unclear impact on jobs and revenue – could push development to state and private lands; Increased royalty and rents could offset less quantity of federal development.
	BLM CO GJFO and CRVFO RMPA	Preferred alternative would lead to cumulative impacts that would reduce jobs and revenues from oil and gas. There would be compounding impacts and stress put on the local communities
	BLM CO Big Game and Gunnison Sage Grouse RMPA	Restrictions for oil and gas development in Moffat, Routt, Mesa, and Jackson are applicable for all three wildlife RMPAs. Hence, the predicted job and revenue loss in **Chapter 4** is the same as the cumulative job effort of these BLM CO planning efforts.

4.13 Air Resources and Climate

4.13.1 Air Quality

This section presents potential impacts on air quality and climate from implementing management actions presented in **Chapter 2**. Existing conditions concerning air quality are described in **Chapter 3**.

Nature and Type of Effects

Air quality is measured by the concentration of air pollutants and changes in air quality-related values, such as visibility and atmospheric deposition (e.g., nitrogen and sulfur deposition on soils and vegetation, and acidification of sensitive water bodies). Emissions of hazardous air pollutants could potentially result in localized increased risk of impacts on human health. Criteria and hazardous air pollutants can negatively impact human health in a variety of ways. Exposure to air pollution most often affects the respiratory system, and is often also associated with pulmonary, cardiovascular, and neurological impairments (EPA 2023f). Children and other high-risk groups, such as the elderly, pregnant women, and individuals with chronic heart and lung diseases, are especially susceptible to impacts from air pollution (EPA 2023f).

Actions that increase emissions of air pollutants can result in negative effects on air quality related values, including visibility and atmospheric deposition. An increase in SO_2, NO_2, PM_{10}, and $PM_{2.5}$ emissions can result in decreased visibility, increased atmospheric nitrogen and sulfur deposition on soils and vegetation, and acidification of sensitive water bodies. Fugitive dust could potentially result in increases in ambient concentrations of PM_{10} and $PM_{2.5}$ resulting in localized impacts on vegetation and increases in atmospheric deposition. Particulate matter also contributes to haze and limits visibility (EPA 2023g). Ground-level ozone, which is formed by a chemical reaction between volatile organic compounds and nitrogen oxides, contributes to smog, which limits visibility (EPA 2023h). Particulate matter emissions (fugitive dust) are primarily caused by earth-moving activities and vehicular traffic on unpaved roads and surfaces associated with development and operation. While PM_{10} emissions are largely caused by fugitive dust, and primary $PM_{2.5}$ emissions can be partially attributed to fugitive dust, secondary $PM_{2.5}$ primarily stems from chemical reactions with gaseous emissions.

Greater Sage-Grouse Management

Implementing management for the protection of GRSG generally involves reducing or otherwise restricting land use and activities that disturb GRSG habitat. These land uses and activities often also emit air pollutants. Wildland fires, particularly uncontrolled wildfires, can significantly affect air quality by introducing large amounts of particulate matter, CO, atmospheric mercury, ozone precursors, and volatile organic compounds into the air, affecting both visibility and human health (British Columbia 2023). By improving landscape resiliency to wildfire and soil degradation, protection of the GRSG habitat would result in a general improvement in air quality. By restricting land uses that may emit air pollutants, protection of GRSG habitat would result in a general improvement in air quality. However, such restrictions could shift such development and associated impacts to state, tribal, or private lands, where GHG emissions and surface disturbance would still occur.

Minerals Management (including Fluid minerals, Saleable Minerals/Mineral Materials, Non-energy Leasable Minerals, and Locatable Minerals)

Activities related to fluid mineral leasing and development can result in emissions produced during all phases of fluid mineral development—from exploration, construction, and operational phases of the project to well plugging, site closure, reclamation, and abandonment. Oil and gas development results in short-term and long-term emissions of criteria pollutants and hazardous air pollutants from vehicle use, drill rigs, construction equipment use, disturbance of soils, and leaks, flaring, or venting of natural gas. Limiting oil and gas leasing and resultant development with the purpose of reducing disturbance to GRSG and their habitat could reduce air pollutant emissions or at a minimum, move sources to a different location.

Activities associated with the development of nonenergy minerals and mineral materials (saleable minerals) generate fugitive dust particles and gaseous tailpipe emissions from large equipment. Activities such as blasting, excavating, loading, and hauling of overburden and mineral resources, and wind erosion of disturbed and un-reclaimed mine areas, produce fugitive dust. Crushing, storage, and handling facilities are common stationary point sources for particulate matter. Air pollutant emissions that could be expected to result from solid mineral development are CO, NOx, particulates (PM_{10} and $PM_{2.5}$), SO_2, ground level ozone, and some EPA listed hazardous air pollutants (e.g., Benzene, Formaldehyde, and Acetone). Actions that limit leasing or development of nonenergy leasable minerals and mineral materials within GRSG habitat areas could reduce non-oil and gas emissions by limiting exploration, construction, and operations associated with nonenergy leasable minerals and mineral materials developments. However, restrictions on travel associated with such resources could result in creating longer trips by redirecting travel around sensitive areas, and thereby increasing travel-related emissions.

Lands and Realty Management

Activities related to surface disturbances (e.g., construction of facilities, roads, and transmission lines, wind and solar energy plants) can result in particulate emissions from fugitive dust, exhaust emissions, and other criteria pollutant emissions from soil disturbances, construction-related travel, use of heavy equipment, and long-term effects associated with road use and maintenance. A number of the management actions under the alternatives address surface disturbances pertaining to GRSG core and connectivity habitat areas, nesting/early brood-rearing habitats, winter habitats, and winter concentration areas. In addition, some of the action alternatives restrict activities by date, density, and any reclamation activities proposed. All proposed actions associated with restricting or prohibiting surface disturbing activity for GRSG core and connectivity habitat areas, nesting/early brood-rearing habitats, and winter habitats and concentration areas specified could reduce air emissions by limiting travel and activity. However, the restrictions on travel could result in creating longer trips by redirecting travel around sensitive areas, and thereby increasing travel-related emissions. In addition, some of the actions that restrict activities in March through May could redirect emissions toward the other months (such as winter), thereby increasing ozone potential in areas subject to winter ozone formation.

Proposed RMP Amendment

Under the Proposed RMP Amendment, impacts on air quality would be managed through a combination of conservation measures and limitations on development.

Under the Proposed RMP Amendment, fluid mineral resource allocations would be guided by stringent lease stipulations and minimization measures that would reduce emissions from fluid mineral activities. Managing PHMA with limited exceptions as NSO with no waivers, exceptions, or modifications would contribute to stronger protection for air quality in these areas compared with Alternative 1. There would be more restrictions on saleable minerals, mineral materials, and coal development, resulting in fewer impacts compared with Alternative 5. Impacts on nonenergy leasable minerals would be similar to impacts under all other alternatives.

The Proposed RMP Amendment would designate PHMAs as exclusion areas for utility-scale wind and solar projects to prioritize habitat conservation and minimize impacts on air quality, similar to the approach under Alternative 1. Additionally, within PHMA with limited exceptions, utility-scale wind and solar projects would be excluded with no exceptions and major ROWs would be excluded with exceptions, offering enhanced protection to air quality in these areas. Renewable energy development would follow established guidelines, with PHMA excluded from utility-scale projects and GHMAs open for development under specific mitigation measures to address potential air quality impacts. ROW avoidance designations in the Proposed RMP Amendment would aim to reduce air quality impacts by strengthening protections within avoidance areas and promoting use within designated corridors, more stringent than the strategies outlined in Alternative 5.

Under the Proposed RMP Amendment, livestock grazing management would align with the management under Alternative 5, focusing on minimizing air quality impacts through flexible and effective grazing practices.

Cumulative Effects

The cumulative impact analysis area for air quality includes the airsheds that encompass the lands within the range of GRSG habitat, regardless of land ownership. The larger cumulative analysis area is chosen because air pollutants can be transported into and/or out of the planning area and affect pollutant concentrations in the ambient air. The cumulative impact analysis timeframe for air quality is chosen based on the expected duration of the GRSG RMPA, which is approximately 20 years. The BLM's regional air quality model (Ramboll 2023) is incorporated by reference as a representation of future cumulative air quality.

In general, air pollution is cumulative in the way that exceedances of ambient air quality standards are based on existing conditions which depend on past and present development. Any change in the level of emission generating activities would affect existing pollutant concentrations in the cumulative impact analysis area. Past, present, and reasonably foreseeable actions that contribute to the cumulative impacts on air quality include mineral exploration and development such as fluid minerals (oil, gas and geothermal), locatable minerals, leasable minerals, and mineral materials; urban and industrial development including major and minor ROWs (e.g., for roads, pipelines, electrical transmission lines, infrastructure, and large renewable energy projects, such as solar and wind development projects); vegetation treatments; fire and fuels management; livestock grazing; and recreation and travel management. The nature and type of impacts from actions considered for the cumulative impact analysis are as described under the *Nature and Type of Effects.*

The cumulative impacts on air quality from all sources within the cumulative impact analysis area include direct emission of air pollutants from burning fossil fuels (e.g., vehicles and heavy equipment) and from wildland fire. Closing areas to mineral material development could increase impacts to air resources if additional transportation is needed to carry mineral materials to centrally located facilities, rather than being developed and processed in close proximity. However, restrictions to development on BLM lands might push development onto state, tribal or private land, which could result in indirect impacts as described under *Nature and Types of Effects.* Indirect cumulative impacts on air quality arise from the generation of secondary pollutants, such as ozone, stemming from other compounds in the atmosphere. Additionally, surface disturbance can generate dust, contributing to regional visibility degradation. This clarification underscores that ground-level ozone is a result of these secondary pollutants, not a precursor. Cumulative air quality impacts can also indirectly affect vegetations and aquatic ecosystems through pollutant depositions (e.g., acid rain). Impacts to air quality from past, present, and reasonably foreseeable actions, when added to the impacts under each alternative can either offset impacts from emissions (e.g., by limiting development and/or improving vegetation conditions) or contribute to pollutant concentrations in ambient air. These impacts would be similar to those described under *Nature and Type of Effects.*

Climate change trends which include an increasing trend in occurrence and severity of drought conditions, extreme weather, and more uncontrolled extreme wildfires can exacerbate the cumulative impacts on air quality. Extreme weather conditions and severe drought conditions can increase erosion potential and acres of disturbance, resulting in higher potential for fugitive dust formation. Furthermore, extreme temperatures particularly during a period of drought increase the potential for uncontrolled severe wildfires which further contribute to the cumulative air quality impacts from increased emissions.

Impacts to air quality from solar development include increased pollutant concentrations near the solar project development site during construction and reclamation activities (e.g., activities that involve burning fuel and surface disturbance, as described under *Nature and Types of Effects).* Maintenance and operation of solar projects would result in significantly smaller emissions from vehicle and equipment operation. An increase in solar development is expected to reduce the dependence on fossil-fuel-based energy productions and indirectly reduce associated emissions, which continue to be a primary source of emissions.

Comparison of Alternatives

Alternative 1, which is primarily based on management actions from the 2015 plan amendments, would continue to contribute to the cumulative impacts from past, present, and reasonably foreseeable actions. This would result in air quality that resembles current local and regional conditions and follows known air quality trends. According to the modeled ambient air pollutant concentrations from BLM's 2032 Western U.S. Photochemical Air Quality Modeling Study (Ramboll 2023), with the exception of particulate matter, circa 2032 cumulative emissions are not expected to result in exceedances of National Ambient Air Quality Standards (NAAQS) for the portions of the planning area that overlap with the model's study area (Colorado, Montana, North Dakota, South Dakota, Utah, and Wyoming only). Exceedances of $PM_{2.5}$ and PM_{10} in parts of the planning area in Colorado, Montana, South Dakota, Utah, and Wyoming were estimated, primarily due to modeled emission from wildfires.

An increase in air quality impacts from development of mineral and renewable energy projects under Alternative 2 would add to impacts from past, present, and reasonably foreseeable actions that also result in emissions, to increase cumulative impacts compared with Alternative I, while the countervailing impacts of vegetation treatments and fire and fuels as well as any potential for replacement of emissions from fossil fuels through use of renewable sources for energy production would be the same as those under Alternative I. Therefore overall, Alternative 2, would result in an increase in cumulative impacts, compared with Alternative I.

Alternative 3, which has the most restrictions and resource protection measures among the alternatives, would offset the air quality impacts from past, present, and reasonably foreseeable actions to the greatest degree compared with cumulative impacts under Alternative 1. Therefore, Alternative 3 would result in the lowest cumulative air quality impacts among the alternatives.

Under Alternative 4, since mineral and renewable energy development can occur in HMAs, there may be an increase in impacts to air quality from development-related emissions and surface disturbing activity, compared with Alternative 1. However, cumulative impacts on air quality would depend on site- and/or state-specific adjustments.

Similar to Alternative 4, development can occur in HMAs under Alternatives 5 and 6. This would increase the potential for added contribution to cumulative air quality impacts in the form of increased pollutant concentrations, which when added to impacts from past, present, and reasonably foreseeable actions would result in increased cumulative air quality impacts compared with Alternative 1. However, compared with Alternative 4, fewer restrictions on development under Alternatives 5 and 6 would result in a greater contribution to cumulative air quality impacts.

The Proposed RMP Amendment introduces targeted management strategies aimed at improving air quality compared to Alternative 1. By designating PHMA as avoidance areas for major ROWs, exclusion for utility-scale solar and wind projects, and exclusion with no exceptions in areas designated as PHMA with limited exceptions, and by implementing state-specific minimization measures in GHMA, the plan seeks to limit activities that could degrade air quality. Enhanced guidelines for fluid mineral leasing, including exclusion with no waivers, exceptions, or modifications in PHMA with limited exceptions, along with restrictions on saleable and nonenergy minerals, are expected to further reduce air quality impacts, making the Proposed RMP Amendment more effective at protecting air quality than Alternative 1.

4.13.2 Climate Change and Greenhouse Gases

Nature and Type of Effects

Management actions that can affect climate change include actions that increase emission of GHGs, and those that create, eliminate, or damage carbon sinks and sequestration on BLM-administered lands. These include mineral exploration, development, and production activities; livestock grazing, wild horses and burros, and wildlife, wildland fire, vegetation management, rangeland management, and infrastructure development.

Protection of GRSG habitat may move sources of GHGs to different locations but may not change the amount of GHG emissions.

Greater Sage-Grouse Management

Management activities that plan to protect and enhance GRSG populations involve management that restrict or reduce land use and activities that can involve surface disturbance and/or GHG emissions. Conservation activities to this effect can be expected to increase vegetation cover (e.g., sagebrush habitat) and enhance the soil, thereby increasing the amount of carbon that can be sequestered from the atmosphere and stored in the landscape in plants and organic soil. However, such restrictions could shift such development and associated impacts to state, tribal, or private lands, where GHG emissions and surface disturbance would still occur.

Minerals Management (including Fluid minerals, Saleable Minerals/Mineral Materials, Non-energy Leasable Minerals, and Locatable Minerals)

Emission of GHGs occurs during all phases of mineral exploration, development, operation, and reclamation. Vehicles and construction equipment that are used in mineral development emit GHGs from combustion of fossil fuels. Restricting or closing areas to mineral exploration and development activities would reduce or eliminate GHG from such activities where such restrictions or closures occur. Surface disturbance from mineral development and exploration activities can also reduce the carbon sequestration potential of the land.

Lands and Realty Management

ROW projects that involve construction activities would continue to emit GHGs (e.g., from operation of heavy construction equipment and vehicles), and result in surface disturbance which can reduce carbon sequestration potential of the land (e.g., from damaged soils and vegetation). Impacts from solar and wind projects are typically on large areas (several thousand acres) and can require major land disturbance which can reduce carbon sequestration potential in the land. At the project construction stage, solar and wind projects emit GHGs from heavy equipment and vehicles which are used to transport workforce and building material. Less available acreage for solar and wind energy projects could increase the use of fossil fuel for energy development, which emit higher levels of GHGs from operation and downstream emissions.

Livestock Grazing Management

Grazing can impact emission of GHGs and improper grazing can affect vegetation, soils, and water resources (Beschta et al. 2014; Ripple et al. 2014; Gerber et al. 2013). GHG emissions of livestock grazing include methane emissions that can result from manure management and digestive process of most livestock and GHG emissions from vehicles and heavy equipment use (e.g., rangeland management or transporting livestock). Conversely, sustainable livestock grazing can have beneficial effects by reducing fuel loads, reduction in wildfire potential, and improving soil conditions and biological diversity. Grazing, under improved management, can increase carbon sequestration potential of the soil and promote root production (Chen et al. 2015). As described in **Appendix 21**, livestock grazing is managed to meet or make progress toward land health standards, thus reducing the likelihood of adverse effects.

Wild Horse and Burro Management

While there is limited data on GHG emissions from wild horses and burros, there is a growing body of literature which suggests GHG emissions from livestock and wildlife species are similar (Manzano et al. 2023; Wilson and Edwards 2008) likely due in part to occupying similar ecological niches (Manzano and White

2019). As such, this analysis assumes wild horses and burros, wild ungulates, livestock, and wildlife species all contribute similar GHG emissions.

Proposed RMP Amendment

The Proposed RMP Amendment would apply a balanced approach to development while minimizing impacts through specific management strategies compared with Alternative 1. The Proposed RMP Amendment would control fluid mineral resource development with stringent lease stipulations, reducing emissions and preserving carbon sequestration. There would be more restrictions on saleable minerals and coal development, resulting in fewer impacts. In PHMA with limited exceptions, these restrictions for fluid minerals would be further strengthened by disallowing waivers, exceptions, and modifications, thus retaining carbon sequestration and limiting GHG emissions in these areas.

For renewable energy development, the Proposed RMP Amendment is similar to Alternative 1 by designating PHMA as exclusion areas to protect GRSG habitat. However, in PHMA with limited exceptions, renewable energy development would be excluded with no exceptions, specifically for utility-scale solar and wind projects. Development in GHMA would remain allowed with mitigation measures. The Proposed RMP Amendment also emphasizes stronger protections within ROW avoidance areas, more stringent than Alternative 5, to promote the use of designated corridors. In areas designated as PHMA with limited exceptions, the Proposed RMP Amendment would take a stricter approach, with ROW exclusion for major ROWs with only specific exceptions permitted. Together, these restrictions would further reduce GHG emissions and retain carbon sequestration compared with Alternative 1. Additionally, livestock grazing would be managed similarly to Alternative 5, focusing on minimizing conflicts and reducing emissions through careful management practices compared with Alternative 1.

Cumulative Effects

Climate change is a global issue, therefore the cumulative impact analysis area for climate change includes lands within the range of GRSG habitat regardless of land ownership, the nation, and the globe. The time frame for cumulative impacts on climate change depends primarily on the cumulative effects of GHGs and the cumulative change in carbon sequestration in the landscape. Due to the different atmospheric lifetime of various GHGs (e.g., methane lasts 12 years in the atmosphere while carbon dioxide can last much longer) the climate change cumulative impact analysis considers both a 20-year and a 100-year timeframe.

Climate change is cumulative by nature. Over time, GHGs accumulate in the atmosphere and contribute to an overall greenhouse gas effect which is a primary driver of cumulative global climate change that can be attributed to human-related activity. Past, present, and reasonably foreseeable actions that contribute to the cumulative impacts on climate change include mineral exploration and development such as fluid minerals (oil, gas and geothermal), locatable minerals, leasable minerals, and mineral materials; urban and industrial development including major and minor ROWs (e.g., for roads, pipelines, electrical transmission lines, infrastructure, and large renewable energy projects, such as solar and wind development projects); vegetation treatments; fire and fuels management; livestock grazing; and recreation and travel management. However, restrictions to development on BLM lands might push development onto state, tribal or private land, which could result in indirect impacts as described under *Nature and Types of Effects.*

The cumulative impacts from all sources within the cumulative impact analysis area include direct emissions from burning fossil fuel and wildland fire as well as methane emissions from livestock grazing. The total amount of carbon dioxide removed from the atmosphere though carbon sequestration and storage in soils and vegetation would contribute to the cumulative climate change impacts through a reduction in the total

GHG concentrations in the atmosphere. These impacts would be similar to those described under *Nature and Type of Effects.*

Climate change trends, particularly the increasing trend in occurrence and severity of drought conditions affecting carbon sequestration, and the increasing trend in uncontrolled large wildfires affecting GHG emissions can further exacerbate impacts to climate change.

Impacts to climate change from solar development include increased emissions near solar project development sites and reduced carbon sequestration and storage in land at the project location. An increase in solar development is expected to reduce the dependence on fossil-fuel-based energy productions and indirectly reduce associated emissions, which continue to be a primary source of emissions.

Comparison of Alternatives

Alternative I, which is based on management actions from the 2015 plan amendments, would continue to contribute to the cumulative impacts from past, present, and reasonably foreseeable actions. This would result in conditions that resemble current local and regional conditions and follows known climate change trends.

Alternative 2, would result in an increase in cumulative impacts, due to fewer restrictions (e.g., fluid mineral development) which would result in an increase in emission of GHGs and fewer countervailing impacts to climate change from carbon storage, compared with Alternative I.

Alternative 3, which has the most restrictions and resource protection measures among the alternatives, would offset the climate change impacts from past, present, and reasonably foreseeable actions to the greatest degree compared with cumulative impacts under Alternative 1. Therefore, Alternative 3 would result in the lowest cumulative climate change impacts among the alternatives. However, potential increases of acres burned by wildfire and increased fine fuels may result in increased GHG emissions from the burning of vegetation, reducing or negating offsets from other actions.

Under Alternative 4, since mineral and renewable energy development can occur in HMAs, there may be an increase in impacts to climate change from development-related GHG emissions and changes to carbon storage levels of the land, compared with Alternative 1. However, these impacts would depend on site- and/or state-specific adjustments.

Similar to Alternative 4, development can occur in HMAs under Alternatives 5 and 6. This would increase the potential for added contribution to the cumulative climate change impacts in the form of increased GHGs and changes to carbon sequestration, which when added to impacts from past, present, and reasonably foreseeable actions would result in increased cumulative climate change impacts compared with Alternative 1. However, compared with Alternative 4, fewer restrictions on development under Alternatives 5 and 6 would result in a greater contribution to cumulative climate change impacts compared with Alternative 4. Alternative 6 would result in a slightly lower contribution to cumulative effects due to management of ACECs in which some development (e.g., major ROWs, renewable energy development) would be restricted.

The Proposed RMP Amendment introduces more focused management strategies aimed at reducing greenhouse gas emissions and mitigating climate change impacts compared with Alternative 1. By designating PHMA as avoidance areas for major ROWs, exclusion for utility-scale solar and wind projects, and exclusion with no exceptions in areas designated as PHMA with limited exceptions, and by implementing state-specific minimization measures in GHMA, the plan would limit activities that contribute to greenhouse gas emissions.

Specific restrictions on saleable and nonenergy minerals, such as closing new saleable permits in PHMA and applying disturbance thresholds in Idaho's IHMA, enhanced guidelines for fluid mineral leasing, including NSO for fluid mineral leasing, with no waivers, exceptions, or modifications in PHMA with limited exceptions areas, and comprehensive evaluations of surface-disturbing activities would have a lower contribution to cumulative impacts on climate change compared with under Alternative 1. Overall, the Proposed RMP Amendment's detailed protections and targeted management actions would produce fewer greenhouse gas emissions and mitigate contribution to climate change impacts more effectively than Alternative 1.

4.14 SOIL RESOURCES

4.14.1 Nature and Type of Effects

Activities that disturb, compact, contaminate, or remove vegetation from soils are generally considered to degrade soil productivity. In some cases, soil compaction aids in plant establishment and growth. However, too much compaction decreases water infiltration rates and gas exchange rates. Decreased gas exchange rates can cause aeration problems, induce nitrogen and potassium deficiency, and negatively impact root development, which is a key component of soil stabilization. As soil compaction increases, the soil's ability to support vegetation diminishes because the resulting increase in soil strength and change in soil structure (loss of porosity) inhibit root system growth and reduce water infiltration. Vegetation diminishment could lead to a shift of soil resources more dominated by trees to one more dominated by grasses and shrubs. As vegetative cover, water infiltration, and soil stabilizing crusts are diminished or disrupted, the surface water runoff rates increase, further accelerating rates of soil erosion (Weltz et al. 2017).

Impacts on soil productivity and erosion can result from a number of causes, including improper livestock grazing, wild horses and burros, surface-disturbing activities, vegetation treatment projects, prescribed burns, and wildfires. The intensity and extent of impacts on soil productivity and erosion are determined in part by the type and location of the activities. Impacts on soil productivity and erosion can also be affected by any applicable stipulations and plans of operations that address site-specific environmental concerns and require mitigation to stabilize soil, to prevent unnecessary erosion, and to revegetate disturbed surfaces.

Impacts on soil productivity and erosion can be mitigated by avoiding or minimizing the impact. This can be done by managing certain lands as closed or unavailable for surface-disturbing activities, or by restricting the activity by managing certain lands as ROW avoidance areas or attaching such stipulations as NSO or CSU to fluid mineral leases. As described in **Appendix 21**, livestock grazing is managed to meet or make progress toward land health standards, thus reducing the likelihood of adverse effects. Impacts that cannot be avoided can be minimized through project design and the application of COAs and BMPs. In addition, to protect GRSG, disturbance cap requirements and the application of lek buffers can locally eliminate impacts from disturbance. However, there could be impacts elsewhere if the disturbance is pushed to another location to minimize habitat impacts on GRSG.

4.14.2 Proposed RMP Amendment

Livestock Grazing Management

Under the Proposed RMP Amendment, livestock grazing would generally remain available in PHMA, IHMA, and GHMA. However, specific areas, such as portions of 13 key RNAs in Oregon, may be fully or partially unavailable for grazing in order to study them without the interruption of grazing This differs from Alternative 1, where grazing restrictions are less specifically targeted to critical habitat areas, focusing instead on broader management approaches. The BLM would maintain its focus on monitoring and renewing grazing activities in PHMA areas. Site-specific management actions would continue to play a crucial role in determining the impacts on soil productivity and erosion resulting from changes in livestock grazing. These actions would strive to minimize concentrated compaction and aim to maintain or improve soil productivity and erosion conditions, compared with Alternative 1, thereby mitigating effects as described under the *Nature and Type of Effects*. To align with land health standards and GRSG habitat objectives, the BLM Authorized Officer would retain the authority to include or adjust permit terms and conditions within the areas available for livestock grazing. The flexibility emphasized under the Proposed RMP Amendment, compared with Alternative 1, would help ensure that grazing practices remain in compliance with established guidelines and contribute to minimizing local impacts on soil productivity and erosion. The Proposed RMP Amendment includes targeted adjustments to active AUMs, timing, intensity, duration, and frequency of grazing at the allotment scale based on site-specific conditions to meet or make progress toward meeting Land Health Standards for special status species. Temporary adjustments could also be made annually within the range of the terms and conditions and in accordance with applicable regulations.

Wild Horse and Burro Management

Under the Proposed RMP Amendment impacts to soil resources for wild horses and burros would be similar to Alternative 1. Wild horses and burros would be managed within their established AML levels with priority management actions occurring within PHMA and where HMAs/HAs overlap GRSG habitat. Soil health would improve under the Proposed RMP Amendment as a result of reduced populations of wild horses and burros within the planning area, which would in turn reduce associated soil impacts from trampling and excessive forage use.

Management of Surface-disturbing Activities

The Proposed RMP Amendment would include enhanced management strategies for surface-disturbing activities compared with Alternative 1, with a focus on balancing resource development with the conservation of GRSG habitat and soil productivity and erosion conditions. Under the Proposed RMP Amendment, the BLM would conduct comprehensive evaluations of parcels identified in EOIs within GRSG habitat management areas. Priority would be given to parcels that avoid impairing habitat suitability and proper function, which would provide a more specific evaluation approach compared with the general management actions under Alternative 1. This approach is designed to ensure that development activities do not compromise the integrity of GRSG habitat and soil productivity and erosion.

In terms of fluid mineral leasing and development, the Proposed RMP Amendment would apply more stringent lease stipulations and minimization measures compared with Alternative 1. For areas designated as PHMA with limited exceptions, the Proposed RMP Amendment would impose stricter conditions, specifically prohibiting surface occupancy for fluid mineral development with no waivers, exceptions, or modifications. The Proposed RMP Amendment integrates project-specific COAs to further mitigate impacts to soil productivity and erosion. These measures would aim to avoid, minimize, reduce, rectify, and compensate for both direct and indirect effects on soil productivity and erosion conditions, aligning with the objectives described under the *Nature and Type of Effects*, offering more detailed measures than those described under Alternative 1.

For wind and solar development, the Proposed RMP Amendment would designate PHMA as exclusion areas to prioritize GRSG habitat conservation. This restriction on utility-scale projects in these areas are similar to Alternative 1, which designates PHMA as exclusion areas for wind and solar development with some exceptions. Under the Proposed RMP Amendment, a new category, PHMA with limited exceptions, would also be established. This area within PHMA would have stricter limitations compared with Alternative 1, prohibiting utility-scale solar and wind development with no exceptions, while maintaining GHMA as open for such developments, provided that specific minimization measures are implemented to address potential habitat impacts. This approach would provide a greater balance, compared with Alternative 1, regarding the need for renewable energy infrastructure with the protection of GRSG habitat and soil productivity and erosion conditions.

Regarding major transmission ROWs, the Proposed RMP Amendment would designate PHMA as avoidance areas, similarly prioritizing GRSG habitat and soil productivity and erosion protection compared with Alternative 1. PHMA with limited exceptions would be classified as exclusion with exceptions for major ROWs, with specific exceptions. GHMA would continue to be available for ROW development, with specific minimization measures required to mitigate impacts on soil productivity and erosion. Designated corridors for transmission infrastructure would be maintained, ensuring that development does not unduly disrupt GRSG habitat or soil productivity and erosion conditions. This approach aligns with the emphasis under Alternatives 4, 5, and 6 but would offer more stringent measures compared with Alternative 1, which allows new ROWs in PHMA under specific conditions and with limitations on collocation.

4.14.3 Cumulative Effects

The cumulative effects analysis area for soil resources includes the entire rangewide planning area. The time frame for the analysis is 20 years. Soil productivity is the ability of soil to support plant growth, and erosion is the removal of soil from the land surface. Soil productivity and erosion are affected by several factors, including soil type, climate, vegetation, and land use (See **Chapter 4**, Soil Resources, *Nature and Type of Effects* for a more detailed description).

Surface-disturbing activities, improper grazing, wild horses and burros, wildlife use, wildfires, and fuels management activities are examples of past, present, and reasonably foreseeable actions and conditions that have affected and will likely continue to affect soil resources in the cumulative effects analysis area. Impacts from these activities would be as described above in **Section 4.14**. ROW MLB Plans can help assure surface disturbance activities are managed appropriately within or outside of the planning area. Additionally, wildfires can have impacts on soil productivity and erosion, such as vegetation removal which can lead to erosion. Fuels management projects can also help to reduce the risk of wildfires by preventing the large-scale removal of vegetation which can lead to soil erosion. Vegetation and habitat management projects can help to improve the condition of soil productivity and erosion. For example, restoring sagebrush can help to stabilize the soil and reduce erosion. However, some of these projects, such as prescribed burning, can also have some impacts on soil productivity and erosion. In addition, recreation can have impacts on soil resources, including soil compaction and erosion. For example, OHVs can compact the soil, making it less able to absorb water and support plant growth. This can lead to erosion, as water and wind can more easily remove the compacted soil. OHVs can also damage vegetation, which can further increase the risk of erosion.

Federal resource management and land use plans can have impacts on soil productivity and erosion, as they can determine how land is used and how vegetation is managed. For example, a plan that allows for more development could lead to increased soil erosion.

Climate change is expected to have impacts on soil productivity and erosion in the GRSG range. Increased temperatures and decreased precipitation could lead to increased soil evaporation, decreased water availability, and more intense rainfall events. These changes could all contribute to increased soil erosion, which could lead to decreased soil productivity and the loss of important habitat for the GRSG. The impacts of climate change on soil productivity and erosion are cumulative, meaning that they will likely increase over time.

Comparison of Alternatives

Alternative 1 would continue the current trend of impacts on soil productivity and erosion. This is because the alternative does not make any significant changes to the management of activities that can impact soil, such as changes in livestock grazing, changes in surface-disturbing activities (including minerals development, renewable energy development, travel, and ROW development), and changes in vegetation treatments, prescribed burns, and potential for wildfire.

Cumulative effects on soil productivity and erosion would be greater under Alternative 2 compared with Alternative 1 because development activities are anticipated to be greater under this alternative. This is because it would provide more flexibility in the management of activities that can impact soil resources conditions. This could lead to increased soil compaction and erosion, which could reduce soil productivity. For example, if more development is allowed, this could lead to more roads, pipelines, and other infrastructure being built. This could, in turn, reduce soil productivity and make it more difficult for plants to grow.

Cumulative effects would be less intensive under Alternative 3, compared with Alternative 1. This is because it would prohibit or limit the number of surface-disturbing activities. This would help to protect soil productivity and prevent erosion. For example, this alternative would prohibit the construction of new roads or pipelines in sensitive areas. It would also require that development activities be carefully managed to minimize soil disturbance. This would help to protect soil productivity and prevent erosion. However, the lack of vegetation management practices and livestock grazing can effectively reduce fuels thereby diminishing the potential for increased wildfires. Consequently, Alternative 3 could contribute to decreased soil productivity and increased erosion.

Alternative 4 would depend on the specific adjustments that are made. This is because it would be based on Alternatives 1 and 2, with adjustments based on HMA review, or other state-specific considerations. The potential impacts of this alternative on soil productivity and erosion will depend on the specific adjustments that are made. For example, if HMA review identifies areas that are particularly sensitive to soil erosion, then these areas could be protected from development.

Alternatives 5 and 6 would involve an increase in areas designated as PHMA compared with Alternatives 1 and 2. The potential impacts on soil productivity and erosion in this alternative will depend on the specific adjustments made. For instance, if HMA review identifies areas particularly sensitive to soil erosion, protective measures could be implemented to limit development. Similarly, under Alternative 6, stricter ACEC management actions might safeguard soil resources within those areas. However, the reduced protection of Alternative 5 and 6 could result in noteworthy cumulative effects on soil productivity and erosion, lacking the additional safeguards present in Alternative 1.

The Proposed RMP Amendment would introduce targeted strategies to reduce cumulative impacts on soil productivity and erosion compared with Alternative 1. PHMA areas are designated as avoidance for major ROWs and utility-scale solar and wind projects, with stricter restrictions for PHMA with limited exceptions, where no waivers, exceptions, or modifications for fluid mineral development are allowed, and major ROWs are excluded with exceptions. Additional restrictions include closing new saleable permits in PHMA and applying disturbance thresholds in Idaho's IHMA. Enhanced guidelines for fluid mineral leasing and surface-disturbing activities aim to further minimize soil compaction and erosion, making the Proposed RMP Amendment more protective of soil resources than Alternative 1.

4.15 WATER RESOURCES

4.15.1 Nature and Type of Effects

Surface water quality is influenced by both natural and human factors. Natural factors include weather-related erosion, sediment delivery into waterways as the result of wildfire removal of vegetation, and heavy use from overpopulated herds of wild horses and burros. Human-related factors that can temporarily affect surface water quality includes additional transport of eroded soils into streams due to improper recreational activities or improper livestock grazing. Presence of livestock could decrease the quality of water sources, via erosion of banks and increased water turbidity. Any level of horse presence affects waterways (Scanes et al. 2021). Water quality can also be affected by the introduction of soil from low-water crossing points of roads, routes, and ways used by motorized vehicles. Activities that introduce chemicals into the natural environment also have the potential to degrade surface and water quality through chemical leaks, accidents, or broken well casings. All of these activities have appropriate regulation and mitigation measures in place to reduce and, in most cases, eliminate these risks. The specific regulation and mitigation measures may include strict guidelines for chemical handling, spill response protocols, and well casing integrity requirements. Continuous monitoring of water quality in areas where such activities occur allows for the prompt identification of any deviations from regulatory standards. Additionally, the observed reduction in incidents and the successful implementation of mitigation measures in response to past events contribute to the confidence that risks to water quality can be minimized and, in many cases, eliminated.

Surface-disturbing activities, particularly under specific soil types or weather conditions, can also lead to soil compaction, which decreases infiltration rates and elevates the potential for overland flow. Overland flow can increase erosion and sediment delivery potential to area surface water bodies, leading to surface water quality degradation (Belnap et al. 2001). This degradation occurs through mechanisms such as the introduction of excess sediments, which may carry pollutants, nutrients, and contaminants into the water, adversely impacting its quality.

Surface-disturbing activities within stream channels, floodplains, and riparian habitats are more likely to alter natural morphologic stability and floodplain function. Morphologic destabilization and loss of floodplain function accelerate stream channel and bank erosion, increase sediment supply, dewater near-stream alluvium, cause the loss of riparian and fish habitat, and deteriorate water quality (Rosgen 1996). The deterioration of water quality refers to the introduction of excessive sediments and pollutants into the water, disrupting its chemical composition and overall health. Altering or removing riparian habitats can diminish the hydraulic roughness of the bank, which refers to the resistance that natural features provide to water flow. This reduction in hydraulic roughness, in turn, amplifies flow velocities near the bank. The term hydraulic roughness encompasses the natural irregularities, such as vegetation, rocks, and other features, that impede the smooth flow of water. Thus, when riparian habitats are altered or removed, the resulting decrease in hydraulic roughness allows for swifter flow velocities near the bank. This acceleration in flow can lead to accelerated erosion and potentially contribute to a decline in water quality (National Research Council 2002).

Removing riparian vegetation and the shade it provides contributes to elevated stream temperatures (Rishel et al. 1982; Beschta 1997). Increased solar radiation, resulting from the absence of riparian vegetation, can raise water temperatures. This is significant because elevated water temperatures impact the water's ability to hold dissolved oxygen. The relationship between increased water temperature and lower dissolved oxygen concentrations is crucial for understanding water quality issues affecting aquatic life, particularly in the context of GRSG habitat. Warmer water with lower oxygen levels can pose challenges for aquatic ecosystems, potentially influencing GRSG habitat conditions and overall ecosystem health. Channel widening or lowering overall flow can increase solar loading in stream channels through specific mechanisms. For instance, when a channel widens, it enlarges the surface area exposed to solar radiation, intensifying the heating of the channel. Additionally, a decrease in overall flow results in a reduction in water volume within the stream channel. With less water present, there is a greater concentration of solar energy absorbed per unit volume of water, as the lower flow means that the available solar radiation is distributed over a smaller volume. This contributes to an increase in solar loading and, consequently, elevated water temperatures. The principal source of heat energy delivered to the water column remains solar energy striking the stream surface directly (Brown 1969). The ability of riparian vegetation to shade the stream throughout the day depends on aspect and vegetation height, width, density, and positions relative to the stream, as well as the aspect in which the stream flows (streamside vegetation provides less shade on a north- or south-flowing stream than on an east- or west-flowing stream). In this context, aspect refers to the compass direction of the slope or landform where the vegetation is located, influencing the angle and duration of sunlight exposure.

The land uses most commonly associated with stream degradation in the planning area include improper livestock grazing and excessive use by wild horses and burros, as these are the most prevalent disturbances as they often congregate in riparian and wetland areas for water and shade (Weltz et al. 2017). Significant contributors to stream degradation include agricultural expansion, urbanization, and the use of fertilizers, pesticides, and other contaminants, which impacts almost all streams and rivers. The conversion of lands for intensive agriculture has led to stream channel straightening and the removal of riparian vegetation to create fields suitable for irrigation, which may have had a greater impact on stream degradation than grazing alone. Additional land uses linked to degraded streams include poorly located roads, which disrupt drainage and increase sediment runoff, construction activities like bridges and culverts that affect water flow, unmanaged trails that contribute to soil erosion, excessive water withdrawal for agriculture or industry, mineral developments that introduce pollutants, and reservoir operations that alter streamflow and aquatic habitats. These activities collectively contribute to degraded streams and compromised water quality.

Management to protect GRSG generally involves reducing or otherwise restricting land uses and activities that disturb the surface. Therefore, the greater the amount of acreage restricted from a land disturbing use, the greater the protection of impacts from surface disturbing activities afforded to water resources. However, water flows across jurisdictional boundaries and such restrictions could merely shift such surface disturbing activities and associated impacts on water resources from BLM lands to state, Tribal, or private lands. Lands and realty management decisions affect where surface-disturbing activities can and cannot occur. The use of ROW exclusion and NSO stipulations limit the opportunities for surface disturbances and runoff of soils and chemicals into waterways within those areas and are generally considered to be protective of water quality. ROW exclusion and NSO stipulations also reduce the likelihood of chemical spills onto the ground which may contaminate surface or groundwater. In areas managed as ROW avoidance, water quality would receive some protection since ground disturbance would often be limited. ROW avoidance areas would generally result in lower impacts on water quality, compared with areas not managed as ROW avoidance. Areas where ROWs are authorized are permitted with conditions of approval (COAs) which assure that the holder of the rights comply with the Water Quality Act and other federal and state laws, which would protect water resources from degradation.

The intention of BLM management is to ensure that water quality adheres to the Standards and Guidelines for Livestock Grazing Administration (BLM and U.S. Department of Energy 1997 (43 CFR Part 4180.2 (b)). Improper livestock grazing and wild horses and burros above appropriate management levels (AMLs) can lead to loss of vegetation cover, reduced water infiltration rates and nutrient cycling, decreased plant litter, lower water quality, and increased bare ground and soil erosion (Manier et al. 2013). See **Section 4.2**, Greater Sage-Grouse, and **Section 4.3**, Vegetation, for a more detailed analysis regarding these effects. Livestock grazing can be a compatible use in riparian areas when managed consistent with land health standards and land management objectives.

Activities beneficial to water resources are primarily defined as improving conditions by enhancing or restoring degraded water quality or by reducing ongoing groundwater depletion. Changing grazing patterns and maintaining wild horses and burros at AMLs in riparian areas can mitigate negative impacts and further benefit the water quality by promoting vegetation health, stabilizing streambanks, and enhancing nutrient cycling, along with the geomorphic function of streams (Burdick et al. 2021; Kaweck et al. 2018).

Water supply structures throughout the landscape that have been established for multi-purpose use may also provide drinking water sources for GRSG. GRSG will use available water although they do not require it because they obtain their water needs from the food they eat. Information on the extent of habitat influenced by developed water and the net effects on GRSG populations is unknown. Natural water bodies and reservoirs can provide mesic areas for succulent forb and insect production, thereby attracting GRSG hens with broods (Connelly et al. 2004). It is unknown whether wildlife guzzlers built to supply available water in normally arid habitats provide a net benefit to GRSG or if potential benefits are countered by potential negative consequences. These negative consequences may include increased competition from other species that benefit from guzzlers, such as domestic and wild ungulates, or predators and the associated increase in predation risk (Braun 1998). In addition, new water sources may become additional habitat for mosquitoes carrying West Nile virus (Naugle et al. 2004).

Diverting the water sources has the secondary effect of changing the habitat at the water source before diversion. This could result in the loss of either riparian or wet meadow habitat that is important to GRSG as sources of forbs or insects. Further study is needed to determine the effects of water management on the sagebrush biome.

Potential impacts from locatable mineral, mineral material disposal, nonenergy leasable, and fluid leasable mineral activity may result from accidents. The accidents can include the release of pollutants capable of contaminating surface water or aquifers during groundwater recharge as a result of use, storage, and transportation of hazardous fluids and compounds. Mineral resource development activities could alter drainage patterns which would affect stream flow and water supplies, and unintended discharge of mine water could alter water chemistry and impair natural stream morphologic conditions. Effects or impacts from mineral activity is regulated and mitigated through federal and state laws, as well as handbooks, stipulations, and conditions of approval which have effectively reduced the potential of surface or groundwater contamination. However, areas managed as withdrawn from locatable mineral entry would eliminate any potential for impacts on water resources, and therefore be more protective of water resources than areas open to locatable mineral entry.

Effects of wildfire on water resource conditions are determined largely by the severity of the wildfire, suppression tactics used for wildfire management, and post-fire precipitation regimes (Neary et al. 2005). Higher-severity wildfires often result in near complete consumption of vegetation and litter cover and can cause changes to soil chemistry resulting in hydrophobic soil conditions. Wildfire can create hydrophobic soil conditions through a process known as fire-induced soil water repellency. During a wildfire, the intense heat can cause the combustion of organic matter in the soil, releasing hydrophobic substances. These substances then coat soil particles, forming a water-repellent layer. This layer disrupts the natural wettability of the soil, causing water to bead up on the surface rather than penetrating the soil profile. As a result, stream flow responses in severely burned watersheds are typically higher, in some cases orders of magnitude, than in unburned or lower severity burned watersheds. Additionally, increased flooding and debris flow risks can occur up to 5 years after a severe wildfire. (Neary et al. 2005).

Changes in vegetation communities due to wildfire can also affect water resources. Most wildfires in the planning area result in an increase to invasive vegetation communities, particularly cheatgrass. Cheatgrass communities often have shorter wildfire return intervals, altering the 32- to 70-year return interval (a range representing the typical frequency at which wildfire events naturally occurred in these ecosystems) for sagebrush communities to a 5-year wildfire return interval (Pellant 1996).

4.15.2 Proposed RMP Amendment

Livestock Grazing Management

Under the Proposed RMP Amendment, similar to Alternatives 4, 5, and 6, livestock grazing would generally remain available in PHMA, IHMA, and GHMA. However, specific areas, such as portions of 13 key RNAs in Oregon, may be fully or partially unavailable for grazing to allow for comparison of ungrazed to grazed areas. This differs from Alternative 1, where grazing restrictions are less specifically targeted to critical habitat areas, focusing instead on broader management approaches. The BLM would maintain its focus on monitoring and renewing grazing activities in PHMA areas. Site-specific management actions would continue to play a crucial role in determining the impacts on water resource conditions resulting from changes in livestock grazing. These actions would minimize concentrated compaction and aim to maintain or improve water resource conditions, compared with Alternative 1, thereby mitigating effects as described under the *Nature and Type of Effects*.

To align with land health standards and GRSG habitat objectives, the BLM Authorized Officer would retain the authority to include or adjust permit terms and conditions within the areas available for livestock grazing. The flexibility emphasized under the Proposed RMP Amendment would help ensure that grazing practices remain in compliance with established guidelines and contribute to minimizing local impacts on water resource conditions, compared with Alternative 1. The Proposed RMP Amendment includes targeted adjustments to active AUMs, timing, intensity, duration, and frequency of grazing at the allotment scale based on site-specific conditions to meet or make progress toward meeting Land Health Standards for special status species. Temporary adjustments could also be made annually within the range of the terms and conditions and in accordance with applicable regulations.

Wild Horse and Burro Management

Under the Proposed RMP Amendment, impacts from wild horses and burros would be similar to what is described in Alternative 1. Wild horses and burros would be managed within their established AML levels with priority of wild horse and burro management actions occurring within PHMA and where HMAs/HAs overlap GRSG habitat. Water resources would improve under the Proposed RMP Amendment as that a reduction in the current population of wild horses and burros within the planning area would reduce direct impacts wild horses and burros have on water resources.

Management of Surface-disturbing Activities

The Proposed RMP Amendment would include enhanced management strategies for surface-disturbing activities compared with Alternative 1, with a focus on balancing resource development with the conservation of GRSG habitat and water resource conditions. Under the Proposed RMP Amendment, the BLM would conduct comprehensive evaluations of parcels identified in EOIs within GRSG habitat management areas. Priority would be given to parcels that avoid impairing habitat suitability and proper function, which would provide a more specific evaluation approach compared to the general management actions under Alternative 1. This approach is designed to ensure that development activities do not compromise the integrity of GRSG habitat and water resource conditions.

In terms of fluid mineral leasing and development, the Proposed RMP Amendment would apply more stringent lease stipulations and minimization measures compared with Alternative 1. The Proposed RMP Amendment would emphasize the importance of compliance with NEPA requirements and integrate project-specific COAs to further mitigate habitat impacts. These measures aim to avoid, minimize, reduce, rectify, and compensate for both direct and indirect effects on water resource conditions, aligning with the objectives described under the *Nature and Type of Effects*, offering more detailed measures than those described under Alternative 1. Under the Proposed RMP Amendment, fluid mineral leasing and development within PHMA with limited exceptions would be subject to NSO with no waivers, exceptions, or modifications. These limited exceptions provide stricter protections compared to the broader PHMA category, ensuring that areas with the highest conservation value are fully protected from potential habitat impacts associated with fluid mineral activities.

For wind and solar development, the Proposed RMP Amendment would designate PHMA as exclusion areas to prioritize GRSG habitat conservation. PHMA with limited exceptions would also be designated as exclusion areas with no exceptions, ensuring stricter protection in these high-priority areas compared with Alternative 1. This restriction on utility-scale projects in these areas would be similar to Alternative 1, which designates PHMA as exclusion areas for wind and solar development with some exceptions. Utility-scale wind and solar projects would be restricted in these areas to prevent adverse impacts on habitat and water resource conditions. However, GHMA would remain open for such developments, provided that specific minimization measures are implemented to address potential habitat impacts. Compared with Alternative 1, this approach seeks to balance the need for renewable energy infrastructure with the protection of GRSG habitat and water resource conditions.

Regarding major transmission ROWs, the Proposed RMP Amendment would designate PHMA as avoidance areas, similarly prioritizing GRSG habitat protection compared with Alternative 1. PHMA with limited exceptions would be designated as exclusion areas with exceptions, ensuring even stricter control over ROW development in these high-priority areas. GHMA would continue to be available for ROW development, with specific minimization measures required to mitigate impacts on water resource conditions. Designated corridors for transmission infrastructure would be maintained, ensuring that development does not unduly disrupt GRSG habitat or water resource conditions compared with Alternative 1. This approach aligns with the emphasis under Alternatives 4, 5, and 6 but may offer more stringent measures compared with Alternative 1, which allows new ROWs in PHMA under specific conditions and with limitations on collocation.

GRSG Management

The Proposed RMP Amendment would introduce specific provisions that differ from Alternative 1 regarding the potential for wildfire and its impacts on water resource conditions for GRSG. Under the Proposed RMP Amendment, different disturbance caps would be applied within the project analysis area of PHMA depending on the state. Specifically, in Wyoming and Montana, a 5% cap on disturbance would be set, while in other states, a 3% cap would be implemented, limited to infrastructure only. Additionally, within the HAF fine scale habitat selection area in PHMA, a 3% cap on infrastructure disturbance would be enforced.

These measures under the Proposed RMP Amendment, compared with Alternative 1, aim to manage and minimize disturbance, preserve vegetation communities, and mitigate the potential for further degradation, while ensuring the conservation of water resource conditions for GRSG. This approach is designed to improve disturbance management compared with Alternative 1 and addresses the impacts on water resource conditions described under the *Nature and Types of Effects*.

4.15.3 Cumulative Effects

The cumulative impact analysis for water resources conditions will assess the potential impacts of past, present, and reasonably foreseeable actions on water quality and quantity in the entire rangewide planning area over a 20-year time frame. Water quality is the physical, chemical, and biological characteristics of water that determine its suitability for a variety of uses. Water quantity is the amount of water available in a given area. Water resource conditions are affected by several factors, including geology, soil type, climate, vegetation, and land use (See **Chapter 4**, Water Resources, *Nature and Type of Effects* for a more detailed description).

Surface-disturbing activities, improper grazing, wild horses and burros, wildlife use, wildfires, and fuels management activities are examples of past, present, and reasonably foreseeable actions and conditions that have affected and will likely continue to affect water resources conditions in the cumulative impact analysis area. Impacts from these activities would be as described above in **Section 4.12**. Additionally, wildfires can also have impacts on water resources conditions through soil erosion, sedimentation, and water quality degradation. Wildfires can remove vegetation, which can increase the risk of erosion. They can also deposit ash and debris into streams and rivers, which can pollute water supplies. Vegetation and habitat management projects can help to improve the condition of water resources conditions by improving soil productivity and plant growth and decreasing erosion which can lead to sedimentation and contamination. However, some of these projects, such as prescribed burning, can also have some impacts on water resources. For example, prescribed burning can release pollutants, which can then be deposited into water supplies. Furthermore, vegetation management and restoration methods to keep water on the landscape longer within riverscapes will help improve function of these areas. In addition, recreation can have impacts on water resources conditions, including soil compaction, erosion, and water quality degradation. For example, off-highway vehicles can compact the soil, making it less able to absorb water and support plant growth. This can lead to erosion, as water and wind can more easily remove the compacted soil.

Federal resource management and land use plans will continue to be updated to reflect best management decisions for current conditions. These plans determine what activities are allowed on federal lands, like mineral developments, livestock grazing, and recreation. Decisions enabling various projects in land use can cause soil to erode, leading to more sediment in water bodies. Sediment inputs to surface water can lead to increased turbidity and decreased water quality and aquatic habitat. Pollutants such as metals and bacteria can attach to soil particles. Turbidity in streams can also increase the solar energy that is absorbed by the water, thereby increasing the water temperature and impacting aquatic species' habitat. Higher turbidity levels can also reduce the amount of light the water receives and could impact ecological productivity.

Climate change is expected to have impacts on water resource conditions in the rangewide planning area. Increased temperatures and decreased precipitation could lead to changes in the timing and amount of water availability, as well as changes in water quality. These changes could have several downstream impacts, including decreased water supplies, increased risk of flooding and water contamination, growth of harmful algae blooms, and increased salinity among others.

Comparison of Alternatives

Alternative 1 would result in a continuation of current trend of impacts on water resources conditions. This is because the alternative does not make any significant changes to the management of activities that can impact water resources conditions, such as changes in livestock grazing, changes in surface-disturbing activities (including mineral development, renewable energy development, travel, and ROW development), and changes in vegetation treatments, prescribed burns, and potential for wildfire.

Cumulative effects on water resource conditions would be greater under Alternative 2 compared with Alternative 1. This alternative would allow for more development and could lead to greater water degradation. This is because it would provide more flexibility in the management of activities that can impact water resources conditions. This could lead to increased soil compaction, erosion, and sedimentation, which could degrade water quality. For example, if more development is allowed, this could lead to more roads, pipelines, and other infrastructure being built. This could increase the risk of soil compaction and erosion, which could lead to sedimentation in streams and rivers. This could, in turn, degrade water quality and otherwise impact water resources conditions.

Cumulative effects would be less intensive under Alternative 3, compared with Alternative 1, because of increased protections from prohibiting or limiting the number of surface-disturbing activities including changes in livestock grazing, changes in surface-disturbing activities (including mineral development, renewable energy development, travel, and ROW development), and changes in potential for wildfire. This would result in the greatest protections of any alternative for water resources conditions in the planning area. For example, this alternative could prohibit the construction of new roads or pipelines in sensitive areas. It could also require that development activities be carefully managed to minimize soil disturbance. This would help to protect water resources conditions.

Alternative 4 would be based on Alternatives 1 and 2, with adjustments based on HMA review, presence of a potential ACEC, or other state-specific considerations. The potential impacts of this alternative on water resources conditions will depend on the specific adjustments that are made. For example, if HMA review identifies areas that are particularly sensitive to soil erosion, then these areas could be protected from development. Similarly, if an ACEC is identified, then this area could be subject to stricter regulations to protect water resources.

Alternatives 5 and 6 would involve an increase in areas designated as PHMA compared with Alternatives 1 and 2. The potential impacts on water resources conditions in this alternative will depend on the specific adjustments made. For instance, if HMA review identifies areas particularly sensitive to water resources degradation, protective measures could be implemented to limit development. Similarly, for Alternative 6, ACECs with stricter regulations might safeguard water resources within that area. However, the reduced protection of Alternatives 5 and 6 could result in noteworthy cumulative effects on water resources conditions, lacking the additional safeguards present in Alternative 1.

The Proposed RMP Amendment would introduce targeted strategies to reduce cumulative impacts on water resource conditions compared with Alternative 1. PHMA areas are designated as avoidance for major ROWs and utility-scale solar and wind projects, with stricter protections in PHMA with limited exceptions areas. Additional restrictions include closing new saleable permits in PHMA, applying disturbance thresholds in Idaho's IHMA, and enhanced guidelines for fluid mineral leasing and surface-disturbing activities. These measures aim to better protect water resource conditions than under Alternative 1.

4.16 CULTURAL RESOURCES

4.16.1 Nature and Type of Effects

Effects on cultural resources can be direct, indirect, or cumulative. They can also be adverse or beneficial. Effects from management guidance under each alternative will be largely indirect and cumulative, influencing the effects (or lack of thereof) from future undertakings.

On a project-by-project basis, the spatial distribution (or range) of effects would be largely focused on the specific site or location of a development or action. However, over time and as more actions occur throughout the planning area, the extent of these effects on cultural resources would accumulate throughout the planning area.

The nature and type of effects to be expected from different management actions are explained in more detail below:

GRSG Management

GRSG management in the proposed alternatives includes designation of HMAs for the benefit of GRSG. Restrictions on land use and surface-disturbing activities would occur within the HMAs. These restrictions and corresponding management guidance, including required design features and habitat objectives seeking to stabilize or increase GRSG populations in HMAs, would reduce potential for ground disturbance, changes in setting such as visual or auditory disturbance, and access.

A cap for disturbance in GRSG habitat is present in some form under all alternatives, ranging from 3% to 5%. This cap varies by alternative and within alternatives by state and situation, limiting disturbance to some degree for the benefit of GRSG. This would offer protection to cultural resources in these habitat areas from impacts due to disturbance under all alternatives, including ground disturbing activities and alterations of setting. This is discussed in detail by alternative. While this will reduce potential for impacts on cultural resources in certain areas, it is likely at least some of the development related habitat impacts will be displaced to locations outside of these protected areas, exposing cultural resources elsewhere to greater potential for impacts.

While intended to benefit the GRSG, reduced potential for ground disturbance, changes in setting, and increase in access would tend to be protective of cultural resources within these areas. Designations of HMA and management guidance by designation varies under each alternative and between states, and the differences will be discussed in more detail below.

Minerals Management (including Fluid minerals, Saleable Minerals/Mineral Materials, Non-energy Leasable Minerals, and Locatable Minerals)

Surface disturbing activities associated with mineral exploration and development would have potential direct and indirect impacts on cultural resources, including damaging, destroying, and/or displacing artifacts and features, and construction of modern features out of character with a historic setting. Many cultural resources that occur on or just below the ground are susceptible to surface disturbance and erosion damage, including modifying spatial relationships of artifacts and destroying features and stratified deposits. The information loss may be relevant to the site function, dates of occupation, subsistence, and past environments; all of these are important to understanding past culture.

Depending on the extent and type of activity, the amount of physical disturbance could be from slight artifact shifts out of context in a small portion of the site to wholesale destruction of the entire site. Should a portion of a site be impacted, it is crucial to recognize that data recovery, while seeking to retrieve valuable information, inherently constitutes an adverse effect. Despite the intention to contribute to the historical or prehistoric record of the region, the process of data recovery itself can have adverse implications. Furthermore, the historical record could be influenced by physical disturbance, encompassing both prehistoric and historic contexts. Adverse impacts that result in an irreversible and irretrievable loss of cultural resource value are of the highest severity. Mineral exploration and development could result in impacts to cultural resources due to surface disturbing or setting altering activities such as road development and use, facility construction and placement, and creation of well pads and pipelines.

Indirect impacts on cultural resources include changing the character of a property's use or physical features within a property's setting that contribute to its historic significance (e.g., isolating the property from its setting) and introducing visual, atmospheric, or sound elements that diminish the integrity of the property's historic features.

Areas closed to mineral leasing and development, or restrictions placed on these activities would reduce the total acreage of potential surface disturbance and associated impacts to cultural resources in those areas. While this would reduce potential for impacts on cultural resources in protected HMA, it is likely at least some of the development related habitat impacts will be displaced to locations outside of HMA, exposing cultural resources in other areas to greater potential for impacts. Additionally, many cultural resources have been discovered because of field surveys associated with anticipated mineral development activities. Reducing mineral development could have the unintended effect of reducing surveys and discoveries.

Renewable Energy Management

The nature and type of effects on cultural resources from renewable energy development and associated infrastructure (including construction and operation of distribution and transmission lines, substations, and access roads) would largely be similar to the type of effects resulting from minerals management, including damaging, destroying, and/or displacing artifacts and features, and construction of modern features out of character with a historic setting.

Similar to minerals management, closing areas to renewable energy development or restricting surface-disturbing activities during development of renewable energy projects would reduce potential impacts to cultural resources in these areas. While this would reduce potential for impacts on cultural resources in protected HMA, it is likely at least some of the development related habitat impacts will be displaced to locations outside of HMA, exposing cultural resources in other areas to greater potential for impacts.

Lands and Realty Management

The nature and type of effects on cultural resources from ROW development would be similar to the type of effects resulting from minerals management and renewable energy management.

Generally speaking, management actions such as establishing ROW exclusion and avoidance areas offer increased protection to cultural resources in these areas from surface disturbing activities or alterations in setting like construction of highly visible features, and from increased access that often accompanies construction in ROWs. While this would reduce potential for impacts on cultural resources in these areas, it is very likely with ROWs that the development related impacts will simply be displaced to other locations, exposing cultural resources in other areas to greater potential for impacts and potential increasing the potential for impacts by resulting in longer ROWs.

Livestock Grazing and Wild Horse and Burro Management

Cultural resources can be adversely impacted by livestock and grazing through direct trampling of artifacts and features and from such activities as trailing or concentrating around water, under shade, or along natural constraining features such as rock cliffs. Experimental studies have shown that trampling significantly impacts both the physical artifacts and features of a site. It also distorts the most common analytical approaches to measuring sites, such as artifact abundance, raw material proportions, and average artifact dimensions (Osborn et al. 1987; Douglass and Wandsnider 2012). Trampling also causes the vertical displacement of artifacts, especially in wet ground (Eren et al. 2010). Making land unavailable for livestock grazing and removal of wild horses or burros would be protective of cultural resources.

The loss of vegetation, such as grass, forbs, and shrubs over-consumed by improperly managed livestock, wild horses, or burros can result in increased erosion (**Section 4.14.2**, Soil, Nature and Type of Effects), potentially impacting the integrity of cultural resources. Erosion and the loss of vegetation due to improper grazing could also result in impacts to the setting of cultural resources. However, as described in **Appendix 21**, livestock grazing is managed to meet or make progress toward land health standards, thus reducing the likelihood of these effects. Additionally, the BLM manages overpopulations of wild horses and burros through standard population control measures and habitat management to further protect the integrity and setting of cultural resources.

4.16.2 Impacts Common to All Alternatives

Under all alternatives, the BLM would continue to adhere to the existing laws, such as the National Historic Preservation Act, and cultural resource related policy like that found in BLM manuals and handbooks, such as Manual 8100 The Foundations for Managing Cultural Resources (BLM 2004a). This would generally act to protect culturally significant resources from impacts related to ground-disturbing activities, alterations to setting, and vandalism or unauthorized collection. It would also contribute to mitigating unavoidable impacts to cultural resources through various strategies. These might involve the collection of scientific data during cultural resource inventories or excavations, as well as *in situ* preservation to minimize physical disturbance and avoidance measures to guide activities away from sensitive areas. The BLM would continue to identify and manage cultural resources on a programmatic and project specific level. Additionally, continued consultation and cooperation with State Historic Preservation Offices and Native American Tribes would allow information on cultural properties and cultural landscapes to continue to be compiled and concerns regarding sensitive cultural resources such as traditional cultural properties (TCPs) to be addressed. This would enable better future management and protection of the integrity of these resources.

4.16.3 Proposed RMP Amendment

GRSG Management

Under the Proposed RMP Amendment, the impacts on cultural resources from designating HMAs within GRSG habitat would be similar to those described under Alternative 1, although PHMA would cover a larger area and SFAs would not be designated under the Proposed RMP Amendment. Additionally, under the Proposed RMP Amendment, the disturbance cap in PHMA (and IHMA in Idaho) for all states would be 3% for new and pre-existing authorizations within HAF fine scale habitat selection area and would apply only to infrastructure (not to wildfire or agriculture). In Wyoming and Montana, a 5% cap in PHMA at the project scale includes disturbance from wildfire and agriculture. In all other states (Colorado, Montana, Idaho, Nevada, California, Oregon, Utah, North Dakota, and South Dakota), a 3% cap at the project scale would not include wildfire or agriculture-related disturbance. However, in areas designated as PHMA with limited exceptions, additional protections would be in place that may further reduce potential impacts on cultural resources within these specific areas compared with Alternative 1.

Minerals Management (including Fluid minerals, Saleable Minerals/Mineral Materials, Non-energy Leasable Minerals, and Locatable Minerals)

Under the Proposed RMP Amendment, fluid mineral leasing management would seek to minimize impacts on GRSG habitat through the reduction of habitat fragmentation and loss, which would be generally protective of cultural resources in GRSG habitat. Under the Proposed RMP Amendment, a greater number of waivers, exceptions, and modifications for fluid minerals leasing applied across a larger portion of the planning area could enable a greater degree of development in HMAs than under Alternative 1, leading to increased potential for impacts on cultural resources related to fluid mineral development, as described under *Nature and Type of Effects*. Additionally, in PHMA with limited exceptions, there would be no waivers, exceptions, or modifications allowed, which could reduce potential disturbances to cultural resources in these areas compared to other PHMA areas.

Renewable Energy Management

Under the Proposed RMP Amendment, impacts on cultural resources related to renewable energy development would be as described in *Nature and Type of Effects*. Exclusion or avoidance of renewable energy development within HMAs under the Proposed RMP Amendment would reduce potential for impacts on cultural resources within these areas and would likely result in a shift of these activities to suitable areas outside of HMAs, negatively impacting cultural resources outside of them. Overall, the restrictions on renewable energy development under the Proposed RMP Amendment could make development more costly and difficult or prevent any uses that could not be relocated to a suitable area, though the overall likelihood of habitat impacts related to renewable energy development within the planning area would likely be similar to that under Alternative 1. In PHMA with limited exceptions, renewable energy development would be excluded without exceptions, which could further limit potential impacts to cultural resources within these areas. Impacts on cultural resources within HMAs would be greater than under Alternative 1 due to the lack of HMAs designated as solar and wind energy exclusion areas. However, the overall likelihood of these habitat impacts within the planning area is likely to be similar to that under Alternative 1, since impacts on cultural resources due to renewable energy development may only be displaced instead of avoided entirely.

Lands and Realty Management

Under the Proposed RMP Amendment, the designation of GHMA as open to major ROWs and the lack of major ROW exclusions could result in shorter ROWs compared with Alternative 1, since Alternative 1 includes greater ROW avoidance or exclusion designations. Shorter ROWs would reduce the overall area where cultural resources could potentially be impacted by ROWs across the planning area compared to all other alternatives. In PHMA with limited exceptions, ROW designations would be excluded with exceptions, potentially reducing the likelihood of cultural resource impacts compared to other areas where avoidance is the standard.

Livestock Grazing Management

Under the Proposed RMP Amendment, impacts on cultural resources from livestock grazing management would be the same as described under Alternative 1.

Wild Horse and Burro Management

Impacts from wild horse and burro management under the Proposed RMP Amendment would be similar to those described under Alternative 1. However, management within established AMLs could reduce impacts from wild horses and burros on cultural resources in some areas.

4.16.4 Cumulative Effects

The effects of past, present, and reasonably foreseeable actions would, when combined with impacts from the decisions made in this planning effort, produce cumulative impacts on cultural resources that differ by alternative. Every impact to cultural resources is cumulative and adverse impacts are permanent; beneficial impacts cannot reverse these impacts. The cumulative effects study area for cultural resources is the planning area and the time frame is 20 years, or the anticipated lifetime of the GRSG RMPA.

Surface-disturbing activities associated with development are the greatest contributor to cumulative impacts to cultural resources. Past and present actions contributing to cumulative impacts on cultural resources in the planning area include mineral exploration, development, and production (including oil and gas); increased recreation and tourism; urban and rural community development; livestock grazing; wild horse and burro management; land use authorizations for ROWs; road construction associated with a variety of uses; renewable energy development, fuels and vegetation treatments, and wildfire. The effects of climate change also present an ongoing threat to cultural resources. Increasing soil erosion, wildfire occurrence and severity, and events such as severe storms that increase weathering and erosion all impact cultural resources and are influenced by a changing climate. Land planning efforts such as this resource management plan tend to offer increased protections to cultural resources, even if incidental to their purposes. Future actions with the potential to affect cultural resources are expected to be very similar to the described past and present actions, influenced by the future social, economic, and regulatory landscape.

Comparison of Alternatives

Under all the alternatives, the over-arching goal or objective of preserving and reducing impacts to GRSG habitat and populations will likely lead to reductions in cumulative impacts on cultural resources by reducing activities like surface disturbance in GRSG habitat. However, the likely contribution to cumulative effects on cultural resources in the planning area varies by alternative.

Alternative 1 would result in a continuation of current impacts on cultural resources from GRSG management decisions regarding activities such as mineral development, renewable energy development, livestock grazing, and ROW location.

Under Alternative 2, potential for impacts on cultural resources is similar in magnitude, but likely greater than under Alternative 1 due to increased potential for fluid mineral and renewable energy development, as well as increased potential for ROW location in PHMA. This alternative would result in the highest level of cumulative impacts on cultural resources in the planning area.

Due to the most robust disturbance cap and highest acreage of designated 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 level of cumulative impacts on cultural resources in the planning area.

Alternatives 4 and 5 would be based on Alternatives 1 and 2, with adjustments based on HMA review and other state-specific considerations. While it is anticipated that impacts under Alternative 4 and 5 will be similar in magnitude to those under Alternatives 1 and 2, the potential impacts on cultural resources from selection of one of these alternatives would depend on the specific adjustments that are made.

Impacts under Alternative 6 would be similar to impacts under Alternatives 4 and 5 except for the designation of ACECs, which may offer additional protection to cultural resources within them.

The Proposed RMP Amendment would have a reduced contribution to cumulative impacts due to the exclusion for solar and wind in PHMA and strengthened protections in PHMA with limited exceptions. In these areas, surface-disturbing activities such as non-energy mineral,, fluid mineral and renewable energy development, and ROW location will be more restricted, potentially reducing cumulative impacts on cultural resources within these specific areas.

4.17 Tribal Interests

4.17.1 Nature and Types of Effects

The nature and type of most effects on Tribal interests are general and non-quantifiable in nature. In general, activities that result in ground disturbance to lands currently or historically occupied by GRSG could decrease opportunities for tribes to maintain traditional cultural practices and values if these activities result in decreases in GRSG populations. These include, but are not necessarily limited to, granting ROWs for road and highway construction, wind energy development, vegetation treatments in sagebrush communities, development of leasable, locatable, saleable, and fluid minerals, OHV use, and special recreation permits (SRPs). Additionally, many tribes manage large areas near BLM lands and rely on BLM ROWs for essential infrastructure and resource development on their lands. Thus, Tribal interests extend beyond cultural practices to include resource management and economic needs. Livestock grazing and wild horse and burros may also alter the landscape in ways that decrease Tribal opportunities to maintain specific traditional practices and values. In addition, natural processes that are impossible to control likely add to the human-caused impacts on GRSG and their habitats listed above, including climate change, drought, and lightning-caused wildfires. The general impacts on Tribal interests that would result through the implementation of each alternative analyzed in this EIS are described below.

Types of impacts that could occur from management actions or their implementation under all alternatives including the following:

- Direct disturbance of locations or landscapes associated with trust or treaty assets, traditional beliefs, sacred sites, resource gathering areas, hunting and fishing areas, water sources, ancestral sites, human remains, and trails (similar to those described in **Section 4.16,** Cultural Resources)
- Alterations of visual and aural aspects of the cultural landscape's setting that would create changes to the landscape that make it no long useable by Tribal members
- Increased access and human presence, which could lead to increased vandalism and unauthorized collection of ancestral sites or trespass on treaty areas
- Decreased Tribal member access or interference with the exercise of treaty rights or cultural uses and practices, such as resource gathering or hunting and fishing
- The potential for erosion, pollution, habitat loss, and less-tangible changes to natural features and resources that Tribal members may consider sacred

Any action that would impact the integrity of an Indian Trust Asset or treaty-based right of a tribe or Tribal resource in the planning area would be considered an adverse effect on that resource, asset, or interest. Impacts can be caused by development (e.g., road construction) or conservation (e.g., habitat improvement or landscape reclamation) actions or future implementation actions. The BLM would continue to maintain government-to-government consultation with federally recognized Native American tribes and would consult with tribes during future implementation actions to assess case-by-case or project-by-project impacts.

Depending on the extent and type of activity the amount of physical disturbance could be from slight visual or other intrusions on a landscape to wholesale destruction of an entire location or site. Whether impacts would affect a small portion of an area or affect a larger stretch of landscape would need to be evaluated by Tribal representatives before making a determination on said impact's severity. However, it is usual to assume that impacts resulting in an irreversible and irretrievable loss of Tribal value are of the highest severity. On a project-by-project basis, the spatial distribution (or range) of the disturbance would be largely focused on a site-specific basis. However, over time and as more actions occur throughout the planning area, the extent would be throughout sagebrush habitat.

4.17.2 Impacts Common to All Alternatives

Under all alternatives the BLM would continue to manage BLM-administered lands in a manner that accommodates Native American religious traditions, practices, and beliefs as guided by directives contained in BLM Manual 1780, BLM Handbook 1780-1, American Indian Religious Freedom Act (42 U.S.C. 1996), Native American Graves Protection and Repatriation Act (25 U.S.C. 3001), Executive Order 13007 (Indian Sacred Sites), and Executive Order 13084 (Tribal Consultation), Secretarial Order 3317, DOI Policy on Consultation with Indian Tribes (December 1, 2011), and Joint Secretarial Order 3403, on Fulfilling the Trust Responsibility to Indian Tribes in the Stewardship of Federal Lands and Waters (November 21, 2022). All alternatives allow for the appropriate Tribal governments to consult on a case-by-case basis on undertakings on BLM-administered land that could affect Native American concerns. The BLM would continue to identify, protect, and preserve Tribal assets, treaty rights, sacred/religious sites, or special use areas through site- and project-specific modification or mitigation on a case-by-case or project-by-project consultation basis that could affect Native American concerns.

Under all alternatives, actions that provide protections for GRSG or its habitat by limiting access into areas or excluding surface-disturbing activities, such as NSO and restrictions on surface and vehicle use would protect cultural resources from effects due to surface disturbance, erosion, effects on setting and access leading to vandalism, inadvertent damage, and unauthorized collection of cultural resources. These actions could also increase Tribal opportunities to maintain specific traditional practices and values such as traditional plant gathering, hunting animals including GRSG, and the role played by GRSG in oral traditions and cultural practices such as observing lekking behavior as described in the Nevada and Northeastern California Greater Sage-Grouse Proposed Land Use Plan Amendment and Final Environmental Impact Statement (BLM 2020b) if the current leasing of nonenergy minerals has led to decreases in GRSG populations.

4.17.3 Proposed RMP Amendment

GRSG Management

Under the Proposed RMP Amendment, the BLM would be more restrictive than Alternative which includes additional consideration of adjustments to HMAs to balance multi-use opportunities. In PHMA, there would be solar and wind exclusions and major rights of way avoidance which would provide greater protections than under Alternatives 4 and 5. In and PHMA with limited exceptions, stricter protections would be applied, eliminating waivers, exceptions, and modifications allowed under standard PHMA, which may further prevent impacts to Tribal interests.

Lands and Realty Management

Under the Proposed RMP Amendment, the potential impacts on areas of Tribal interest in PHMA would be similar to those described under Alternative 1. However, in PHMA with limited exceptions, ROW designations would follow an exclusion with exceptions approach, potentially leading to greater protection of Tribal interests within these areas. Impacts in GHMA would be similar to those under Alternatives 1 and

2, but additional state-specific requirements as described for GRSG in **Section 4.2.1** above would provide additional protections to Tribal interests.

Managing PHMA as exclusion for renewable energy would have impacts similar to those described for Alternative 1. Managing associated ROWs as exclusion would offer greater protections than Alternative 1. Managing PHMA with limited exceptions would further reduce impacts by not allowing exceptions to these exclusions. GHMA would be open, but the requirement for minimization measures and mitigation in the Proposed RMP Amendment would provide more protections for Tribal interests.

Impacts from applying a disturbance cap under the Proposed RMP Amendment would be the same as described for Alternative 5, meaning impacts from applying a 3% disturbance cap would be the same as described for Alternative 4, except in Wyoming and Montana, which would have a 5% disturbance cap at the project scale. Impacts from exceeding the 3% disturbance cap under certain conditions would be similar to those described for Alternative 4, but more exceptions would be allowed, which may result in increased development and potential disturbance to resources of Tribal interest.

Minerals Management (including Fluid minerals, Saleable Minerals/Mineral Materials, Non-energy Leasable Minerals, and Locatable Minerals)

Under the Proposed RMP Amendment, limitations on fluid mineral leasing would seek to minimize impacts on GRSG and their habitats through the reduction of habitat fragmentation and loss, compared with Alternative 1, generally protecting cultural resources and other Tribal interests in GRSG habitat. However, a greater number of waivers, exceptions, and modifications for fluid minerals leasing applied across a larger portion of the planning area could enable a greater degree of development in HMAs than under Alternative 1. In PHMA with limited exceptions, fluid minerals would be subject to NSO without waivers, exceptions, or modifications, which could lead to reduced fluid mineral extraction activities in these areas and potentially leading to greater protection of Tribal interests within these areas.

Livestock Grazing Management

Impacts under the Proposed RMP Amendment would be the same as those described under Alternative 1.

Wild Horse and Burro Management

Impacts from wild horse and burro management under the Proposed RMP Amendment would be similar to those described under Alternative 1. However, management within established AMLs could increase GRSG habitat quality, which could enhance opportunities for tribes to maintain traditional practices in some areas.

4.17.4 Cumulative Effects

The effects of past, present, and reasonably foreseeable actions would, when combined with impacts from the decisions made in this planning effort, produce cumulative impacts on resources and areas of Tribal interest that differ by alternative. The cumulative effects study area for cultural resources is the planning area and the time frame is 20 years, or the anticipated lifetime of the GRSG RMPA.

Increasing development pressure including increased oil and gas and renewable energy development; recreation uses; construction of pipelines, transmission lines, and roads; urban expansion within the planning area; and livestock grazing would likely continue on a regional scale. Resource management activities within the planning area and surrounding areas would likely result in a trend toward increased adverse impacts and ultimately the destruction of many cultural resources and other areas of Tribal interest through time and across political boundaries. If this trend continues as expected, the preservation of cultural resources, research, public education, and consultation with Native American Tribes will become even more critical.

Surface-disturbing activities are the greatest contributor to cumulative impacts to resources and areas of Tribal interest. Residential development and associated recreation opportunities and access on adjacent lands, both within and near the planning area, will continue to be a likely avenue for adverse effects on resources and areas of Tribal interest. Other past and present actions that have affected and would continue to adversely affect resources and areas of Tribal interest include energy and mineral exploration and development; range improvements; lands and realty ROWs; OHV travel and recreation use; wildland fires, and vegetation treatments for fire management and forest health. These actions have cumulative impacts on resources through surface disturbance that contributes to erosion and subsequent sedimentation; exposure of contributing cultural features and artifacts from removal of vegetative cover; and better vehicular access to resources and areas that could lead to relic hunting, and/or disturbance to contributing features and artifacts by vandals.

Comparison of Alternatives

Under all the alternatives, the over-arching goal or objective of preserving and reducing impacts to GRSG habitat and populations will likely lead to reductions in cumulative impacts on cultural resources by reducing activities like surface-disturbance in GRSG habitat. However, the likely contribution to cumulative effects on cultural resources in the planning area varies by alternative.

Alternative 1 would result in a continuation of current impacts on resources and areas of Tribal interest from GRSG management decisions regarding activities such as mineral development, renewable energy development, livestock grazing, and ROW location. However, cumulative adverse impacts to resources and areas of Tribal importance under Alternative 1 are anticipated to be minor to moderate based on Section 106 compliance procedures, in addition to authorities mentioned in **Section 3.16**, which include appropriate Tribal consultation on a case-by-case basis on undertakings on BLM-administered land that could affect Native American concerns.

Under Alternative 2, potential for impacts on 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 would result in the highest level of cumulative impacts on resources and areas of Tribal interest in the planning area.

Under Alternative 3, the level of surface-disturbing activities on BLM-administered public lands would greatly reduce impacts and improve protection to resources and areas of Tribal interest over the other alternatives. Alternative 3 would provide the best protection and would result in the least cumulative impacts when compared to the other alternatives. Cumulative adverse impacts to resources and areas of Tribal importance under Alternative 3 are anticipated to be minor based on Section 106 compliance procedures which include appropriate Tribal consultation on a case-by-case basis on undertakings on BLM-administered land that could affect Native American concerns.

Cumulative impacts to resources and areas of Tribal interest under Alternatives 4 and 5 would be similar to those of Alternatives 1 and 2, with state-specific considerations and adjustments to HMA allocations based on data review. While impacts under Alternatives 4 and 5 would be similar in type to those under Alternatives 1 and 2, the degree of the potential impacts on resources and areas of Tribal interests from selection of one of these alternatives would vary based on the specific adjustments that are made.

Impacts on Tribal interests under Alternative 6 would be similar to impacts under Alternatives 4 and 5 except for the designation of ACECs, which may offer additional protection to cultural resources within them.

The Proposed RMP Amendment would have reduced contribution to cumulative effects due to management of PHMA with limited exceptions. In those areas, stricter protections would be enforced, particularly through the exclusion of waivers, exceptions, and modifications for surface-disturbing activities. This could lead to reduced adverse impacts on resources and areas of Tribal interest in these specific locations, offering greater protection compared to the broader PHMA areas.

4.18 LANDS WITH WILDERNESS CHARACTERISTICS

4.18.1 Nature and Type of Effects

Wilderness characteristics are primarily influenced by actions that impact the undeveloped nature of the area or by activities that increase the sights and sounds of other visitors. Linear developments also impact the sizes of lands with wilderness characteristics units, which can also impact a unit's eligible acreage. These actions and activities could change the wilderness qualities listed in BLM Manual 6310 that make up the criteria for lands with wilderness characteristics. Generally, actions that create surface disturbance degrade the naturalness of wilderness characteristics, as well as the setting for experiences of solitude and primitive recreation.

Allowing any type of energy or mineral development, such as fluid, nonenergy leasable, and saleable minerals, as well as renewable energy (e.g., wind and solar), would result in surface disturbance that would diminish the area's natural characteristics. Any new roads authorized for access to the development area could eliminate wilderness characteristics of the entire unit. This would be the case if the road were to bisect the unit so that it would no longer be considered a roadless area of adequate size. In addition, allowing developers regular access to the lease area or mine site would reduce opportunities for solitude. ROW exclusion areas provide direct and indirect protection of wilderness characteristics by preserving naturalness and opportunities for solitude and primitive recreation by prohibiting disturbance and fragmentation from transmission lines, roads, and other utility developments. ROW avoidance areas also provide protection of wilderness characteristics by encouraging ROW development outside of the avoidance area when feasible.

Impacts on wilderness characteristics are possible from changes in livestock grazing and wild horse and burro management, particularly from new developments (e.g., water developments and range facilities) in lands with wilderness characteristics. This could lessen the naturalness of appearance or could limit unconfined recreation. Existing range facilities used for livestock grazing and wild horse and burro management, such as stock trails and spring developments, would result in no changes to current wilderness characteristics. Installing and maintaining range improvements could result in short-term impacts on solitude and naturalness due to human presence, noise, and disturbance. In addition, range improvements reduce the overall appearance of naturalness over the long-term and could result in short-term impacts on solitude and naturalness due to human presence, noise, and disturbance during installation. Where areas are unavailable for livestock grazing, lands with wilderness characteristics that overlap with these areas would experience a reduction of these impacts. However, removing livestock grazing exposes lands with wilderness characteristics to fuel buildup and increased risk of wildland fire. Gathering operations to manage wild horse and burro populations would temporarily reduce opportunities for solitude due to the increase in human presence and noise during these efforts.

4.18.2 Proposed RMP Amendment

Management of PHMA with limited exceptions under the Proposed RMP Amendment, the direction would be NSO with no waivers, exceptions, or modifications, providing stronger protections to wilderness characteristics in these areas. That is, no changes to mineral resource use allocations would be made, but fluid mineral leasing would be managed to minimize the potential for conflict and associated impacts from subsequent development in important habitats or connectivity areas. The evaluation of parcels and the consideration of development proximity, habitat significance, and potential would contribute to the preservation of naturalness in lands with wilderness characteristics.

The Proposed RMP Amendment would designate PHMA as exclusion areas to prioritize GRSG habitat conservation. This restriction on utility-scale projects in these areas are similar to Alternative 1, which designates PHMA as exclusion areas for wind and solar development with some exceptions. PHMA with limited exceptions would be subject to an absolute exclusion for utility-scale solar and wind projects, with no exceptions. Utility-scale wind and solar projects would be restricted in these areas to prevent adverse impacts on habitat and soil productivity and erosion. However, GHMA would remain open for such developments, provided that specific minimization measures are implemented to address potential impacts.

Under the Proposed RMP Amendment, impacts on lands with wilderness characteristics from ROW avoidance designations would be similar to those as described under Alternative 4 but greater in magnitude due to GHMA being managed as open to major ROW development. This approach aligns with the emphasis in Alternatives 4, 5, and 6 but may offer more stringent measures compared with Alternative 1, which allows new ROWs in PHMA only under specific conditions. PHMA with limited exceptions would be managed under an exclusion with exceptions approach, which would further reduce impacts on lands with wilderness characteristics in those areas.

Under the Proposed RMP Amendment, impacts on lands with wilderness characteristics from livestock grazing management would be the similar as those described under Alternative 4, 5, and 6. All GRSG HMAs would be available for livestock grazing, except in Oregon, where some, all, or none of 15 key RNAs would be unavailable. Livestock grazing would be managed toward meeting land health standards to meet or make progress toward meeting the GRSG habitat objectives in HMAs. The Proposed RMP Amendment would provide additional protections to lands with wilderness characteristics, compared with Alternative 1, because the BLM would design new range improvement projects to enhance livestock distribution and new structural range improvements would be placed along existing disturbance corridors where possible to not increase impacts on GRSG and their habitat. This would limit the impacts on lands with wilderness characteristics from new range improvement projects as described under *Nature and Type of Effects*.

4.18.3 Cumulative Effects

The cumulative effects study area for lands with wilderness characteristics includes BLM-administered lands in the planning area where completed inventories have identified wilderness characteristics to be present. The period of potential cumulative impacts is the approximately 20-year timeline of the plan.

Past and present actions in the cumulative effects study area that affected lands with wilderness characteristics include resource uses, such as, mineral extraction, utility and infrastructure development, recreation and travel management, and livestock grazing and range improvements as these activities affect the naturalness and outstanding opportunities for solitude and primitive recreation. Reasonably foreseeable actions would have similar effects to the extent that they occurred within lands with wilderness characteristics units.

Alternative 1 would result in a continuation of existing trends of current impacts on lands with wilderness characteristics because there would be no changes to the existing management of GRSG habitats where they occur within lands with wilderness characteristics units.

Mineral leasing, exploration, and development have and continue to occur throughout the planning area. Areas under this alternative that are managed as open to fluid, saleable, and locatable mineral entry would impact lands with wilderness characteristics through surface disturbances associated with these types of projects which reduce the opportunities for solitude and primitive and unconfined recreation in lands with wilderness characteristics.

Large-scale planning projects for major ROWs, such as the Solar Programmatic EIS and the westwide energy corridors would reduce the size of lands with wilderness characteristics units and impair the apparent naturalness of the area and the experience of solitude. There could be additional impacts to lands with wilderness characteristics within PHMAs that are managed as avoidance areas which would encourage ROW development outside of PHMAs, but not prevent ROW developments from these areas.

Recreation has increased on public lands in general and if this continues, it would affect lands with wilderness characteristics. Recreational use would create alterations to the landscape over time through an increase in human presence, vehicle use, and road use in certain areas. Although the effects from these uses may be substantially unnoticeable, they may cumulatively affect the area's solitude with increased use. PHMAs and GHMAs would be limited to existing roads and trails with cross-country use allowed where suitable which would preserve the size of lands with wilderness characteristics in these areas.

Existing livestock grazing management would not directly impact lands with wilderness characteristics, but the addition of any reasonably foreseeable developments that increase the number of rangeland improvements (such as fencing and stock ponds) could lessen the apparent naturalness and limit unconfined recreation found within lands with wilderness characteristics.

Comparison of Alternatives

Compared to Alternative 1, Alternative 2 would include more areas that would be open to fluid mineral leasing. Additionally, fewer restrictions on mineral development under this alternative would create more opportunities for wilderness characteristics to be impacted by increasing surface disturbing activities. For example, if more development is allowed, this could lead to more mines, roads, pipelines, and other infrastructure being built which would directly impact the size of lands with wilderness characteristics units and opportunities for solitude and primitive recreation. Cumulative impacts from ROWs, recreation, and livestock grazing under Alternative 2 would be the same as those described under Alternative 1, with no additional additive effects due to similar management actions being proposed for these resource uses in the range of alternatives.

Management actions under Alternative 3 would provide the overall greatest potential to maintain wilderness characteristics on lands with wilderness characteristics units within PHMAs when compared to all other alternatives due to the closure of fluid, saleable, and nonenergy mineral leasing, ROWs being managed as exclusion, and PHMAs being unavailable for livestock grazing. However, these management actions could lead to a buildup of fuels and increase the risk of wildfire. Wildfire would make affected areas less desirable for primitive recreation.

Management actions under Alternatives 4, 5, and 6 would not offer as many protections to wilderness characteristics as those under Alternative 3, but would reduce impacts when compared to Alternatives 1 and 2. For example, under Alternatives 4, 5, and 6 fluid mineral leasing would be managed to minimize the potential for conflict and associated impacts from subsequent development in important GRSG habitats or connectivity areas which would indirectly protect overlapping lands with wilderness characteristics units.

The Proposed RMP Amendment would have the potential for reduced cumulative impacts compared to those under Alternatives 4 and 5 due to strengthened protections within avoidance areas and the promotion of use within designated corridors. PHMA with limited exceptions areas would provide enhanced protections by including an absolute exclusion for utility-scale solar and wind projects, with no exceptions allowed, which would further reduce impacts to lands with wilderness characteristics compared to the general PHMA management direction. Additionally, PHMA with limited exceptions would be subject to stricter controls for mineral resource use, minimizing surface disturbances and potentially preserving the naturalness and solitude of these areas more effectively than in areas with less stringent protections.

4.19 RECREATION AND VISITOR SERVICES

4.19.1 Nature and Type of Effects

Impacts on recreation can be direct and indirect. Management actions that alter or prohibit users' opportunities to access recreation areas or participate in recreation activities would result in a direct impact. Management actions that change the physical, social, or administrative setting within which recreation activities take place would result in indirect impacts. Impacts on recreation settings can be the achievement of or movement toward a desired setting or an unwanted shift in setting, such as to either a more or less developed environment. Management actions which change when or where SRPs are issued would affect recreation users by changing the types of organized recreation activities permitted via SRPs in the planning area over the long term. This would potentially add costs to recreational users of BLM-administered lands having to circumvent some areas or adopting less preferred options in certain activities. Dispersed recreational activity does not require a permit and would not be affected. There may also be areas temporarily closed for restoration, changing the experiences of or opportunities for users. Physical, social, and administrative settings are not specifically managed for in areas not designated as Recreation Management Areas, although these areas do still provide intrinsic recreation values and opportunities.

4.19.2 Impacts Common to All Alternatives

Under all alternatives, the BLM would continue to review and approve SRPs on a case-by-case basis within the planning area, and the overall number of large group and commercial SRPs would remain consistent. There would be no direct impacts on recreation through changes to the number and types of SRPs issued annually within the decision area. Any indirect impacts on SRPs would be related to the impacts on the change in the types of recreation activities, experiences, and benefits in the decision area.

Under all alternatives, disturbance caps which restrict the construction of recreation infrastructure would decrease access for recreation experiences that depend on road and trail development and could inhibit management objectives where developments are part of the desired conditions. If future recreation projects would exceed the disturbance cap in a particular area, the disturbance cap would prohibit construction of new recreation facilities such as campground, day-use areas, and trailheads in PHMA and GHMA. However, these disturbance caps would also limit development in some areas, thereby increasing remoteness and naturalness in areas managed for those objectives and enhancing the recreational user experience of primitive backcountry recreation activities and experiences over the long-term (BLM 2014).

4.19.3 Proposed RMP Amendment

Under the Proposed RMP Amendment, existing restrictions on other resource uses such as fluid mineral leasing would have an indirect effect on recreation by reducing resource conflicts in PHMA or GHMA. Additionally, under the Proposed RMP Amendment, all states would be exclusion for utility scale wind and solar energy development, which is similarly restrictive as Alternative 1. This could indirectly affect recreation by potentially reducing resource conflicts with energy development, thus enhancing recreational experiences in those areas (BLM 2014).

Furthermore, PHMA would cover a larger area under the Proposed RMP Amendment compared with Alternative 1 (**Table 2-14**). This expansion would result in more acres of land being restricted to disturbance caps, potentially affecting future recreation projects that exceed these caps in specific areas. This would have the effect of restricting more acres against the construction of new recreation facilities compared with Alternative 1.

Moreover, the management of PHMA with limited exceptions under the Proposed RMP Amendments, would provide additional restrictions on fluid mineral leasing, major ROWs, and renewable energy. Compared with Alternative 1, these provisions would reduce potential conflicts with recreational uses and ensure that PHMA areas maintain their naturalness and remoteness for enhanced recreational experiences.

4.19.4 Cumulative Effects

The cumulative effects study area for recreation and visitor services is the BLM-administered lands in the planning area over a 20-year time frame.

Dispersed, organized, and concentrated recreation would continue throughout the planning area and overall visitation would be expected to continue to increase but vary by season, year, location, and type of activity. Present, past, and reasonably foreseeable actions, such as mineral development and livestock grazing and agriculture, would continue to affect recreation throughout the cumulative effects analysis area. These actions as well as management actions related to Big Game RMPA (Colorado) and Gunnison Sage-Grouse RMPA (Colorado and Utah) that alter the landscape and affect naturalness or remoteness would lead to conflict with these other resources, while reducing or affecting recreation opportunities and experiences. All alternatives would lead to a continuation of reviewing and approving SRPs on a case-by-case basis within the planning area.

Comparison of Alternatives

Alternative 1 would result in a continuation of existing trend of current impacts on recreation because there would be no changes to the existing management.

Compared with Alternative 1, Alternative 2 would have greater cumulative impacts on recreation since there would be more exceptions to restrictions on other resources uses than under Alternative 1. This would reduce impacts on recreation that would otherwise continue to occur and maintain the naturalness and remoteness for recreation in those locations. Compared with Alternative 1, Alternative 2 would also have fewer acres of PHMA and IHMA. This would restrict fewer acres of land to disturbance caps when compared to Alternative 1. Therefore, if future recreation projects would exceed the disturbance cap in a particular area, this would have the potential to restrict fewer acres against the construction of new recreation facilities when compared with Alternative 1.

Alternative 3 would reduce the cumulative impacts in the planning area on recreation since Alternative 3 has the greatest restrictions on other resource uses, such as season restrictions on fluid mineral development. This would reduce the resource conflicts with recreation in PHMA, IHMA, and GHMA that occur, as resource uses that could lead to resource conflict with recreation would otherwise continue in the project area. These restrictions would reduce the degradation of physical setting characteristics in the planning area, which would enhance the recreational user experience compared with Alternative 1. Compared with Alternative 1, Alternative 3 would also have the greatest acres PHMA. Which would subject the greatest acreage to disturbance caps. Therefore, if future recreation were to have the potential exceed the disturbance cap in a particular area, the disturbance cap would have the potential to prohibit the construction of new recreation facilities over the largest area when compared with the other alternatives. Alternative 3 would have the most adverse impacts on motorized recreation of the alternatives analyzed.

Compared with Alternative 1, Alternative 4 would have additional criteria for avoidance of GRSG, which would limit developments over a greater area, which would maintain naturalness and remoteness for recreation experiences where activities, such as mineral exploration, would have been pursued. Compared with Alternative 1, Alternative 4 would also have fewer acres of PHMA and IHMA. This would restrict fewer acres of land to disturbance caps when compared with Alternative 1. Therefore, if future recreation projects would exceed the disturbance cap in a particular area, this would have the potential to restrict fewer acres against the construction of new recreation facilities when compared with Alternative 1.

Compared with Alternative 1, Alternatives 5 and 6, would have less restrictive avoidance of GRSG which would decrease the naturalness and remoteness for recreation experiences where activities such as mineral exploration, would have been pursued. Compared with Alternative 1, Alternatives 5 and 6 would also have fewer acres of PHMA and IHMA. This would restrict fewer acres of land to disturbance caps when compared with Alternative 1. Therefore, if future recreation projects would exceed the disturbance cap in a particular area, this would have the potential to restrict fewer acres against the construction of new recreation facilities when compared with Alternative 1.

Management of PHMA with limited exceptions under the Proposed RMP Amendment would reduce the contribution to cumulative impacts similar to Alternatives 4 and 5, with additional protections in PHMA with limited exceptions. These areas would see stricter limitations on activities, such as utility scale solar, utility scale wind, and fluid mineral development, that may conflict with recreational uses.

4.20 TRANSPORTATION AND TRAVEL MANAGEMENT

Through Resource Management Plans (RMPs) BLM designates lands in one of three Off Highway Vehicle (OHV) designation categories: open to cross country vehicle use, limited to existing routes, or closed to OHV use. None of the action alternatives, including the Proposed RMP Amendment, propose changes to the existing 2015 GRSG travel and transportation allocations or management direction. Therefore, under all alternatives, in PHMA and GHMA, OHV travel is limited to existing routes and no cross-country travel is allowed. The changing HMA allocations occurring across the alternatives could, however, result in changes to areas moving from open to cross country travel to limited to existing routes due to areas moving from non-habitat to either PHMA or GHMA and, conversely, areas could move from limited to open if previously identified habitat (GHMA or PHMA) is no longer identified as habitat and the areas are not otherwise limited or closed under an existing RMP decision.

The HMA allocations in Colorado, Idaho, Montana, and Wyoming would not change the OHV allocations currently in place under any of the alternatives, and, therefore, there are no anticipated effects by alternative and thus no effects are expected in those states (**Table 4-4** in **Appendix 9** shows the existing OHV allocations in those States).

In Nevada/California there is an increase in open areas when compared with the existing condition under Alternative 1 in all alternatives except Alternative 3, where there is a decrease in open areas (refer to **Table 4-5** in **Appendix 9**). The increase in open areas is greatest under Alternative 4. Alternatives 5, 6, and the Proposed RMP Amendment all increase open areas by approximately two million acres (refer to **Table 4-5** in **Appendix 9**). From a travel and transportation perspective, this increase in open areas could allow for more recreation associated with off-highway vehicle use. These increases could also increase resource impacts associated with off-highway vehicle travel. The increases are occurring in areas that are not considered habitat (they moved from being either PHMA or GHMA to non-habitat based on the updates to the HMA boundaries) and, therefore, these open areas should not impact GRSG directly. There could, however, be indirect effects from noise or vegetation disturbance should these areas and any off-highway vehicle use be proximate to habitat areas.

In Oregon, there is decrease in open areas and corresponding increase in limited areas from the existing acres in Alternative 1 in all of the alternatives except Alternative 2 (refer to **Table 4-6** in **Appendix 9**). The largest decrease in open areas occurs under Alternatives 5, 6, and the Proposed RMP Amendment with approximately 600,000 fewer acres identified as open. Under Alternatives 3 and 4, there are approximately 450,000 fewer acres allocated as open. From a travel and transportation perspective, these changes could reduce recreation opportunities associated with off-highway vehicle use. These decreases would also reduce resource impacts associated with off-highway vehicle travel. Limiting travel to existing routes in these areas that have been identified as habitat will benefit GRSG by reducing potential noise and disturbance impacts.

In Utah, like Oregon, there is a decrease in the amount of OHV areas that are open and a corresponding increase in areas that are limited as a result of changes in HMA allocations. The decrease in open areas is greatest under Alternative 3 followed by Alternative 4, and the Proposed RMP Amendment (refer to **Table 4-7** in **Appendix 9**). Under Alternatives 5 and 6 the decrease is approximately 88,000 acres; under the Proposed RMP Amendment the decrease is approximately 295,000 acres; under Alternative 4 the decrease is approximately 376,000 acres; and under Alternative 3 the decrease is approximately 464,000 acres. From a travel and transportation perspective, these changes could reduce recreation opportunities associated with off-highway vehicle use. These decreases would also reduce resource impacts associated with off-highway vehicle travel. Limiting travel to existing routes in these areas that have been identified as habitat will benefit GRSG by reducing potential noise and disturbance impacts.

Under the Proposed RMP Amendment, acres open to OHV use would increase by 2,187,000 acres (8%) in Nevada/California compared to Alternative 1. Conversely, acres limited to OHV use would decrease by 2,314,000 acres (11%). In Oregon, there would be 604,000 fewer acres (50% fewer) open to OHV use under the Proposed RMP Amendment compared to Alternative 1, with 665,000 more acres (6% more) limited to OHV use. Utah has a similar trend, with 295,000 fewer acres (5%) open under the Proposed RMP Amendment and 308,000 more acres (2%) limited.

4.20.1 Cumulative Effects

The cumulative impact analysis area includes all BLM-administered lands within the range of GRSG as well as other federally managed lands, and adjacent state, Tribal, county, and privately owned lands within the planning area. The larger analysis area is necessary because transportation and travel management has consequential effects on ecosystems that extend over larger areas. Ongoing and planned actions in and near the cumulative impact analysis area would influence conditions for transportation and travel management to be effective across the planning area. The time frame for cumulative environmental consequences for future actions is 20 years.

Cumulative impacts on travel and transportation management would occur primarily from actions that facilitate, restrict, or preclude motorized and mechanized access. Past, present, and reasonably foreseeable actions (see **Appendix 14**) that restrict motorized and mechanized use would limit the degree of travel opportunities and the ability to access certain portions of the planning area for the public. Such past, present, and reasonably foreseeable actions and conditions within the cumulative impact analysis area that have affected and will likely continue to affect transportation and travel include restrictions in GRSG HMAs on mineral exploration and development, other planning efforts, such as those for Gunnison sage-grouse and big game in Colorado, and continued maintenance of federal and state highways and county roads which provide arterial connections to BLM system roads.

The management actions considered in the alternatives, including land use restrictions, such as management of ROW avoidance or exclusion areas and NSO stipulations on fluid mineral development, would not result in the inability of the BLM to provide public access. Changes to OHV area designations from changes in HMAs in Nevada/California could increase opportunities for off-highway vehicle use with the increased level of open areas and the impacts associated with such use. In Oregon and Utah changes to OHV area designations from changes in HMAs could decrease opportunities for off-highway vehicle use by decreasing the amount of open areas in both states. Limiting off-highway vehicle use in these areas would reduce the negative environmental effects associated with off-highway vehicle use but would reduce the potential for off-highway vehicle recreation.

Chapter 5. Consultation and Coordination

5.1 Introduction

This chapter describes the efforts undertaken by the BLM in developing the Proposed RMPA/Final EIS to ensure the process remained open and inclusive. Efforts to comply with legal requirements to consult and coordinate with various government agencies are also described. These include public scoping; identifying, designating, and coordinating with cooperating agencies; formally consulting with applicable federal, state, and tribal governments; providing a 90-day comment period on the Draft RMPA/EIS, and identifying "any known inconsistencies with state or local plans, policies or programs" (43 CFR 1610.3-2(e)).

The BLM land use planning activities are conducted in accordance with NEPA requirements, CEQ regulations, and DOI policies and procedures implementing NEPA, as well as specific BLM planning and NEPA policies. The NEPA and associated laws, regulations, and policies require the BLM to seek public involvement early in and throughout the planning process to develop a range of reasonable alternatives and to prepare environmental documents disclosing the potential impacts of proposed alternatives.

Public involvement and agency consultation and coordination have been a critical component of the planning process leading to this Proposed RMPA/Final EIS. These efforts were achieved through Federal Register notices, public meetings, individual contacts, media releases, and the GRSG project website. This chapter documents the outreach efforts that have occurred to date. Additional efforts will continue as the planning process continues and the Approved RMPA and Records of Decision are prepared.

5.2 Formal Consultation Efforts

5.2.1 Federally Recognized Tribes

Federally recognized Tribes are sovereign nations and retain inherent powers of self-government. They interact with the United States on a government-to-government level. In accordance with the National Historic Preservation Act and several other legal authorities (see BLM Manual 8120), and in recognition of the government-to-government relationship between individual Tribes and the federal government, the BLM sought to initiate Tribal consultation efforts in the preparation of this RMPA. The BLM contacted Tribes in a variety of methods, twice mailing letters to 53 federally recognized Tribes within or with cultural interest in the planning area notifying them of the effort. These letters provided a summary of the project and invited them to participate in government-to-government consultation and be cooperating agencies in the planning effort. Subsequent outreach continued through emails, phone calls, and meetings with Tribal personnel, as they have expressed interest. On September 4, 2024, the BLM held an online information session for Tribal governments to provide an update on the development of the Proposed RMPA/Final EIS.

In Colorado, the Ute Indian Tribe of the Uintah and Ouray Reservation expressed an interest in formal, government-to-government consultation and it was held during biannual consultation meetings in April 2023, August 2023, and April 2024. The Ute Mountain Ute Tribe was also present at these consultation meetings. In Nevada, formal, government-to-government consultation occurred with the following Tribes: Battle Mountain Band of the Te-Moak Tribe, Duckwater Shoshone Tribe, Lovelock Paiute Tribe, Modoc Nation, Reno-Sparks Indian Colony, Summit Lake Paiute Tribe, Timbisha Shoshone Tribe, Walker River Paiute Tribe, Yerington Paiute Tribe, and the Yomba Shoshone Tribe. In the other participating states, no formal, government-to-government consultation was requested.

5.2.2 U.S. Fish and Wildlife Consultation

Under Section 7(a)(2) of the ESA, federal agencies must consult with FWS when an action the agency carries out, funds, or authorizes may affect any federally listed or endangered species or its critical habitat. The Proposed RMP Amendment/Final EIS describes potential impacts on threatened and endangered species because of management actions proposed in the alternatives. The USFWS is a cooperating agency in this planning process. The BLM has met with the USFWS and provided them with drafts of proposed management direction for discussion and input. The BLM has initiated development of a biological assessment and will coordinate with the USFWS to complete that analysis and initiate Section 7 consultation. The USFWS will evaluate the biological assessment and either concur with the determination via memorandum or prepare a biological opinion. The USFWS response to this consultation process (either the memorandum or the biological opinion) will be included in the ROD.

5.3 Coordination Efforts

5.3.1 State Historic Preservation Officer Coordination

Section 106 of the National Historic Preservation Act and regulations at 36 CFR Part 800 govern the BLM's cultural resource management programs. These regulations provide specific procedures for consultation between the BLM and State Historic Preservation Offices. Proposed changes to RMPs can comprise a federal undertaking subject to compliance with Section 106 of the National Historic Preservation Act (NHPA) and its implementing regulations. However, the RMP-level allocations and management direction proposed by this Proposed RMP Amendment/Final EIS do not constitute an undertaking requiring formal consultation. The Proposed RMP Amendment will not approve any site-specific undertakings on BLM-administered lands within the planning area, and all future proposed, agency actions/undertakings related to this RMP Amendment will be subject to National Environmental Policy Act (NEPA) compliance and National Historic Preservation Act (NHPA) Section 106 compliance and consultation with the SHPO. Given the RMP-level allocations and management direction being proposed, the BLM anticipates that the Proposed RMP Amendment may reduce the overall number of subsequent undertakings that have the potential to affect cultural resources. The likely reduction of undertakings is a result of establishing additional limitations on where and how future development could be approved on public lands in greater sage-grouse Habitat Management Areas (HMAs). These limitations would result from protections the BLM is proposing in Priority HMAs, Priority HMAs with limited exceptions, and in General HMAs. The Proposed RMP Amendment/Final EIS will be provided to the State Historic Preservation Officers (SHPO) of each participating state for their awareness.

5.4 Cooperating Agencies

Federal regulation directs the BLM to invite eligible federal agencies, state and local governments, and federally recognized Native American Tribes to participate as cooperating agencies when amending RMPs (43 CFR 1610.3-1(b)). A cooperating agency is any such agency or Tribe that enters into an agreement with the lead federal agency to "work with the BLM, sharing knowledge and resources, to achieve desired outcomes for public lands and communities within statutory and regulatory frameworks" (BLM Land Use Planning Handbook H-1601-1). These agencies are invited to participate because they have jurisdiction by law or can offer special expertise. Cooperating agency status provides a formal framework to engage in active collaboration with a lead federal agency in the planning process. Invitations were sent to potential cooperating agencies in December 2021 and January 2022. **Table 5-1** lists the agencies that accepted BLM's invitation and served as cooperating agencies throughout preparation of the RMPA/EIS. The BLM invited many other cooperators to engage in this effort who either did not reply or chose not to participate. In addition, the BLM engaged the U.S. Forest Service, U.S. Fish and Wildlife Service and Environmental

Protection Agency at the national level to identify and receive feedback on specific issues under the jurisdiction of those agencies.

Table 5-1. List of Cooperating Agencies

Cooperating Agency Name
Rangewide Level
United States Forest Service
U.S. Fish and Wildlife Service
U.S. Environmental Protection Agency
Colorado
City of Steamboat Springs
Colorado Department of Agriculture
Colorado Department of Natural Resources (includes the Colorado Oil and Gas Commission and Colorado Division of Reclamation Mining and Safety)
Colorado Department of Transportation—Region 3 (includes the Colorado Department of Transportation State Office)
Colorado First Conservation District
Colorado Parks and Wildlife
Douglas Creek Conservation District
Eagle County Board of Commissioners
Garfield County Board of Commissioners
Grand County Board of Commissioners
Jackson County Board of Commissioners
Mesa County Board of Commissioners
Moffat County Board of Commissioners
Rio Blanco County Board of Commissioners
Routt County Board of Commissioners
White River Conservation District
Idaho
State of Idaho, including Idaho Governor's Office of Species Conservation, Idaho Governor's Office of Energy and Mineral Resources Idaho Department of Fish and Game, Idaho Department of Lands, Idaho State Department of Agriculture, and Idaho Department of Parks and Recreation
Idaho Army National Guard
Blaine County
Clark County
Custer County
Montana and the Dakotas
Blaine County Commission
Bowman-Slope Conservation District
Fergus County Commission
McCone County Commissioners
Montana Department of Agriculture
Montana Department of Environmental Quality
Montana Department of Livestock
Montana Fish, Wildlife and Parks
Montana Grass Conservation Commission
Montana Sage-Grouse Habitat Conservation Program
North Dakota Game and Fish Department
Phillips County Commission
Prairie County Commissioners
Rosebud County Commissioners

Cooperating Agency Name
Slope County Commissioners
Sweet Grass County Commissioners
Valley County Commission
Nevada/California
Nevada Department of Wildlife
Nevada Department of Agriculture
Nevada Department of Conservation and Natural Resources
Nevada Division of Minerals
Churchill County
Elko County
Eureka County
Humboldt County
Lincoln County
Mineral County
Nye County
Pershing County
White Pine County
Oregon
Deschutes County
Harney County
Harney Soil and Water Conservation District
Lake County
Malheur County
Oregon Department of Fish and Wildlife
Oregon Department of Geology and Mineral Industries
Oregon State University - Institute of Natural Resources
Umatilla County
Utah
State of Utah
Utah County
Department of Defense (including Utah Test and Training Range and Hill Air Force Base)
Daggett County
Beaver County
Emery County Public Lands
Wyoming
Big Horn County Commissioners
Campbell County Commissioners
Campbell County Conservation District
Carbon County Commissioners
Converse County Commissioners
Converse County Conservation District
Crook County Commissioners
Fremont County Commissioners
Hot Springs County Commissioners
Johnson County Commissioners
Laramie Rivers Conservation District
Lincoln County Commissioners
Lincoln Conservation District
Lingle-Fort Laramie Conservation District
Lower Wind River Conservation District
Medicine Bow Conservation District
Meeteetse Conservation District

Cooperating Agency Name
Natrona County Commissioners
Niobrara County Commissioners
Park County Commissioners
Popo Agie Conservation District
Saratoga-Encampment-Rawlins Conservation District
Sheridan County Commissioners
South Big Horn Conservation District
Shoshone Conservation District
State of Wyoming
Wyoming Department of Agriculture
Wyoming Oil and Gas Conservation Commission
Wyoming State Historic Preservation Office
Wyoming State Parks and Cultural Resources
Wyoming State Forestry
Wyoming Game and Fish Department
Wyoming Department of Environmental Quality
Wyoming Office of State Lands and Investment
Sublette County Conservation District
Sublette County
Sweetwater County Conservation District
Sweetwater County
Teton County Commissioners
Uinta County Conservation District
Uinta County
Washakie County Commissioners
Washakie County Conservation District
Weston County Commissioners

The BLM also actively engaged the Western Governors' Association Conservation Task Force (Task Force) to share and collect information relevant to this planning effort, conservation of GRSG, and impacts of BLM authorizations on state and local economies and livelihoods. Members of the Task Force are also members of cooperating agencies within their home states. Meetings were initiated in 2022 and occurred monthly (both virtual and in person) through September 2023. In the lead up to the issuance of the Draft RMP Amendment/EIS, weekly meetings were conducted to get feedback on the draft range of alternatives and the associated language. Since the issuance of the Draft RMP Amendment/EIS, the BLM has met with the Task Force four times.

Each BLM State Office coordinated with cooperating agencies in their states to establish information sharing processes and meeting schedules. The frequency of meetings varied by state needs and cooperator requests. BLM Headquarters staff virtually attended most individual state coordination meetings when invited to share rangewide planning information and consider individual state concerns and suggestions in drafting the range of alternatives.

A GRSG Planning update newsletter was released to cooperating agencies on March 29, 2023, which presented information refining the list of management topics to be addressed in this current effort, and high-level conceptual summary of preliminary draft range of alternatives. The list of management topics included were the result of scoping comments received and a review of management decisions from previous GRSG planning efforts. Some management topics were not carried forward to this Amendment as they were extensively addressed in the previous planning efforts and new scientific information did not support changing associated management.

In June 2023, draft text was provided to cooperating agencies for review, including a draft range of alternatives and associated management. Comments from the cooperating agencies were reviewed and incorporated as appropriate. In December 2023, a pre-draft version of the entire Draft RMPA/EIS was provided to the cooperating agencies for review and input. Coordination with the cooperating agencies has included project presentations and working meetings discussing the purpose and need, new science, alternative strategies, range of alternatives, review of alternative text, meetings to review subsequent changes and further refine the alternatives, and a review of the administrative Draft RMPA/EIS. Since the release of the Draft RMPA/EIS, the BLM has met with cooperating agencies to discuss their feedback on the Draft RMPA/EIS and get their input on the development of the Proposed RMP Amendment/Final EIS and state-specific management direction. Cooperating agencies were provided an administrative draft of the Proposed RMP Amendment management direction in August for review. As a result of these reviews and the many state-level meetings with cooperating agencies, the BLM has made many changes to the Proposed RMP Amendment/Final EIS that have improved the clarity of the document and have addressed cooperating agency concerns.

5.5 PUBLIC INVOLVEMENT

Public involvement is a vital and legal component of both the land use planning and NEPA processes. Public involvement provides public opportunities to raise issues to be addressed in the planning process, disclosure of the alternatives and effects anticipated, and, in general, invests the public in the decision-making process. Guidance for implementing public involvement under NEPA is codified in 40 CFR 1506.6, thereby ensuring that federal agencies make a diligent effort to involve the public in the NEPA process. Section 202 of the FLPMA directs the Secretary of the Interior to establish procedures for public involvement during land use planning actions on public lands. These procedures can be found in the BLM's Land Use Planning Handbook (H-1601-1). Public involvement for this Proposed RMPA/Final EIS included the following four phases:

- Public scoping before NEPA analysis began to determine the scope of issues and identify potential alternatives to be addressed in the RMPA/EIS
- Public outreach via news releases
- Collaboration with federal, state, local, and Tribal governments and cooperating agencies
- 90-day public review of and comment on the Draft RMPA/EIS, which analyzed likely environmental effects and identified the preferred alternative.
- Final EIS availability period and 30-day protest period on Proposed RMP Amendment.

Information about the plan amendment process can be obtained by the public at any time on the National NEPA Register project website (https://eplanning.blm.gov/eplanning-ui/project/2016719/510). This website contains background information about the project, a public involvement timeline, and copies of public information documents released throughout the RMPA/EIS process.

5.5.1 Scoping Process

The formal public scoping process for the RMPA/EIS began on November 22, 2021, with the publication of the Notice of Intent to Amend an RMP and Prepare an EIS (NOI) in the *Federal Register* (Vol. 86 No. 222). The NOI notified the public of the BLM's intent to develop RMPAs for the management of GRSG and initiated the public scoping period, which closed on February 8, 2022. During the comment period, the BLM received 258 total submissions containing 1,865 unique comments. A summary of comments received can be found on the project's website under "documents." The issues identified during public scoping and outreach helped refine the list of planning issues, summarized in Section 3 of the Scoping Report.

Virtual Public Scoping Meetings

The BLM hosted two virtual public meetings to gather input on issues to consider while amending BLM RMPs regarding GRSG and sagebrush management, and specifically language from the 2015 and 2019 RMPAs. The virtual public forums were held on January 11, 2022, from 1:00 to 2:30 p.m. mountain standard time, and January 24, 2022, from 6:30 to 8:00 p.m. mountain standard time. The meeting recordings can be found on the project's National NEPA Register website within the "Documents" tab. The meetings' purpose was to provide the public with opportunities to become involved, learn about the project and the planning process, and participate in a question-and-answer session where participants were able to ask BLM specialists questions and receive live responses.

5.5.2 Project Website

The BLM maintains a national GRSG conservation website (https://www.blm.gov/programs/fish-and-wildlife/sage-grouse) as part of its efforts to maintain and restore GRSG habitat on public lands. The site is intended to help the public learn how the BLM is working on maintaining and restoring GRSG habitat. It includes background information related to government and BLM roles in GRSG conservation. In addition to the national GRSG conservation website, the BLM has a National NEPA Register website with information related to this planning effort. It includes background documents, information on public meetings, and contact information (https://eplanning.blm.gov/eplanning-ui/project/2016719/510).

5.5.3 Draft RMP Amendment/EIS Comment Period

A substantial contribution to this effort is the opportunity for members of the public to review and comment on the Draft RMPA/EIS during a 90-day comment period which included a 60-day comment period on the Areas of Critical Environmental Concern (ACECs) being considered as per 43 CFR 1610.7-2[1]. The BLM held a 90-day public comment period on the Draft RMPA/EIS from March 15th, 2024, through June 13th, 2024. Thirteen public meetings were held, including two virtual meetings and eleven in-person meetings throughout the planning area. Over 38,000 submissions were received, including approximately 6,000 individual comments. Additionally, the BLM has also initiated and/or participated in over 80 meetings with Tribes; federal, state, and county cooperating agencies; and interest groups since the issuance of the Draft RMPA/EIS. The BLM has considered all public comments and responded to all substantive comments received on the Draft RMPA/EIS (refer to **Appendix 22**, Responses to Substantive Public Comments on the Draft EIS). The high level of public comments and high level of stakeholder coordination has significantly shaped the development of the Proposed RMPA/Final EIS.

5.5.4 Proposed RMP Amendment/Final EIS Availability and Protest Period

Release of the Proposed RMP/Final EIS initiates a 30-day protest period for any person who previously participated in the planning process and has an interest that is (or may be) adversely affected by the Proposed RMPA. The protest regulations specify the required elements for filing a valid protest. To help guide you through this process, there is a critical item checklist available at https://www.blm.gov/programs/planning-and-nepa/public-participation/filing-a-plan-protest. As much as possible, cite specific planning documents or available planning records (such as summaries, correspondence, etc.) in your protest. All protests must be

[1] The 43 CFR 1610.7-2 regulations have been revised since the Draft RMPA/Draft EIS was issued. Under the revised regulations, the public comment and review period for ACECs is not specified in the regulation and would follow the same public comment and review period as specified and required for the associated RMP, RMP revision, or applicable RMP amendment.

in writing and filed with the BLM Director, either as a hard copy or electronically via the BLM's National NEPA Register website, by the close of the protest period.

The only electronic protests the BLM will accept are those filed through the National NEPA Register website at https://eplanning.blm.gov/eplanning-ui/project/2016719/510. All protest letters sent to the BLM via fax or email will be considered invalid unless a properly filed protest is also submitted. If you do not have the ability to file your protest electronically, hard-copy protests must be mailed to the following addresses (regular and overnight mail), postmarked by the close of the protest period:

USPS Mail:
BLM Director
Attention: Protest Coordinator (HQ210)
PO Box 151029
Lakewood, CO 80215

Overnight Mail:
BLM Director
Attention: Protest Coordinator (HQ210)
Denver Federal Center, Bldg. 40
Lakewood, CO 80215

Before including your address, phone number, email address, or other personal, identifying information in your protest, be advised that your entire protest—including your personal, identifying information—may be made publicly available at any time. While you can ask the BLM in your protest to withhold from public review your personal, identifying information, the BLM cannot guarantee that it will be able to do so.

5.5.5 Governor's Consistency Review

The BLM planning regulations in 43 CFR 1610.3-2(e) provide each Governor with a review opportunity for RMPs and RMP amendments. The Governors of each state in the planning area will be provided with 60 days to identify inconsistencies between the Proposed RMPA/Final EIS with approved state or local plans, policies, or programs and to provide written recommendations to the BLM State Director. If the BLM does not accept the Governor's recommendations on plan consistency, the Governor may appeal to the BLM Director. If no response to this Governor's consistency review request is received, the BLM assumes the Proposed RMPA is consistent with state approved plans, policies, and programs.

5.6 Next Steps

The BLM intends to issue an Approved RMP Amendment and Record of Decision for each BLM state in the planning area once the protest and Governor's consistency review processes are complete.

5.7 List of Preparers

This Proposed RMPA/Final EIS was prepared by an interdisciplinary team of staff from the BLM and AECOM (see **Table 5-2**, Rangewide Preparers). In addition to the staff on this list, additional staff from numerous BLM field, district and state offices, as well as other federal, state, and local agencies reviewed and provided comments on various iterations of internal drafts of the Draft RMPA/EIS.

Table 5-2. Rangewide Preparers

Name	Role/Responsibility	Qualifications
BLM Headquarters/National Operations Center		
Quincy Bahr	Project Manager	Quincy has a B.S. in Parks, Recreation Tourism-Natural Resource Planning and Management. He has over 25 years natural resources planning and management experience with federal land management agencies (NPS, USFS, and BLM), including over 18 years working on BLM NEPA and land use planning projects.
Pat Deibert	BLM National Sage-grouse Conservation Coordinator	Pat has a B.A. in biology from Earlham College, a M.S. in ecology from the University of Dayton and a PhD from the University of Wyoming in wildlife management. She has worked for two state wildlife agencies, USFWS and BLM, totaling nearly 35 years of experience with sagebrush ecosystems and greater sage-grouse.
Brenda Lincoln-Wojtanik	Project Manager	Brenda has a B.A. in political science from the State University of New York at Albany and a M.S. in Environmental Science from the State University of New York, College of Environmental Science and Forestry. She has worked for the BLM for over 25 years and has over 20 years of NEPA and land use planning experience.
Bonnie Million	Greater Sage-grouse Core Team	Bonnie has a B.S. in biology from the George Washington University. She has worked over 22 years with the NPS and BLM across the western U.S., including over 18 years of NEPA and land use planning experience.
Katie Flahive	Greater Sage-grouse Core Team	Katie has a B.A. in Sustainable Development and Geography from McGill University and M.P.A. in Environmental Science & Policy from Columbia University. She has 8 years of NEPA and land use planning experience.
Jennifer Schein Dobb	Socioeconomics	Jenn has a B.A. in Economics and a Master of Science degree in Agricultural and Resource Economics. She has over 10 years of experience providing federal land management agencies (USFS and BLM) with socioeconomic support, including 6 years working on BLM NEPA and land use planning projects.
Zach Miller	Socioeconomics	Zach has a BA in Natural Resources, and MS in Park and Conservation Area Management, and a PhD in Forest and Conservation Sciences. He has over 10 years of experience in using social science to support land managers and planning.
Kimberly Hackett	Livestock Grazing/Range	Kimberly has a B.S. in wildlife management with a rangeland management emphasis from New Mexico State University. She has more than 35 years of experience with the BLM, including over 20 years as a rangeland management specialist in several western states and 14 years working in the range program for headquarters.

Name	Role/Responsibility	Qualifications
AECOM		
Meredith Linhoff	Project Manager and Greater Sage-Grouse and Wildland Fire Management	Meredith has B.S. degrees in biology and environmental science from SUNY Binghamton and a M.A. in biology from Boston University. She has 17 years of consulting experience as a biologist and NEPA planner.
Andrew Wilkins	Assistant Project Manager and Cultural Resources and Tribal Interests	Dr. Wilkins has a B.A. in Historic Preservation from the University of Mary Washington, a M.A. in Historical Archaeology from the University of Massachusetts Boston, and a PhD in Anthropology from the University of Tennessee. He has 18 years of cultural resource management and NEPA experience.
Lily Benson	Air and Climate, Lands with Wilderness Characteristics, Travel and Transportation	Lily has a Bachelor of Arts degree in Environmental Studies from the University of California, Santa Cruz. She has two years of NEPA experience.
Lindsay Chipman	Greater Sage-Grouse	Dr. Chipman has a B.S. in Physics from the College of William and Mary, a M.S. and PhD degree in Oceanography from Florida State University. She has four years of experience as an environmental professional.
Amy Cordle	Air and Climate	Amy has a B.S. in Civil Engineering from Virginia Polytechnic Institute and State University. She has 26 years of experience in management, public involvement, planning, environmental analysis, and air quality analyses.
Francis Craig	Mineral Resources	Francis has B.S. degrees in Geoscience, Psychology and a Minor in Environmental Studies from Hobart College, and a M.A. in Environmental Remote Sensing and GIS from Boston University. He has 10 years of Energy and Minerals experience.
Noelle Crowley	Lands and Realty and Renewable Energy	Noelle has a B.S. in Environmental Studies from the University of Southern California and a Master of the Environment degree in Sustainability Planning and Management from the University of Colorado Boulder. She has 3 years of NEPA experience.
Sean Cottle	Lands with Wilderness Characteristics	Sean has a B.S. in Ecohydrology from the University of Nevada, Reno. He has 10 years of experience as an environmental professional.
Emma Davis	Lands with Wilderness Characteristics	Emma has a B.S. in Geography, with a minor in Renewable Energy from the University of Nevada, Reno. She has over 2 years of experience as an environmental professional.
Kayla Ferron	Fish and Wildlife, Special Status Species	Kayla has a M.S. in Environmental Science from the University of Illinois and a B.S. in Fish, Wildlife, and Conservation Biology from Colorado State University. She has over 5 years of experience in the biological resource field.

Name	Role/Responsibility	Qualifications
Zoe Ghali	Socioeconomics and Environmental Justice	Zoe has a B.S. in biology from the University of California Santa Barbara and a M.S. in environmental physiology and a certificate in environmental policy from the University of Colorado Boulder. She has 15 years of experience as a NEPA specialist.
Derek Holmgren	Soil and Water	Derek has a B.A. in International Studies and a B.S. degree in Environmental Studies from Oregon State University. Additionally, he has a M.S. in Environmental Science and a M.P.A. in Environmental Policy and Natural Resources Management from Indiana University, He has 20 years of NEPA experience.
Erin Hudson	Cultural Resources	Dr. Hudson has a B.A. in Anthropology from the University of Colorado, Boulder; a M.A. in Anthropology from Georgia State University and the University of New Mexico; and a PhD in Anthropology from the University of New Mexico. She has over 15 years of experience as an environmental professional.
Perry Lown	Cultural Resources	Perry has a B.A. in Anthropology from the University of New Mexico. He has seven years of experience in cultural resource management.
Courtney Luxford	Mineral Resources	Courtney has a B.S. in Geology from Humboldt State University. He has 15 years of experience as a geologist and environmental professional.
Michael McIntire	Livestock and Grazing, Wild Horses and Burros	Michael has a B.S. in Natural Resources: Rangeland Management and Ecology from the University of Arizona. HE has over 7 years of combined experience working as a rangeland management specialist.
Mike Meany	Lands and Realty and Renewable Energy	Mike has B.S. degrees in Geography and Environmental Planning and Policy from the University of Maine at Farmington. He has 10 years of experience as an environmental professional.
Bronson Pace	Soil, Water, and Special Designations	Dr. Pace has a B.S. in History with a minor in Zoology from Weber State University, a J.D. in Natural Resources and Environmental Law from the University of Idaho, and a PhD in Water Resources: Law, Management, and Policy from the University of Idaho. He has over 5 years of NEPA experience.
Allison Piazzoni	Lands and Realty, Recreation	Allison has a MENV in Sustainability in the Outdoor Industry from the University of Colorado, Boulder and a B.A. in Environmental Studies from Sonoma State University. She has 2 years of experience in outdoor recreation planning and biology

Name	Role/Responsibility	Qualifications
Sara Piccolomini	Greater Sage-Grouse	Sara has a M.S. in Biological Sciences from Auburn University and a B.A. in Environmental Sciences from Hiram College. She has over 5 years of experience in project management, section writing, NEPA related tasks, and biological assessments.
Rachel Redding	Fish and Wildlife and Special Status Species and Wildland Fire Management	Rachel has a B.S. in Wildlife Ecology and Conservation from the University of Nevada, Reno. She has five years of wildlife and natural resource experience.
Shannon Regan	Vegetation	Shannon has a B.S. degree in Marine Science, from Coastal Carolina University and a M.S. in Fisheries, Wildlife, & Conservation Biology, with a GIS minor from North Carolina State University. She has 10 years of wildlife biology experience.
Camila Reiswig	Socioeconomics, Environmental Justice	Camila has a B.A. in Economics from Portland State University and a Master of Science in Agriculture and Applied Economics from the University of Illinois, Urbana-Champaign. She has over 6 years of experience as an environmental professional
Shine Roshan	Mineral Resources	Shine has a B.S. in Physics with a concentration in Astrophysics and a M.S. in Physics from San Francisco State University. She has 5 years of experience as an environmental professional.
Eduardo Sanchez	Transportation, Vegetation, Fire	Eduardo has a B.S. in Natural Resources and Wildlife Management from the University of Texas at San Antonio and a Master of Natural Resources Stewardship degree in Ecological Restoration from Colorado State University. He has three years of experience as an environmental professional.
Andy Spellmeyer	Livestock and Wild Horses and Burros, 508 Compliance	Andy has a B.S. and a M.S. degree in Biology from Wichita State University. He has 10 years of Biology experience.
Val Stanson	Recreation	Val has a B.S. in Biology from the State University of New York at New Paltz and a Master of Public Health degree in Environmental Health from the State University of New York at Albany. She has five years of experience as an environmental professional.
Morgan Trieger	Fish and Wildlife and Special Status Species	Morgan has a B.S. in Conservation and Resource Studies with a minor in Forestry from the University of California, Berkeley. He has over 17 years of experience as an environmental professional.

Name	Role/Responsibility	Qualifications
Kim Murdoch	Technical Editing	Kim has a B.S. degree in marketing and entrepreneurship from the University of Colorado and a Master of Business Administration in marketing and management information systems from the University of Denver. She has 15 years of writing and editing experience.
Cindy Schad	Formatting	Cindy has a B.F.A. degree in Creative Writing from Emerson College. Cindy has 30 years of formatting experience.

Table 5-3. California Preparers

Name	Role/Responsibility	Qualifications
	BLM	
Amy McGowan	Planning Coordinator	Amy has a B.A. in biology from Colorado College and a Post-Degree certificate in Technical Writing and Communication from Pima Community College. She has over 10 years of experience in NEPA and Planning.
Arlene Kosic	Greater Sage-Grouse	Arlene has a B.S. from the State University of NY, College of Environmental Science and Forestry and over 20 years of experience as a wildlife biologist with the BLM.
Brian A. Novosak	State Wildlife Program Lead	Brian has a M.S. in Zoology from Southern Illinois University and almost 20 years experience in wildlife conservation.

Table 5-4. Colorado Preparers

Name	Role/Responsibility	Qualifications
	BLM	
Diane Mastin Dixon	Planning Coordinator, GRSG, and ACECs	Diane has a bachelor's degree in environmental science and GIS certificate from Colorado Mesa University and a master's degree in natural resources stewardship with an emphasis on rangeland ecology and management from Colorado State University. She has 10 years of interdisciplinary experience with the BLM and has spent the last 6 years implementing sage-grouse management.
Forrest Cook	Air	Forrest holds a bachelor's degree in atmospheric science from the University of Georgia and has over 20 years of experience analyzing atmospheric phenomena. He joined the BLM in early 2013 as an air resource specialist for the Colorado State Office.

Name	Role/Responsibility	Qualifications
James Miller	Climate	James has a bachelor's degree in meteorology from the University of Utah and a Ph.D. in geography with an emphasis on regional climatology from Arizona State University. He has over 20 years of experience in climate and atmospheric science as a research scientist, university professor, and land management professional.
Ed Rumbold	Soil and Water	Ed has a B.S. in watershed management from SUNY College of Environmental Science and Forestry with over 30 years of aquatic resources experience with USFS as well as BLM Field, District and State Office levels. His experience includes design and implementation of stream restoration and stream crossing replacements, NEPA, aquatic resources monitoring, fluvial geomorphology, riparian resources, sediment transport, water resources, water quality and modeling.
Carol Dawson	Vegetation	Carol has a MS degree in Botany from Arizona State University and a PhD in Biology from the University of Denver. Carol has over 30 years' experience in developing and implementing conservation strategies for rare plants, demographic trend monitoring for rare plants, plant identification, and teaching.
Tom Fresques	Fish and Wildlife	Tom has a B.S. in fish biology from Colorado State University. He has 24 years of interdisciplinary experience with the BLM, and six years with the Arizona Game and Fish Department prior to that. For the past 2 years, he has served as the CO State Lead for Fisheries and Riparian resources under the Aquatic Resources Program.
Natalie Clark	Cultural Resources	Natalie has a B.A. in Anthropology from Colorado College and a Master of Arts degree in Anthropology from Washington State University, both with an emphasis in archaeology. She has over 15 years of experience in cultural resource management, Tribal consultation, and collections management. She is currently the BLM Colorado State Archaeologist/ Deputy Preservation Officer.
Ian Barrett	Wildland Fire Management	Ian has a bachelor's degree in forestry from Colorado State University. He has 18 years of experience with fire/fuels management and has spent the last 8 years implementing treatments and managing wildfires within sage-grouse landscapes.

Name	Role/Responsibility	Qualifications
Dan Ben-Horin	Lands with Wilderness Characteristics	Dan has a master's degree in Urban and Regional Planning concentrating in Land Use and Environmental Planning from the University of Colorado Denver. He has over a decade of experience in public lands management with a focus on wilderness and special designations.
Laria Lovec	Livestock Grazing	Laria has an Associate of Science degree in AgBusiness from Dawson Community College and a Bachelor of Science degree in Rangeland Ecology and Management from University of Idaho. She has over 20 years of experience working for the BLM and USFS in Montana, Nevada, Nebraska, and Colorado.
Tim Finger	Recreation	Tim has dual Bachelor of Science degrees in Wildlife Management and Zoology from Washington State University. Tim has over 40 years of experience in the federal land management agencies managing recreation, visual, tourism, wilderness, Travel and Transportation Management, wild and scenic rivers and other related programs in an interdisciplinary team setting. Tim has been the BLM Colorado Recreation Program Manager since 2015.
Jeff Christenson	Travel and Travel and National Trails	Jeff has a Bachelor of Science degree from Oregon State University in Forestry Recreation with a minor in Planning. He has 7 years of seasonal and volunteer experience with the BLM and USFS as a Recreation Technician and 23 years as an Outdoor Recreation Planner at the Field and State Office levels.
Kemba Anderson	Mineral Resources	Kemba has a Bachelor of Science degree in Business Administration from Wesleyan College and MBA in Finance from Capella University. She has over 18 years of experience working in the minerals arena.
Carmia Wooley	Mineral Resources	Carmia has a bachelor's degree in watershed science from Colorado State University. She has 20 years of experience in environmental science and has spent the last 9 years in the BLM's fluid minerals program.
Kristin Elowe	Mineral Resources and NEPA	Kristin has a bachelor's degree in geoscience from the University of Texas at Austin and a master's degree in petroleum geoscience from the University of London. She has 25 years of experience, 12 years in federal service with the last 2 years in planning and environmental coordination within the BLM's fluid minerals program.

Name	Role/Responsibility	Qualifications
Shay Romine	Mineral Resources	Shay has a BS in Geology from the University of Wyoming and completed graduate work in geophysics and mineral economics. She has spent the last 3 years as the Colorado State office Fluid Minerals Program lead and over 7 years in the Office of the Secretary, Appraisal Valuation Services, Division of Minerals Evaluation. Earlier experiences include work in the mining and environmental sectors, forestry, fire, trails and wilderness experience.
Amy Stillings	Socioeconomics and Environmental Justice	Amy has Master of Science in Agriculture and Resource Economics from Oregon State University. She has over 26 years of experience as an environmental professional.
Erin Leifeld	Tribal Interests	Erin has a bachelor's and master's degree in Anthropology with an emphasis in Archaeology from Colorado State University. She worked for the BLM in Colorado for 14 years as an archaeologist. She recently moved into the role of Tribal Liaison Officer for the BLM Colorado State Office in 2023.

Table 5-5. Idaho Preparers

Name	Role/Responsibility	Qualifications
	BLM	
Sylvia Copeland	Planning Coordinator, GRSG	Sylvia has a Bachelor of Science in Biology from University of Massachusetts at Amherst and a Master of Science in Wildlife Science from Viriginia Polytechnic Institute and State University. She has worked for industry and consulting, and several state and federal agencies. She has nearly 25 years of experience in wildlife studies and management and environmental planning, with most experience on sagebrush ecosystems. She has been with BLM Idaho for 7 years and is the Sage-grouse Lead at the Idaho State Office.

Name	Role/Responsibility	Qualifications
Ethan Ellsworth	Water and Fish and Wildlife	Ethan has a Bachelor of Science degree in Zoology and Botany from Wisconsin-Oshkosh University, a MS in raptor Biology from Boise State University, and a PhD in Wildlife Resources from University of Idaho. He has 12 years of experience with the BLM in wildlife, threatened and endangered species, and aquatic habitat. Ethan's is the BLM Idaho Aquatic Resource State Lead.
Anne Halford	Vegetation and ACECs	Anne has a Bachelor of Science Degree from the University of Colorado-Boulder in Environmental Science and a Master of Science Degree in Plant Physiology from the University of Nevada Reno. She has 32 years of experience with the BLM in botany, plant ecology, native plant restoration and rare plant management and her current position is as the BLM Idaho State Botanist.
Paul Makela	GRSG, ACEC, Special Status Species, and Fish and Wildlife	Paul has a Bachelor of Science in Natural Resources (Wildlife Management Option) from the University of Michigan and a Master of Science degree in Wildlife Biology from the University of Montana. He has over 35 years of experience with the BLM and USFS. Most of his career has involved wildlife and habitat conservation in sagebrush ecosystems. He currently serves as lead for the BLM Idaho Wildlife Habitat Management program.
Christa Braun	Geospatial Analyst	Christa has a Bachelor of Science in Wildlife Biology from Washington State University and Master of Public Administration from Boise State University. Christa has 22 years of experience working with the Bureau of Land Management as a GIS Specialist supporting multiple disciplines including botany, wildlife, planning, lands & realty, fire & fuels and recreation.
Donald Major	ACEC	Don has a Master's Degree in Wildlife Biology from Wahington State University and a PhD in Wildlife Ecology from Utah State University. He has 20 years of professional experience (USGS and BLM) working in wildlife/fire/landscape ecology in sagebrush ecosystems.

Name	Role/Responsibility	Qualifications
Robin Fehlau	Lands with Wilderness Characteristics and Recreation	Robin has a Bachelor of Science in Physical Geography from the University of California at Davis and a Master's Degree in Outdoor Recreation from the University of Utah. Robin 31 years of experience working for the BLM, including the last 25 years as the Recreation and National Conservation Lands Lead at the BLM Idaho State Office.
Melissa Davis	Lands and Realty and Renewable Energy	Melissa has a Bachelor of Science in Business Information Systems from the University of Phoenix. She has 23 years of experience with federal agencies in lands adjudication, lands and realty, project management, and as a Field Manager. She currently serves the BLM Idaho State office as Supervisory Realty Specialist.
Devin McLemore	Locatable Minerals	Devin has a Bachelor of Science in Geology from Southern Utah University and a Professional Master's Degree in Geosciences from the University of Northern Colorado. She has over 6 years with the BLM. She detailed as the Idaho State Office Locatable Minerals Program lead. Her permanent position is in the Utah Richfield Field Office as a geologist.

Table 5-6. Montana/Dakotas Preparers

Name	Role/Responsibility	Qualifications
	BLM	
David Wood	Planning Coordinator, GRSG, ACECs	David has Bachelor of Science and Masters Degrees from University in Arizona in Fish and Wildlife Management and a PhD in Ecology and Environmental Sciences from Montana State University. He has 16 years of professional experience working in landscape ecology, natural resource management, and sagebrush systems for the BLM and USGS.
Dan Brunkhorst	Planning and NEPA Coordination, ACECs	Dan has a Bachelor of Science in Resource Conservation from the University of Montana. He has over 25 Years professional experience working in wildlife, vegetation, fisheries, recreation, range and planning with Montana/Dakotas BLM, US Forest Service and the State of Montana.
Jess McDermott	Geospatial Analyst and Fish and Wildlife	Jess has a Bachelor of Arts and a Master of Science degree in Environmental Science from Clark University. She has six years of experience with the BLM working in GIS and natural resource management.

With Review and Program Support from the Following:

Name	Role/Responsibility	Qualifications
Mark Peterson	Air	Montana/Dakotas Program Leads, Blue Sky Zone and/or Senior Specialists for assigned areas of responsibility
Josh Buckmaster	Soil	
James Johnson	Water	
Wendy Velmen	Vegetation	
Chris Boone	Special Status Species and Fish and Wildlife	
Amy Waring	Wild Horses and Burros, Planning and Coordination	
Zane Fulbright	Cultural Resources	
Karly DeMars	Wildland Fire Management	
Jamie Tompkins	Lands with Wilderness Characteristics and National Trails	
Reyer Rens	Livestock Grazing	
Whitney Patterson	Recreation	
Brad Colin	Travel	
Cindy Eide	Lands and Realty and Renewable Energy	
John Zeise	Mineral Resources	
Tessa Wallace	Mineral Resources	
Joel Hartmann	Mineral Resources	
Dorothy VanOss	Mineral Resources	
Amy Stillings	Socioeconomics and Environmental Justice	
Marcia Pablo	Tribal Interests	

Table 5-7. Nevada Preparers

Name	Role/Responsibility	Qualifications
	BLM	
Carolyn Sherve	Planning & Environmental Specialist, ACECs	Carolyn has a Bachelor of Arts degree in German from the University of Montana and a Master of Arts degree from the University of Nevada, Reno in Anthropology with an emphasis in Archaeology. She has fifteen years of experience in cultural resource management and sixteen years of experience working on BLM NEPA and land use planning projects.
Tim Bowden	Greater Sage-Grouse Program Lead, Wildlife Biologist	Tim has a Bachelor of Science degree from Cal Poly Humboldt and a Master of Biological Science from Montana State University, with an emphasis in Quantitative Ecology. He has 20 years of experience as a wildlife biologist within the Department of Interior (NPS, USFWS, and BLM). He is the BLM Nevada State Office sage-grouse biologist.

Name	Role/Responsibility	Qualifications
Jamie Lange	Geospatial Analyst	Jamie has a Bachelor of Science degree in Animal Ecology from Iowa State University and a Master of Science in Environmental Science from the University of Illinois, with a GIS certificate. She has 7 years of experience as a GIS Specialist with the BLM Nevada State Office.
Alan Shepherd	Deputy State Director, Resources, Lands, and Planning	Alan has Bachelor of Science degrees in Range Management and Wildlife Management from the University of Idaho. He has over 34 years of professional experience working in wildlife, vegetation, range, wild horses and burros, restoration, and planning with Nevada and Wyoming BLM as well as BLM Headquarters.
Brock Uhlig	Wildland Fire Management	Brock has 27 years of experience in fire and fuels management in Nevada. He has an A.S. from Great Basin College in Elko and years of practical rangeland management experience being raised on a small ranch in northeastern Nevada.
Tyson Gripp	Wildland Fire Management	Tyson has a Bachelor of Science degree in Rangeland Management from Oregon State University. He has 22 years of experience in range, post fire rehabilitation, and fuels management in Nevada.
Dylan Rader	Wildland Fire Management	Dylan has a Bachelor of Science degree in Education and Fire Ecology from the University of Nevada. He has 28 years of experience in fire and fuels management in Nevada.

Table 5-8. Oregon Preparers

Name	Role/Responsibility	Qualifications
	BLM	
Jim Regan-Vienop	Planning Coordinator, Wildland Fire Management, Research Natural Areas	Jim has a Bachelor of Art's degrees in biology from Humboldt State University, California and a Master of Science degree in Regional and Community Planning from the University of Texas, Austin. He has more than 30 years of planning and project management experience in many different locations and levels of government, including eight years as a Planning & Environmental Coordinator at the Oregon/Washington BLM State Office in the Branch of Planning, Monitoring, Social Sciences.

Name	Role/Responsibility	Qualifications
Angel Dawson	Planning and Environmental Coordinator	Angel has a bachelor's degree from Reed College and a master's degree from the University of Oregon both in anthropology. She has 35 years of federal land management experience (BLM and USFS) including 20 years as a natural resource advisor and seven years as a cultural and Tribal program specialist.
Mike Brown	Air, Soil, and Water	Mike has Master of Science degree in Geology, a graduate degree Geography, a Bachelor of Science in Geology and a Bachelor of Science in Natural Resources and Environmental Sciences from Kansas State University. Mike has 20 years of federal land management experience (BLM, USFS, and NPS) which includes experience in land management planning and implementation for water resources and soils related actions, and fire, fuels and emergency management.
Stacy Johnson	Vegetation	Stacy has a Bachelor of Science degree in Botany from Northern Arizona University. She has 19 years of experience as a Botanist spanning several western states and ecoregions. She is a coauthor of the Service First publication "Rare Plants of Southwestern Oregon" (2018). She is the Invasive Species Program lead for Oregon Washington BLM State Office Branch of Biological Resources.
Sarah Canham	Vegetation and ACECs	Sarah has a Bachelor of Science degree in Ethnobotany from the University of Massachusetts, Amherst and a Master of Forest Science degree from the School of Forestry & Environmental Studies at Yale University. She has over 17 years of Federal employment in botanical resources, across four states, with the NPS, USFWS, USFS, and 13 years with the BLM Oregon. Sarah is the Plant Conservation & Restoration Program Lead for Oregon/Washington BLM.
Glenn Frederick	GRSG and Fish and Wildlife	Glenn has a Master of Science degree in wildlife management from Humboldt State University. He has 30 years of experience as a wildlife biologist, including 11 years as the BLM ORWA Wildlife Program Lead and greater sage-grouse Biologist.

Name	Role/Responsibility	Qualifications
Rob Huff	Special Status Species	Rob has a bachelor's degree in Ecology and Evolutionary Biology from Northwestern University in Evanston IL. Rob has 36 years of federal experience with USFS and the BLM as a wildlife biologist and general biologist, and currently serves as the Conservation Planning Coordinator in the Interagency Sensitive and Special Status Species Program for BLM Oregon/Washington and Region 6 of the Forest Service.
Kelli Van Norman	Planning Coordinator and Sage-Grouse Coordinator	Kelli has a Bachelor of Science degree in Geography with a minor in Biology from University of Oregon and a Master of Science degree in Forest Science from Oregon State University with an emphasis on landscape ecology disturbance. She has 25 years federal land management experience (BLM and USFS) including 18 years working on PNW Sensitive Species.
Emily Lent	Wild Horses and Burros	Emily has a Bachelor of Science in Rangeland Management & Natural Resources from the University of Arizona. 17 years of experience in BLM Rangeland & Natural Resource Management. She currently works as a Rangeland Management Specialist in the Oregon/Washington State Office Branch of Biological Resources.
Heather Ulrich	Cultural Resources	Heather received her bachelors degree in Anthropology in 2001 from the University of Oregon and then her Masters in Anthropology with a focus on Archaeology in 2009. She has worked permanently for the BLM in Oregon since 2009 first as a District Archaeology, then as the OR/WA Cultural and Paleontological Program Lead. She is currently the OR/WA Tribal Liaison.
David Lachapelle	Wildland Fire Management	David is the Deputy Fire Management Officer (Fuels) for Vale BLM. He has 34 years in fire and fuels management with the Payette National Forest and Vale BLM. He was educated at Oregon State University, University of Idaho, Colorado State University, and Treasure Valley Community College.
Lauren Pidot	Lands with Wilderness Characteristics	Lauren has 15 years of experience with the BLM, primarily focused on NEPA and planning and national conservation lands. She has a BA in Government from Wesleyan University and an MS in Environmental Policy and Planning from the University of Michigan.

Name	Role/Responsibility	Qualifications
Rebecca Carter	Livestock Grazing	Rebecca has a Bachelor of Science degree in Earth Sciences with emphasis in range management and ecology from Montana State University. She has 20 years' experience with the government and has worked in the fields of cartography, forestry and rangeland management. She is the OR/WA Rangeland Management program lead and OR/WA Emergency Stabilization and Burned Area Rehab (ES&R) program lead.
Dan Davis	Recreation	Dan has a Bachelor of Science degree in sociology from Linfield University, and a Master of Business Administration, with a concentration in Environmental Compliance and Sustainability from Southern New Hampshire University. He has eight years as an Outdoor Recreation Planner.
Chris Knauf	Travel and National Trails	Chris has a Bachelor of Science degree in biology and environmental science from Evergreen State College in Olympia. Chris has worked for the BLM as a Biologist, Natural Resource Specialist, and Project Manager for 6 years, and an Outdoor Recreation Planner for 18 years.
Trisha Skerjanec	Lands and Realty and Renewable Energy	Trisha has an Associates Degree in Paralegal Studies. She has spent 27 years working from the Vale District Office. She is a Realty Specialist for the Oregon State Office.
Greta Krost	Mineral Resources	Greta has a Bachelor of Science in geology from Portland State University. Greta has 18 years of experience in managing and administering the federal mineral estate. Greta worked for the USFS for 7 years and has currently worked for the BLM for 11 years. Greta is a State Registered Geologist with the State of Oregon.

Name	Role/Responsibility	Qualifications
Stewart Allen	Socioeconomics and Environmental Justice	Stewart has been the Zoned Socioeconomic Specialist (California, Oregon/Washington and Alaska), in the Oregon State Office, Branch of Planning, Monitoring, and Social Science, since 2013. He has dual B.A.s in Psychology and Mass Communications from the University of Utah, an M.A. in Psychology from Claremont Graduate School, and a Ph.D. in Forestry from the University of Montana. He has 43 years of experience in social science aspects of natural resource management, including 29 years as a federal employee with the Tennessee Valley Authority, USFS, USFWS, NOAA Fisheries, and the BLM.
Paul Whitman	Planning and Environmental Coordinator, Lakeview District	Paul has a BA in Biology, Illinois Wesleyan University; MS in Zoology, Southern Illinois University - Carbondale
Jerome (Ted) Benson	Natural Resource Specialist (weeds)- Baker City Field Office	Ted Benson has a Masters of Science in forestry from Stephen F. Austin State University. He has served on Forestry, Weeds, Recreation, and Water Quality Interdisciplinary Teams over a 25 year career with the BLM.
Jonah Blustain	Field Manager - Malheur Field Office	Jonah has a Bachelor of Arts degree from Boston University in Anthropology and Archaeology and a Master of Arts in Anthropology from the University of Nevada, Reno. He has 16 years of natural and cultural resource management experience in the consulting industry and the BLM.
Caryn L. Burri	Planning and Environmental Specialist	Caryn has a Bachelor of Science in Natural Resource Management with 16 years in government service and 3 years as a Planning & Environmental Coordinator/Project Manager with the BLM.
Annie Franks	Forestry Technician- Baker City Field Office	Annie has a Bachelor of Science in Exercise Science and a Masters of Science in Exercise Science from Central Washington University and a non-degree seeking credits in Forestry through Oregon State University. She has worked for the BLM for 16 years, all in the Forestry discipline and is a Certified Cruiser/Appraiser and Certified Check Scaler, through the BLM.
Susan Fritts	Natural Resource Specialist- Malheur Field Office	Susan has a Bachelor of Science degree in biology with a botany emphasis and a minor in ecology from Washington State University. She has 25 years of experience as a botanist working for both the USFS and the BLM.

Name	Role/Responsibility	Qualifications
Michele McDaniel	Supervisory Rangeland Management Specialist- Malheur Field Office	Michele has a Bachelors of Science Degree in Natural Resource Management from the University of Nevada Reno, College of Agriculture, Biotechnology, & Natural Resources. She has over 20 years of experience with the BLM in natural resource management and planning.
Megan McGuire	Wildlife Biologist- Malheur Field Office	Megan McGuire has a Bachelor of Science in Biology from Colorado Mesa University and 20 years experience in wildlife biology.
Shelli Pence	Land Law Examiner- Baker Field Office	Shelli Pence is the Land Law Examiner for the Baker Field Office and is currently working as the Realty Specialist for the Malheur Field and Baker Field Office, and the Vale District. Shelli has worked for the Vale District of the BLM since 2010 and for the federal government since 1998. She is a fully qualified Land Law Examiner with extensive administrative experience.
Amber M. Pike	Geologist	Amber has a Bachelor of Science in Geology from University of South Alabama and Master of Science in Geology/Geochemistry from Northern Illinois University. She has eight years as a Geologist with two years in private industry and six years with the federal government. with the federal government.
Kari A. Points	Outdoor Recreation Planner-Jordan Field Office	Kari has Bachelor of Science degree in Environmental Science from University of Kansas and a Master of Arts degree in Environmental Science from University of Idaho. She is an American Institute of Certified Planners (AICP #018426, July 2003). She has 29 years of experience as NEPA project manager and 14 years at the Vale BLM as an Outdoor Recreation Planner.
John G. Quintela	Fishery Biologist- Baker City Field Office	John has a Bachelor of Science degree in Environmental Science from Lubbock Christian University and a Master of Science degree in Fishery Resources from the University of Idaho. He has 23 years of experience as a fisheries biologist; seven years with the Forest Service in Idaho, Montana, and Oregon; and has served as the Fisheries Biologist for the BLM Vale District Baker Field Office for the last 16 years.

Name	Role/Responsibility	Qualifications
John A. Rademacher	Supervisory Natural Resource Specialist- Baker City Field Office	John has a Bachelor of Science from the University of Idaho in Range Management and Ecology and a Master of Science in Ecology from the University of Toledo. He has co-authored three peer reviewed manuscripts and a master's thesis on subjects related to carbon storage/allocation and habitat fragmentation. He has worked in range management for 22 years and has been a supervisor for 18 years.
Sarah Sherman	Acting Field Manager- Baker Field Office	Sarah has a Bachelor of Science in environmental science and a Bachelor of Arts in English from the University of Virginia. She has two years of experience as a NEPA planner and five years in BLM Resources and Planning.
Lynne F. Silva	Range Technician-Malheur Field Office	Lynne has worked for the BLM for 32 years, including 30 years in the Weed Program/Invasive Species. She holds DOI/BLM Pesticide Applicator's Certification in 5 categories (Ag Plant Pests, Aquatic Pests, Forest Pests, Rights of Way Pests and Research and Development), and an Oregon Department of Agriculture Public Applicator's License in Agriculture Plant Pests.
Daniel J. Thomas	Range Technician-Malheur Field Office	Daniel has 20 years at the Vale District BLM working in the Range and National Conservation Lands System programs.
Brian T. Woolf	Outdoor Recreation Planner- Baker City Field Office	Brian has a Bachelor of Science Degree in Recreation Resource Management from Oregon State University with an emphasis in Adventure Tourism. Brian spent six years as a primary firefighter before pursuing more experience in Recreation Management. He has worked for the BLM since 2007 as Lead Interpretive Specialist at Garnet Ghost Town, Work Leader for the Upper Missouri River Breaks, Interpretive Center Director at the Upper Missouri River Breaks, and two detailed assignments as Supervisory Recreation Planner and Interpretive Center Manager with cumulatively, 17 years in BLM Recreation Resource Management.
Melissa N. Yzquierdo Primus	Natural Resource Specialist- Baker City Field Office	Melissa has a Bachelor of Science in Wildlife Resources from the University of Idaho with 23 years with the BLM in resources for wildlife and botany.

Table 5-9. Utah Preparers

Name	Role/Responsibility	Qualifications
	BLM	
Tia Arbogast	Planning Coordinator, GRSG, and ACECs	Tia has a Bachelor of Arts degree in Environmental Studies from University of North Carolina at Greensboro and a Master in Natural Resources – Policy and Administration from North Carolina State University. She has 8 years of experience as a NEPA practitioner.
Christine Fletcher	Planning Coordinator and GRSG	Christine has a Bachelor of Science from the University of Wyoming in Wildlife Biology & Management with a minor in Botany. She has worked for three federal agencies and has 24 years of experience in wildlife management, GRSG, and NEPA.
Ben Gaddis	Planning Coordinator	Ben has Bachelor of Science degrees in environmental science from Willamette University and a Master of Environmental Management in watershed management from Duke University. He has 17 years of experience as a NEPA practitioner.
Erik Vernon	Air	Erik has a Bachelor of Science and a Master of Science from the University of Utah in Meteorology. He has over 21 years of experience in the fields of boundary layer meteorology, atmospheric dispersion, climate, air quality, and noise.
Jared Dalebout	Soil and Water	Jared has a Bachelor of Science degree in Geology at Weber State University 16 years federal experience with the BLM.
Jason Burgess Conforti	Vegetation	Jason has a PhD from the University of Arkansas in Environmental Dynamics with a focus on soil science and hydrology. He has worked for NRCS and the BLM and has experience in assessing management effects on ecological health.
Adrienne Pilmanis	Vegetation	Adrienne has a B.A. in Biology, a M.S. in Botany (Paleoecology) and a PhD (ABD) in Botany (Biogeochemistry) with research projects focused on global change impacts in arid ecosystems. She has 19 years working for BLM Natural Resources in several states and leads the Colorado Plateau Native Plant Program.
Aaron Roe	Vegetation and Special Status Species	Aaron has a Master of Science in Botany from the University of Wyoming. He has worked fourteen years of experience with the BLM in botany; special status species management, including Endangered Species Act implementation; and NEPA.

Name	Role/Responsibility	Qualifications
Cassie Mellon	Vegetation, Special Status Species, and Fish and Wildlife	Cassie has a Master of Science in Fisheries from the University of Alaska Fairbanks. She has fifteen years of experience with state and federal agencies in sensitive aquatic species and aquatic habitat management.
Josh Robbins	Vegetation	Josh has a Bachelor of Science from the University of Nevada, Reno, in Animal Science, with a minor in Rangeland Management. He has work for the BLM for 16 years, participating in many resource management disciplines; including, rangeland management, wildlife, fisheries, fire, and ES&R.
Jared Reese	GRSG	Jared has a Bachelor of Science in Wildlife Science from Utah State University. He has over 15 years of BLM experience ranging from grazing, oil and gas development and wildlife management. He has solely been focused on sage-grouse management for the BLM since 2016.
Dave Cook	Special Status Species and Fish and Wildlife	Dave has a Bachelor of Science in Wildlife Biology from the University of Idaho. He has 35 years of wildlife management experience with 17 years with Utah DNR, 5 years with Texas Parks and Wildlife and 13 Years with the BLM.
Victor (Gus) Warr	Wild Horses and Burros	Gus has a Bachelor of Science degree from Utah State University. He has 35 years of experience in wild horse and burro management with the BLM.
Nate Thomas	Cultural Resources & Tribal Interests	Nate has a Bachelor of Science from Utah State University in Anthropology, and a Master's degree in Archaeology and Ancient History from the University of Leicester. He has worked for federal agencies, including the BLM and USFS in Nevada and Utah since 2000.
Nicole Lohman	Cultural Resources	Nicole has a Masters in Applied Anthropology with a focus in Archaeology. She serves as the Assistant State Archaeologist for BLM Utah, with over 13 years of service as an archaeologist for the federal government with both the National Park Service and the BLM.
Geoffrey Wallin	Wildland Fire Management	Geoff studied Environmental Science at Utah State University. He has worked federally (BLM and USFS) in fire suppression fuels management for the last 28 years in Nevada, Montana, Oregon, and Utah. He is currently BLM Utah's Fuels Program Lead.

Name	Role/Responsibility	Qualifications
Mark Williams	Wildland Fire Management	Mark has a PhD in Fire Ecology and has worked for two federal agencies in multiple states across the western US. He has more than 20 years of experience with NEPA related to Hazardous Fuels and Fire Management.
Ray Kelsey	Lands with Wilderness Characteristics	Ray has a Master of Science in Parks, Recreation, and Tourism with a Natural Resources Management emphasis from the University of Utah. He previously worked in the field for 15 years as a BLM Outdoor Recreation Planner before joining the staff at the Utah State Office as the National Conservation Lands Program Lead in 2019.
Alan Bass	Livestock Grazing	Alan has a Bachelor of Science in Botany from Weber State University and a Bachelor of Science in Rangeland Resources from Utah State University. Alan has over 17 years of experience in the Rangeland Management Program.
Josh Robbins	Livestock Grazing	Josh has a Bachelor of Science in Animals Sciences with a minor in Rangeland Management from the University of Nevada, Reno. He has over 16 years of BLM experience in the Rangeland Management Program.
Michelle Campeau	Lands and Realty and Renewable Energy	Michelle has over 18 years of service with the BLM primarily in Land and Realty processing Land Use Authorizations in Southern Utah. Michelle currently serves as the BLM's Renewable Energy Program Coordinator for Colorado, New Mexico, Utah and Wyoming.
Mary Higgins	Lands and Realty and Renewable Energy	Mary has over 30 years' experience working in BLM, Utah, in the Cadastral Survey and Oil and Gas Programs, including 14 years in the Lands and Realty Program working on all types of rights-of-way projects.
Terry Snyder	Mineral Resources	Terry has a B.A. in Geology and a Professional Geologist license from the State of Utah. She has over 40 years of BLM experience as a field office, district office and a state office geologist and currently serves as the Utah Solid Minerals Branch Chief. In these positions she created with the assistance of contractors a technical guidance entitled "Verification of Risk at Abandoned Mine site on BLM Management Lands in Utah."

Name	Role/Responsibility	Qualifications
Nathan Packer	Mineral Resources	Nate has a Bachelor of Science in Fisheries and Wildlife and a Master of Natural Resources from Utah State University. He has 24 years of experience with the BLM in Wildlife, Hazardous fuels, Fluid Minerals, and NEPA Planning. He currently works on Oil, Gas, and Geothermal leasing.
Rob Sweeten	National Trails	Rob has a Bachelor of Landscape Architecture and Environmental Planning from Utah State University. He has 31 years of experience as an employee of the BLM. He has served as a District and State Landscape Architect and for 13 years and the BLM Administrator for the Old Spanish National Historic Trail.
Matt Fockler	Socioeconomics and Environmental Justice	Matt has two Bachelor of Arts degrees in history and English from the University of Nevada, Reno, a Master of Science in Geography from the University of Nevada, Reno, a M.A. in Education from Sierra Nevada College, and a PhD in Earth Sciences (Geography and Natural Resource Management) from Montana State University. He has two years of experience as the BLM's Great Basin Zone Socioeconomic Specialist (ID, NV, UT).
Amber Koski	Planning & Environmental Specialist	Amber has a Bachelor of Arts in Anthropology (archaeology emphasis) and a M.S in Environmental Policy and Management. She has 20 years of federal service and currently serves as a Utah project manager in the West Desert District Office.

Table 5-10. Wyoming Preparers

Name	Role/Responsibility	Qualifications
	BLM	
James Halperin	Planning Coordinator and Soil	Jamie has a Bachelor of Arts in Political Science, an AAS in Geographic Information Systems, and Master of Science and PhD degrees in forestry. He has 20 years of environmental planning and project implementation experience.
Matt Holloran	Planning Coordinator, GRSG, and ACECs	Matt has a BS in biology from Colorado College, and an MS and PhD in zoology and physiology from the University of Wyoming. He has 24 years of sagebrush-dependent wildlife management and environmental planning experience.

Name	Role/Responsibility	Qualifications
Tia Flippin	Geospatial Analyst	Tia has a Bachelor of Science degree in Environmental Biology from Fort Lewis College and a Masters of Science degree in Geographic Informational Science and Technology from the University of Southern California. She has 10 years experience in geospatial data generation, standardization and management.

With Review and Program Support from the Following:

Name	Role/Responsibility	Qualifications
Ryan McCommon	Air	Wyoming BLM Program Leads and/or Senior Specialists for assigned areas of responsibility
Chad Mickschl	Water	
Kim Wahl	Vegetation	
Mark Goertel	Vegetation and Livestock Grazing	
Chris Keefe	Special Status Species and Wildlife	
June Wendlandt	Wild Horses and Burros	
Georges (Buck) Damone	Cultural Resources and Tribal Interests	
Reed Oldenburg	Wildland Fire Management	
Gwenan Poirier	Wildland Fire Management	
Katy Kuhnel	Lands with Wilderness Characteristics, Travel, and National Trails	
Travis Bargsten	Lands and Realty and Renewable Energy	
Kurt Triscori	Mineral Resources	
George Varhalmi	Mineral Resources	
Allen Stegeman	Mineral Resources	
Karsyn Lamb	Socioeconomics and Environmental Justice	
Susan Hunter Norman	Geospatial Analyst	

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Glossary

Acquisition. Acquisition of lands can be pursued to facilitate various resource management objectives. Acquisitions, including easements, can be completed through exchange, Land and Water Conservation Fund purchases, donations, or receipts from the Federal Land Transaction Facilitation Act sales or exchanges.

Adaptive management. A type of natural resource management in which decisions are made as part of an ongoing science-based process. Adaptive management involves testing, monitoring, and evaluating applied strategies, and incorporating new knowledge into management approaches that are based on scientific findings and the needs of society. Results are used to modify management policy, strategies, and practices.

Adjacent (rights-of-way). Installation of authorized improvements parallel, near, or next to existing authorized rights-of-way.

Allocation. The identification in a land use plan of the activities and foreseeable development that are allowed, restricted, or excluded for all or part of the planning area, based on desired future conditions.

Amendment. The process for considering or making changes in the terms, conditions, and decisions of approved Resource Management Plans or management framework plans. Usually only one or two issues are considered that involve only a portion of the planning area.

Area of Critical Environmental Concern (ACEC). 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 identification of a potential ACEC shall not, of itself, change or prevent change of the management or use of public lands.

Artifact. A human-modified object, often appearing on an archaeological site, that typically dates to over 50 years in age.

Authorized Officer. Any employee of the BLM to whom authority has been delegated to perform the duties described.

Avoidance/avoidance area. These terms usually address mitigation of some activity (i.e., resource use). Paraphrasing the CEQ Regulations (40 CFR 1508.20), avoidance means to circumvent, or bypass, an impact altogether by not taking a certain action, or parts of an action. Therefore, the term "avoidance" does not necessarily prohibit a proposed activity, but it may require the relocation of an action, or the total redesign of an action to eliminate any potential impacts resulting from it. Also see *"right-of-way avoidance area"* definition.

Best management practices (BMPs). A suite of techniques that guide or may be applied to management actions to aid in achieving desired outcomes. BMPs are often developed in conjunction with land use plans, but they are not considered a planning decision unless the plans specify that they are mandatory.

Biologically significant unit (BSU). A geographical/spatial area that includes Greater Sage-Grouse priority habitat management areas that is used as the basis for comparative calculations to support evaluation of changes to habitat. In Utah, each BSU correlates to the priority habitat management area within a population area.

Co-location (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.

Co-location (electrical lines). Installation of new rights-of-way adjacent to current ROWs boundaries, not necessarily placed on the same power poles.

Co-location (other rights-of-way (ROW). Installing new authorized ROWs within or on the existing footprint of an approved ROW boundary.

Communication site. Sites that include broadcast types of uses (e.g., television, AM/FM radio, cable television, broadcast, translator) and non-broadcast uses (e.g., commercial or private mobile radio service, cellular telephone, microwave, local exchange network, passive reflector).

Controlled surface use (CSU). CSU is a category of moderate constraint stipulations that allows some use and occupancy of public land while protecting identified resources or values and is applicable to fluid mineral leasing and all activities associated with fluid mineral leasing (e.g., truck-mounted drilling and geophysical exploration equipment off designated routes, construction of wells and/or pads). On BLM-administered lands, CSU areas are open to fluid mineral leasing but the stipulation allows the BLM to require special operational constraints, or the activity can be shifted more than 200 meters (656 feet) to protect the specified resource or value.

Cultural resources. The present expressions of human culture and the physical remains of past activities, such as historic buildings, structures, objects, districts, landscapes, and archaeological sites. These resources can be significant in the context of national, regional, or local history, architecture, archaeology, engineering, or culture. They may also include sacred sites and natural features of landscapes that are significant to living communities.

Cultural resource inventories. Both a systematic review of records, files, and archived databases and a survey to determine the past human use of an area.

Cumulative Impact (Effect). The impact on the environment that results from the incremental impact of the action when added to other past, present, or reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

De-watering. The process of removing surface and ground water from a particular location.

Designated Roads and Trails. Those roads and trails that are specifically identified by the BLM as the only allowable routes for motor vehicle travel in the specific area involved. Travel on designated roads and trails may be allowed seasonally or yearlong. Additional roads or trails may be constructed and authorized for travel as need dictates in conformance with the land use plan or activity plan.

Disposal lands. Transfer of public land out of federal ownership to another party through sale, exchange, Recreation and Public Purposes Act of 1926, Desert Land Entry or other land law statutes.

Disturbance response groups. A process that examines local knowledge, soil mapping data and published literature on soils, plant ecology, plant response to various disturbances, disturbance history of the area, and any other important attributes necessary to sort pre-existing ecological sites into groups of ecological sites based on their responses to natural or human-induced disturbances.

Easement. A right afforded a person or agency to make limited use of another's real property for access or other purposes.

Ecological site. A distinctive kind of land with specific characteristics that differs from other kinds of land in its ability to produce a distinctive kind and amount of vegetation.

Ecological site description. A report that provides detailed information about an ecological site.

Erosion. The wearing away of the land surface by running water, wind, ice, or other geological agents.

Ethnographic resources. Variations of natural resources and standard cultural resource types. They are subsistence and ceremonial locales and sites, structures, objects, and rural and urban landscapes assigned cultural significance by traditional users.

Exchange. A transaction whereby the federal government receives land or interests in land in exchange for other land or interests in land.

Exclusion areas. An area on the public lands where a certain activity(ies) is prohibited to ensure protection of other resource values present on the site. The term is frequently used in reference to lands/realty actions and proposals (e.g., rights-of-way, etc.), but is not unique to lands and realty program activities. This restriction is functionally analogous to the phrase "no surface occupancy" used by the oil and gas program and is applied as an absolute condition to those affected activities. These less restrictive term is avoidance area. Also see "right-of-way exclusion area" definition.

Existing habitat. Habitat that currently supports greater sage-grouse, even if not currently occupied. This can include seasonal habitats, such as wintering, nesting and brood-rearing**.**

Exploration. Active drilling, geophysical operations, surface sampling and trenching, or smallscale mining or similar activities, to: a. Determine the presence of the mineral resource; or b. Determine the extent of the reservoir or mineral deposit.

Feature. In reference to archaeology, a feature is a collection of one or more contexts representing some non-portable activity, such as a hearth or wall.

Federal mineral estate. Subsurface mineral estate owned by the US and administered by the BLM. Federal mineral estate under BLM jurisdiction is composed of mineral estate underlying BLM lands, tribal lands, privately owned lands, and state-owned lands.

Federal mineral interest. See Federal mineral estate.

Fluid minerals. Oil, gas, coal bed natural gas, and geothermal resources.

Fully Processed Grazing Authorization. A grazing permit or lease that has been issued in accordance with all applicable laws, regulation, and policy including the NEPA, Endangered Species Act (ESA), and decision processes provided in 43 CFR 4160.

General Habitat Management Areas (GHMA). Lands that are, or have the potential to become, occupied seasonal or year-round habitat outside of PHMA, managed to sustain GRSG populations. These areas are defined differentially by state wildlife management agencies, but generally are of poorer GRSG habitat quality with reduced occupancy when compared to PHMA. Some state wildlife agencies have identified areas of GHMA as important for restoration, connectivity, or seasonal habitats. The objective intent for GHMA is to maintain habitat conditions to support GRSG populations consistent with the state agency designations of recovery, connectivity, or seasonal habitats.

Geophysical exploration. Efforts to locate or better define mineral or oil and gas deposits, using geophysical methods such as seismic refraction, electrical resistivity, induced magnetism, or other methods.

Geothermal energy. Natural heat from within the Earth captured for production of electric power, space heating, or industrial steam.

GRSG nesting habitat. Areas with protective grass and high lateral shrub cover where hens nest, typically under sagebrush shrubs.

GRSG early brood-rearing habitat. Upland sagebrush sites relatively close to nest sites, typically characterized by high species richness with an abundance of forb sand insects, where sage-grouse hens raise young chicks (<21 days).

GRSG winter habitat. Sagebrush habitats that provide access to sagebrush above the snow for all food and cover requisite needs.

Habitat. Areas that currently provide GRSG resources (such as space, food, cover, and water) and environmental conditions (such as temperature, precipitation, presence or absence of predators and competitors) that promote occupancy of sage-grouse during a particular stage of its annual life cycle (e.g., breeding, nesting) and allows for them to survive and reproduce.

Habitat Assessment Framework. The Habitat Assessment Framework (HAF) is a tool to measure the suitability of GRSG habitat at multiple scales.

> **<u>Mid-scale HAF areas</u>**. Areas 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 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.
>
> **<u>Fine-scale HAF areas</u>**. Fine-scale HAF delineations generally describe the extent of all seasonal use areas used by local populations. Fine-scale areas include suitable habitats within home range areas that have contiguous mosaics of sagebrush shrublands or grassland/sagebrush connecting seasonal use areas.

Indicators. Factors that describe resource condition and change and can help the BLM determine trends over time.

Intact landscape. Landscapes with healthy sagebrush ecosystems that have not been disrupted by anthropogenic activities or catastrophic natural events, including invasion by non-native grasses and associated wildfires.

Invasive Species (Invasive Plant Species, Invasives). An alien species whose introduction does or is likely to cause economic or environmental harm or harm to human health. The species must cause, or be likely to cause, harm, and be exotic to the ecosystem it has infested before considered invasive.

Key areas of critical environmental concern. Special management areas that have been identified as having a high utility for GRSG conservation. These land allocations were designated in previous RMPs to protect other relevant and important resource values; however, they also contain quality GRSG habitat, are within PHMA, and contain leks. They should be priority areas for GRSG management as well as the values for which the ACEC was designated; site-specific ACEC management plans will be prepared at the implementation level.

Key research natural area. A special type of ACEC that was designated in a previous RMP to protect specific intact representative native plant communities. These areas are in PHMA and are used for long term vegetation monitoring of relatively unaltered native plant communities important for GRSG. These areas can provide baseline vegetation information on natural processes such as successional changes, and future vegetation shifts in the plant communities from changes in precipitation and temperature (climate change). Key RNAs either contain GRSG leks or are within 0.1 to 4 miles of leks and are, or likely are, used for nesting, brood-rearing, foraging, breeding or wintering.

Land tenure adjustments. Land ownership or jurisdictional changes. To improve the manageability of BLM-administered lands and their usefulness to the public, the BLM has numerous authorities for repositioning lands into a more consolidated pattern, disposing of lands, and entering into cooperative management agreements. These land pattern improvements are completed primarily through the use of land exchanges but also through land sales, through jurisdictional transfers to other agencies, and through the use of cooperative management agreements and leases.

Leasable minerals. Those minerals or materials designated as leasable under the Mineral Leasing Act of 1920. These include energy-related mineral resources such as oil, natural gas, coal, and geothermal, and some nonenergy minerals, such as phosphate, sodium, potassium, and sulfur. Geothermal resources are also leasable under the Geothermal Steam Act of 1970.

Lease. Section 302 of the Federal Land Policy and Management Act of 1976 provides the BLM's authority to issue leases for the use, occupancy, and development of public lands. Leases are issued for purposes such as a commercial filming, advertising displays, commercial or noncommercial croplands, apiaries, livestock holding or feeding areas not related to grazing permits and leases, native or introduced species harvesting, temporary or permanent facilities for commercial purposes (does not include mining claims), residential occupancy, ski resorts, construction equipment storage sites, assembly yards, oil rig stacking sites, mining claim occupancy if the residential structures are not incidental to the mining operation, and water pipelines and well pumps related to irrigation and nonirrigation facilities. The regulations establishing procedures for processing these leases and permits are found in 43 CFR 2920. (BLM)

Lease stipulation. A modification of the terms and conditions on a standard mineral lease form established at the time of the lease sale.

Lek. The BLM is adopting the Western Association of Fish and Wildlife Agencies (WAFWA) lek definitions (Cook et al., 2022).

> **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.

Active lek. A lek that has more than 2 males counted during two or more lek counts within the last 10 years.

Inactive lek. 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.

Pending Active lek. 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.

Sub-lek. A sub-lek is similar to a lek in most respects, except that its location represents an actual activity center for a specific year or series of years while a lek can represent multiple sub-leks over an extended number of years. Sub-leks are generally ≤¼ the average inter-lek distance from other sub-leks included within the same lek. In relatively static situations, there may be only one sub-lek within a lek. The sub-lek is not used to evaluate population status and long-term trends but may be used to examine breeding behavior, habitat use, or other aspects of natural history

Undetermined Lek. A location where male sage-grouse are displaying that has not been documented in multiple years and does not meet the definition of a lek. Sage-grouse may spontaneously display in an alternate location that is not maintained through time; therefore, any undetermined leks should be verified in subsequent breeding seasons.

Lessee. A person or entity authorized to use and occupy National Forest System land under a specific instrument identified as a lease. Forest special use leases are limited to authorize certain wireless communication uses. Leases are also used for certain mineral leasable activities.

Linkage and Connectivity Habitat Management Area (LCHMA). BLM-administered lands that have been identified as broader regions of connectivity important to facilitate the movement of Greater Sage-Grouse and maintain ecological processes.

Linkage Management Area. Areas that have been identified as broader regions of connectivity important to facilitate the movement of GRSG and to maintain ecological processes.

Locatable minerals. Minerals subject to exploration, development, and disposal by staking mining claims as authorized by the Mining Law of 1872, as amended. This includes deposits of gold, silver, and other uncommon minerals not subject to lease or sale (17 Stat. 19-96).

Major Rights of Way. (Refer to definition in Rights of Way)

Mineral. Any naturally formed inorganic material, solid or fluid inorganic substance that can be extracted from the earth, any of various naturally occurring homogeneous substances (as stone, coal, salt, sulfur, sand, petroleum, water, or natural gas) obtained usually from the ground. Under federal laws, considered as locatable (subject to the general mining laws), leasable (subject to the Mineral Leasing Act of 1920), and saleable (subject to the Materials Act of 1947).

Mineral entry. The filing of a claim on public land to obtain the right to any locatable minerals it may contain.

Mineral estate. The ownership of minerals, including rights necessary for access, exploration, development, mining, ore dressing, and transportation operations.

Mining claim. A parcel of land that a miner takes and holds for mining purposes, having acquired the right of possession by complying with the Mining Law and local laws and rules. A mining claim may contain as many adjoining locations as the locator may make or buy. There are four categories of mining claims: lode, placer, millsite, and tunnel site.

Mining Law of 1872, as amended. Provides for claiming and gaining title to locatable minerals on public lands. Also referred to as the "Mining Law."

Minor Rights of Way. (Refer to definition for Rights of Way).

Mitigation. Includes specific means, measures, or practices that could reduce, avoid, or eliminate adverse impacts. Mitigation can include avoiding the impact altogether by not taking a certain action or parts of an action; minimizing the impact by limiting the degree of magnitude of the action and its implementation; rectifying the impact by repairing, rehabilitation, or restoring the affected environment; reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action; and compensating for the impact by replacing or providing substitute resources or environments.

Modification. A change to the provisions of a lease stipulation, either temporarily or for the term of the lease. Depending on the specific modification, the stipulation may or may not apply to all sites within the leasehold to which the restrictive criteria are applied.

Naturalness. Refers to whether an area looks natural to the average visitor who is not familiar with the biological composition of natural ecosystems versus human-affected ecosystems. New, nonrecreational modifications are not visually obvious or evident from trails.

National Register of Historic Places. A listing of resources that are considered significant at the national, state, or local level and that have been found to meet specific criteria of historic significance, integrity, and age.

Neighborhood Cluster. Represents a GRSG population unit and includes local aggregations of leks and seasonal habitats used by birds attending those leks based on state wildlife agency and research data.

Neighborhood Cluster Scale. Spatial scale used for population trend analyses.

No surface occupancy (NSO). A major constraint where use or occupancy of the land surface for fluid mineral exploration or development and all activities associated with fluid mineral leasing (e.g., truck-mounted drilling and geophysical exploration equipment off designated routes, construction of wells and/or pads) are prohibited to protect identified resource values. Areas identified as NSO are open to fluid mineral leasing, but surface occupancy or surface-disturbing activities associated with fluid mineral leasing cannot be conducted on the surface of the land. Access to fluid mineral deposits would require horizontal drilling from outside the boundaries of the NSO area.

Nonenergy leasable minerals. Those minerals or materials designated as leasable under the Mineral Leasing Act of 1920. Nonenergy minerals include resources such as phosphate, sodium, potassium, and sulfur.

Non-habitat. Areas within the historical distribution of GRSG that are not occupied and are not capable of supporting GRSG or necessary habitats to support GRSG, and do not have the potential to provide habitat in the foreseeable future (< 100 years). GRSG may occasionally use these areas (e.g., migration), but these areas do not provide the necessary resources to support GRSG seasonally year-round.

Potential habitat. An area that is currently unoccupied by GRSG but has the potential for occupancy in the foreseeable future (< 100 years). These areas are capable of supporting GRSG habitats based on soil types, climate, etc., and can include areas of habitat previously disturbed but that can be restored to GRSG habitats through either natural succession or human intervention.

Priority Habitat Management Areas (PHMA). Areas that have the highest value to maintaining sustainable GRSG populations and can include breeding, late brood-rearing, winter concentration areas, and migration or connectivity corridors. The BLM objective intent for these areas is to maintain and enhance habitat conditions that will support persistent and healthy GRSG populations through management to minimize habitat loss and degradation.

PHMA with limited exceptions. Areas within PHMA requiring additional protections to support conservation of GRSG populations. **Required design features (RDFs).** Means, measures, or practices intended to reduce or avoid adverse environmental impacts. A suite of features that would establish the minimum specifications for certain activities (i.e., water developments, mineral development, and fire and fuels management) and mitigate adverse impacts. These design features would be required to provide a greater level of regulatory certainty than through implementation of best management practices. In general, the design features are accepted practices that are known to be effective when implemented properly at the project level.

Remoteness. Represents how far a visitor is from a road or trail. The farther a visitor is from a road or trail, the more primitive the remoteness setting.

Renewable energy. Energy resources that constantly renew themselves or that are regarded as practically inexhaustible. These include solar, wind, geothermal, hydro, and biomass. Although particular geothermal formations can be depleted, the natural heat in the Earth is a virtually inexhaustible reserve of potential energy.

Resource Management Plan Designated Corridor. A corridor designated through a Resource Management Plan Record of Decision in compliance with Section 202 of the Federal Land Policy and Management Act (FLPMA).

Rights-of-way (ROW). Public lands authorized to be used or occupied for specific purposes pursuant to a right-of-way grant, which are in the public interest and which require ROWs over, on, under, or through such lands. ROWs may be issued for linear features (pipelines, powerlines, communication cable, roads, canals, access, etc.) or for sites (communication towers, airports, reservoirs, pumping stations, power generating facilities, etc.). For BLM GRSG Management ROWs are divided into major or minor depending on possible level of impact to GRSG (see below). For example, ROWs for buried linear features with limited to no surface disturbance are minor, but high voltage overhead transmission lines are major. Other projects may depend on the specific development plan and location, connected actions, and will require a determination by the BLM (refer to ROW management direction in Chapter 2, Table 2-2 and 2-3). For example, to use federal pore space for carbon sequestration would be minor, however, ROWs for associated and/or connected actions such as surface facilities to support carbon sequestration could be major depending on the scope of surface disturbance and infrastructure.

> **Major ROW**. Major ROW projects include transmission lines > 100kv and distribution pipelines > 24" diameter but may also include smaller electrical transmission and/or distribution lines and pipelines, as well as, other ROW projects that require large distances, density or footprints, with

high levels of activity or surface disturbance. In addition, major ROW sites may contain multiple types of above and below ground features leading to a high density of infrastructure, or many tall structures.

Minor ROW. Minor/Other ROW Projects include typical distribution, small transmission facilities, or low volume gathering features that create minimal surface disturbance. These types include but are not limited to local roads, pipelines, powerlines, and small communication sites.

Right-of-way avoidance area. An area identified through resource management planning to be avoided but may be available for ROW location with special stipulations.

Right-of-way exclusion area. An area identified through resource management planning that is not available for ROW location under any conditions.

Riparian Area. A form of wetland transition between permanently saturated wetlands and upland areas. These areas exhibit vegetation or physical characteristics reflective of permanent surface or subsurface water influence. Lands along, adjacent to, or contiguous with perennially and intermittently flowing rivers and streams, glacial potholes, and the shores of lakes and reservoirs with stable water levels are typical riparian areas (See BLM Manual 1737). Included are ephemeral streams that have vegetation dependent upon free water in the soil. All other ephemeral streams are excluded.

Runoff. The total stream discharge of water, including both surface and subsurface flow, usually expressed in acre-feet of water yield.

Sagebrush Focal Area. Areas identified by the USFWS that represent recognized "strongholds" for Greater Sage-Grouse that have been noted and referenced as having the highest densities of Greater Sage-Grouse and other criteria important for the persistence of Greater Sage-Grouse.

Spatial relationships. How one object is located in space relative to another, important for spatial analysis of cultural resources.

Split estate. This is the circumstance where the surface of a particular parcel of land is owned by a different party than the minerals underlying the surface. Split estates may have any combination of surface/subsurface owners: federal/state; federal/private; state/private; or percentage ownerships. When referring to the split estate ownership on a particular parcel of land, it is generally necessary to describe the surface/subsurface ownership pattern of the parcel.

Saleable Minerals. Minerals that may be disposed of through sales and free use permits under the Materials Act of 1947, as amended. Included are common varieties of sand, stone, gravel, and clay (See also Mineral Materials).

Season of Use. A livestock grazing permit term and condition identifying the time during which livestock graze a given area to achieve management and resource condition objectives.

Special Use Authorization. A written permit, term permit, lease, or easement that authorizes use or occupancy of National Forest System lands and specifies the terms and conditions under which the use or occupancy may occur.

Stipulation (oil and gas). A provision that modifies standard oil and gas lease terms and conditions in order to protect other resource values or land uses and is attached to and made a part of individual lease requirements at the time the lease is issued. Once a mineral lease is issued, the applied stipulations cannot generally be changed or altered. Exceptions, modifications, or waivers may be granted under certain conditions outlined in the LUP. Typical lease stipulations include No Surface Occupancy (NSO), Timing Limitations (TL), and Controlled Surface Use (CSU), and Protection of Survey Corner and Boundary Line Markers. Lease stipulations are developed through the land use planning (RMP) process.

Surface Discharge. The release of produced water onto the unconfined land surface or into an existing drainage system.

Surface Disturbing Activities. An action that alters the vegetation, surface/near surface soil resources, and/or surface geologic features, beyond natural site conditions and on a scale that affects other Public Land values. Examples of surface disturbing activities may include: operation of heavy equipment to construct well pads, roads, pits and reservoirs; installation of pipelines and power lines; and the conduct of several types of vegetation treatments (e.g., prescribed fire, etc.). Surface disturbing activities may be either authorized or prohibited (WY IB-2007-029).

Surface Management Agency (SMA). Depicts surface estate Federal land for the United States and classifies this land by its active Federal surface managing agency.

Timing limitation (TL). The TL stipulation, a moderate constraint, is applicable to fluid mineral leasing, all activities associated with fluid mineral leasing (e.g., truck-mounted drilling and geophysical exploration equipment off designated routes, construction of wells and/or pads), and other surface-disturbing activities (i.e., those not related to fluid mineral leasing). Areas identified for TL are closed to fluid mineral exploration and development, surface-disturbing activities, and intensive human activity during identified time frames. This stipulation does not apply to operation and basic maintenance activities, including associated vehicle travel, unless otherwise specified. Construction, drilling, completions, and other operations considered to be intensive in nature are not allowed. Intensive maintenance, such as workovers on wells, is not permitted. TLs can overlap spatially with NSO and CSU, as well as with areas that have no other restrictions.

Traditional cultural property (TCP). A property that is eligible for inclusion in the National Register of Historic Places (NRHP) based on its associations with the cultural practices, traditions, beliefs, lifeways, arts, crafts, or social institutions of a living community. TCPs are rooted in a traditional community's history and are important in maintaining the continuing cultural identity of the community.

Transmission line. A set of electrical current conductors, insulators, supporting structures, and associated equipment used to move large quantities of power at high voltage, usually over long distances (e.g., between a power plant and the communities that it serves).

Transmission corridor. An electric or pipeline transmission corridor is a route approved on public lands, in a BLM or other federal agency land use plan, as a location that may be suitable for the siting of electric or pipeline transmission systems.

Undisturbed habitats. Areas that are not presently directly or indirectly impacted by anthropogenic development.

Utility corridor. Tract of land varying in width forming passageway through which various commodities such as oil, gas, and electricity are transported.

Utility-scale solar. Solar projects with nameplate capacity (theoretical output registered with authorities) of 5 megawatt (MW) or higher that deliver electricity to the electricity transmission grid.

Utility-scale wind. The U.S. Department of Energy defines utility-scale wind projects as land-based and offshore projects larger than 1 megawatt (MW) (Wind Energy Technologies Office, WINDExchange, Office of Energy Efficiency & Renewable Energy, U.S. Department of Energy).

Valid existing rights. Documented, legal rights or interests in the land that allow a person or entity to use said land for a specific purpose and that are still in effect. Such rights include but are not limited to fee title ownership, mineral rights, rights-of-way, easements, permits, licenses and adjudicated RS 2477 or RS 2339. Such rights may have been reserved, acquired, leased, granted, permitted, or otherwise authorized over time.

Vandalism. An action involving deliberate destruction or damage, in this case to cultural resources.

Watershed. The area of land, bounded by a divide, that drains water, sediment, and dissolved materials to a common outlet at some point along a stream channel (Dunne and Leopold, 1978), or to a lake, reservoir, or other body of water. Also called drainage basin or catchment

West Nile Virus. A virus that is found in temperate and tropical regions of the world and most commonly transmitted by mosquitoes. West Nile virus can cause flu-like symptoms in humans and can be lethal to birds, including Greater Sage-Grouse.

Wetlands. Those areas that are inundated by surface water or groundwater with a frequency sufficient to support, and under normal circumstances do or would support, a prevalence of vegetative or aquatic life that requires saturated or seasonally saturated soil conditions for growth and reproduction. Wetlands generally include swamps, marshes, bogs, and similar areas such as sloughs, potholes, wet meadows, river overflows, mudflats, and natural ponds.

Withdrawal. Withdrawals are used to transfer jurisdiction of management of public lands to other federal agencies.

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